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Description: FIRE HALL #3: CHANGE ROOM MODIFICATIONS

LIST OF DRAWINGS

Dwg. No.	Title	Issue	Rev	Issue Date		
		NO.	No.			
ARCHITECTURAL						
A000	Drawing List, Site Location, Matrix	3	-	Dec. 13, 2024		
A001	Life Safety Floor Plan	3	-	Dec. 13, 2024		
A201	Overall Ground Floor Plan	3	-	Dec. 13, 2024		
A202	Part Ground Floor Plan Demolition Plan	3	-	Dec. 13, 2024		
A203	Part Demolition Reflected Ceiling Plan	3	I	Dec. 13, 2024		
A204	Ground Floor Plan	3	-	Dec. 13, 2024		
A205	Reflected Ceiling Plan	3	-	Dec. 13, 2024		
A601	Plan & Section Details	3	-	Dec. 13, 2024		
A701	Interior Elevations & Enlarged Plans	3	-	Dec. 13, 2024		
A801	Millwork and Miscellaneous Details	3	-	Dec. 13, 2024		
A901	Room Finish and Door Schedules	3	-	Dec. 13, 2024		
STRUCTURAL						
S100	General Notes, Key Plan and Typical Details	3	-	Dec. 13, 2024		
S201	Part Foundation Plan	3	-	Dec. 13, 2024		
S202	Part Roof Framing Plan	3	-	Dec. 13, 2024		
MECHANICAL						
M-01	Mechanical Legend, Drawing List & General Notes	4	-	Dec. 13, 2024		
M-02	HVAC Plan	4	-	Dec. 13, 2024		
M-03	Plumbing Plan	4	-	Dec. 13, 2024		
M-04	HVAC Demolition Plan	4	-	Dec. 13, 2024		
M-05	Plumbing Demolition Plan	4	_	Dec. 13, 2024		
M-06	Equipment Schedule	4	-	Dec. 13, 2024		
M-07	Mechanical Details	4	-	Dec. 13, 2024		

Project: 24103

LIST OF DRAWINGS Section 01 00 60

Description: FIRE HALL #3: CHANGE ROOM MODIFICATIONS

Dwg. No.	Title	lssue No.	Rev	Issue Date		
			No.			
ELECTRICAL						
E0-01	Electrical Legend, Notes & Drawing List	4	-	Dec. 13, 2024		
E0-02	Electrical Key Plan	4	-	Dec. 13, 2024		
E1-01	Ground Floor-Lighting Plan	4	-	Dec. 13, 2024		
E1-02	Ground Floor-Power & Communication Plan	4	-	Dec. 13, 2024		
E2-01	Panel Schedules and Details	4	-	Dec. 13, 2024		
E3-01	Ground Floor-Lighting Demolition Plan	4	-	Dec. 13, 2024		
E3-02	Ground Floor-Power & Communication Demolition Plan	4	-	Dec. 13, 2024		

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Work covered by contract documents
- .2 Owner
- .3 Location of the site
- .4 Scheduling requirements
- .5 Site access .
- .6 Work sequence
- .7 Contractor use of premises
- .8 Pre-ordered materials and equipment
- .9 Work by others
- .10 Engineer design
- .11 Designated substances: ACM and others
- .12 Building smoking environment
- .13 Special conditions
- .14 Integrated systems testing
- .15 Site security
- .16"By Others"
- .17 Protection of Drawings

1.2 <u>Work Covered by Contract Documents</u>

- .1 Work of this Contract comprises the renovations at Fire Hall #3 as indicated on the Contract Drawings and specifications.
- 1.3 <u>Owner</u>
 - .1 City of Oshawa

1.4 Place of the Work

- .1 The Work of this Contract is located at 50 Beatrice St. E., Oshawa, Ontario.
- 1.5 <u>Scheduling Requirements</u>
 - .1 Refer to Instructions to Bidders
- 1.6 <u>Metric Project</u>
 - .1 This project is to be based on The International System of Units (SI). Measurements are expressed in metric (SI) units.

.2 All dimensions are to be shown in meters and millimeters.

1.7 <u>Site Access</u>

- .1 Access to the site to be arranged by the Owner.
- .2 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work
- .3 Provide secure construction fencing as specified and where indicated.

1.8 <u>Work Sequence</u>

- .1 Construct Work continuously.
- 1.9 <u>Contractors Use of Premises</u>
 - .1 Contractor has restricted use of site until Substantial Performance.
- 1.10 Pre-ordered Materials and Equipment
- 1.11 Work by Others

1.12 Engineer Design

.1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work. Refer to Section 01 78 00.

1.13 Designated Substances: ACM and Others

- .1 The Owner shall provide any prospective constructor or contractor a copy of building ACM surveys and information on designated substances that are known or suspected of being present within the area or scope of work.
- .2 The General Contractor shall ensure that a copy of the ACM survey is provided to each contractor and subcontractor who will be working on the Project.
- .3 Any findings of undeclared ACM, or damaged ACM that could pose a risk to workers is to be brought to the attention of the Owner immediately, and work is to

be stopped.

- .4 All project design and construction activities must be carried out in compliance with the Regulations.
- .5 No asbestos-containing materials, as defined by O. Reg. 278/05, may be specified or used in any project.

1.14 Verification

- .1 All dimensions shall be verified on site, and all necessary modifications and adjustments shall be made as necessary to suit.
- 1.15 Building Smoking Environment
 - .1 Smoking and vaping are prohibited in all work places within the Owner's buildings and on the Owner's property.

1.16 Special Conditions

- .1 The following general and special conditions apply:
 - .1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.
 - .2 Wherever existing floor and wall finishes are to be removed, include full removal down to the existing substrate of all tile, base, mortars, grouts, waterproofing membranes and adhesives in accordance with TTMAC recommended procedures. Patch and repair existing substrate to the quality required by the new finish material manufacturer for the installation of their products.
 - .3 All openings in existing fire rated assemblies or fire separations which are created by the removal of existing services, plumbing, conduit, ductwork, fittings fixtures or accessories are to be firestopped to maintain the integrity of the existing construction.
 - .4 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.

1.17 Integrated Systems Testing

.1 Test and verification in conformance with CAN/ULC S1001, Integrated Systems Testing of Fire Protection and Life Safety Systems. Provide a satisfactory Integrated Testing Report. Procure (engage, coordinate and pay for) an Integrated Testing Coordinator, responsible to develop and implement the Integrated Testing Plan. The systems which must be included as part of the integrated systems testing to be determined by the Integrated Testing Coordinator. All costs related to the integrated systems testing must be included as part of the base bid price. Provide all requirements to all required trades during the bid period.

- .2 Include the following scopes of work as part of the base bid price specific to CAN/ULC S1001, Integrated Systems Testing of Fire Protection and Life Safety Systems:
 - .1 Fire Alarm Technician required for operations and resetting of the fire alarm control panel for the duration.
 - .2 Electrician required for operations and initiating alarms, demonstrating wiring, etc., for the duration.
- 1.18 Site Security
 - .1 Daily Inspection: Provide inspection of the work areas daily while the work is in progress and take whatever measures are necessary to secure the construction zones from theft, vandalism and unauthorized entry.
- 1.19 <u>"By Others"</u>
 - .1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work but will be required to be done within the General Contractor's contract.
- 1.20 Use of Drawings
 - .1 Drawings are not to be scaled.
 - .2 Copies of architectural and structural "issued for construction" drawings in digital format will be made available for the contractors use under the following conditions.
 - .1 Copyright remains with BBA.
 - .2 The drawings will only be used for shop drawings for this project and not be put to any other use.
 - .3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all risk and expenses associated with the use of drawings in the production of his work.
 - .4 References to BBA and other Consultants must be deleted from the title block.
 - .5 The Contractor signs a release available from BBA that addresses the above items in more detail. (Sample attached as Appendix 'A')

.3 Arrangements for use of Sub-Consultant drawings must be made with the Appropriate Sub-Consultant.

1.21 Protection of Drawings

- .1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.
- .2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password protected platforms with access only to those parties with an expressed interest in the Project.
- .3 Provide Consultant and Owner with access to such websites as noted above.

PART 2 PRODUCTS

- 3.1 Not Used
 - .1 Not used
- PART 3 EXECUTION
- 3.2 Not Used
 - .1 Not used

SAMPLE

[Date] [CONTRACTOR'S COMPANY ADDRESS CITY, PROVINCE, POSTAL CODE] Attention: [INSERT CONTACT NAME]

At your request, BBA will provide electronic files for your convenience and use in the preparation of your shop drawings for Project Name, subject to the following terms and conditions:

Our electronic files are compatible with [AutoCAD 2022 (**)]. We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced drawings.

Data contained on these electronic files are part of our instruments of service, and at all times remain the exclusive property of Barry Bryan Associates and copyright is reserved. The electronic files shall not be used by you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. You further agree not to transfer these electronic files to others without the prior written consent of Barry Bryan Associates. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or other project consultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defence costs, arising out of or resulting from your use of these electronic files, or from the use by others, should they have obtained them from you.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the hard-copy construction documents prepared by us and the electronic files, the hard-copy construction documents shall govern. You are responsible for determining if any conflict exists.

Due to the nature of the design and construction process, the drawings on these electronic files may not be fully coordinated, may change, and may not incorporate revisions, change orders, or addenda. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we require all indications of our ownership and/or involvement be removed from each electronic display.

We will furnish you electronic files upon your written request.

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us, and we make no warranties, either express or implied, of merchantability of fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

Barry Bryan Associates

[CONTRACTOR FIRM NAME]

PART 1 <u>GENERAL</u>

1.1 <u>Consultants</u>

- .1 ARCHITECT: Barry Bryan Associates 201 - 250 Water Street Whitby, Ontario L1N 0G5 Tel: (905) 666-5252 Fax: (905) 666-5256 Attention: Ms Cassandra Cassius, OAA
- .2 STRUCTURAL ENGINEER: Barry Bryan Associates 201 - 250 Water Street Whitby, Ontario L1N 0G5 Tel: (905) 666-5252 Fax: (905) 666-5256 Attention: Mr. David Bovill, P.E., P. Eng.
- .3 MECHANICAL ENGINEER: MCW Consultants Ltd. 207 Queens Quay W, Suite 615 Toronto, Ontario M5J 2M6 Tel: (416) 598-2920 Fax: (416) 598-5394 Attention: PaulaTerry
- .4 ELECTRICAL ENGINEER: MCW Consultants Ltd. 207 Queens Quay W, Suite 615 Toronto, Ontario M5J 2M6 Tel: (416) 598-2920 Fax: (416) 598-5394 Attention: Denise Neutel

PART 2 PRODUCTS

- 3.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.2 <u>Not Used</u>
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Access and Egress
- .2 Use of Site and Facilities
- .3 Alterations, Additions or Repairs to Existing Buildings
- .4 Existing Services
- .5 Special Requirements
- .6 Security
- .7 Building Smoking Environment
- 1.2 Access and Egress
 - .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- 1.3 Use of Site and Facilities
 - .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Owner to facilitate work as stated.
 - .2 Maintain existing services to building and provide for personnel and vehicle access.
 - .3 Where security is reduced by work provide temporary means to maintain security.
 - .4 Owner will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
 - .5 Protect walls of passenger elevators, to approval of Owner prior to use.
 - .6 Accept liability for damage, safety of equipment and overloading of existing equipment.
 - .7 Closures: protect work temporarily until permanent enclosures are completed.
- 1.4 <u>Alterations, Additions or Repairs to Existing Buildings</u>
 - .1 Execute work with least possible interference or disturbance to[building

operations, occupants, public and normal use of premises. Arrange with Owner to facilitate execution of work.

1.5 Existing Services

- .1 Notify, Owner, utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Owner 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel, pedestrian and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00.
- 1.6 <u>Special Requirements</u>
 - .1 Paint and carpet public or Owner occupied areas Monday to Friday from [18:00] to [07:00] hours only [and on [Saturdays,] [Sundays,] [and statutory holidays]].
 - .2 Carry out noise generating Work Monday to Friday from [18:00] to [07:00] hours [and on [Saturdays,] [Sundays,] [and statutory holidays]].
 - .3 Submit schedule in accordance with Section [01 32 00 Construction Progress Documentation] [01 32 16 Construction Schedule Bar (GANTT) Chart].
 - .4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
 - .5 Keep within limits of work and avenues of ingress and egress.
 - .6 Ingress and egress of Contractor vehicles at site is limited to [_____].
 - .7 Deliver materials outside of peak traffic hours [17:00] to [07:00] and [13:00] to [15:00] unless otherwise approved by Owner.
 - .8 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Owner prior to cutting or drilling.

1.7 <u>Security</u>

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:
 - .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
 - .2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Each pass must be returned at end of work shift and personnel checked out.

1.8 Building Smoking Environment

.1 Comply with smoking restrictions. Smoking and vaping is not permitted.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

PART 1 GENERAL

- 1.1 <u>Section Includes</u>
 - .1 Cash Allowances

1.2 <u>References</u>

.1 Canadian Construction Documents Committee CCDC2-2020 Stipulated Price Contract including the Supplementary Conditions.

1.3 <u>Cash Allowances</u>

- .1 Refer to General Conditions, GC4.1.
- .2 Unless otherwise specified, Cash Allowances shall cover the cost of the materials and equipment delivered F.O.B. job site, and all applicable taxes, except Harmonized Sales Tax. The Contractor's handling costs on the site, labour, installation costs, overhead and profit and other expenses shall be included separately in the Stipulated Price and not in the Cash Allowance.
- .3 Where it is specified that a Cash Allowances is to include both supply and installation costs, such allowances shall cover the cost of the materials and equipment delivered and unloaded at the site, all applicable taxes and the contractor's handling costs on the site, labour and installation costs and other expenses, except overhead and profit which shall be included separately in the Stipulated Price.
- .4 If the cost of the Work covered by Cash Allowances, when determined, is more or less than the allowance, the Contract Sum shall be adjusted accordingly.
- .5 In the event that the cost of the work covered by Cash Allowances should exceed the cash allowance, while the Contract Sum will be adjusted in conformity therewith, there shall be no adjustment to the Contractor's fee or other expenses such as overhead or profit, it being understood and agreed that the contract sum includes the Contractor's expenses and profit for all Cash Allowances whether or not they are exceeded.
- .6 Progress payments on accounts of work authorized under Cash Allowances shall be included in monthly certificate for payment.
- .7 Expenditures from Cash Allowances shall be authorized by Site Instruction, Change Directive or Change Order.

- .8 Cash Allowance for independent inspection and testing shall cover the cost of such services as provided by independent testing agency only. The Contractor's cost for labour, overhead and other expenses related to independent inspection and testing shall be included separately in the Stipulated Price and not in the Cash Allowance.
- .9 Cause the work covered by Cash Allowances to be performed for such amounts and by such persons as the Consultant may select and direct or as required by the project drawings and specifications.
- .10 Amount of each allowance, for Work specified in respective specification Sections is as follows:
 - .1 Independent Inspection and Testing:
 - .2 Supply only of Finishing Hardware:
- PART 2 PRODUCTS
- 2.1 <u>Not Used</u>
 - .1 Not used
- PART 3 EXECUTION
- 3.1 Not Used
 - .1 Not used

PART 1 GENERAL

1.1 <u>Section Includes</u>

- .1 Requests for Substitution (RFS) prior to execution of Contract.
- .2 Requests for Substitution (RFS) after execution of Contract.

1.2 <u>Definitions</u>

- .1 Products Not Available: When all listed manufacturers products in the specification section are no longer manufactured.
- .2 Proprietary Specification: a specification which includes one or more proprietary names of products or manufacturers, or both, and may also include descriptive, reference standard, or performance requirements, or any combination thereof.
- .3 Non-proprietary Specification: a specification which includes descriptive, reference standard or performance requirements, or any combination thereof, but does not include proprietary names of products or manufacturers.
- .4 Substitution: a product or manufacturer not specified by proprietary name, which may be acceptable in place of a product or manufacturer which, is specified by proprietary name.

1.3 <u>Procedures</u>

.1 Product Options:

- .1 For products specified by non-proprietary specification:
 - .1 Select any product by any manufacturer, which meets requirements of Contract Documents.
- .2 For products specified by proprietary specification:
 - .1 Select any product or manufacturer named, or
 - .2 Substitute an unnamed product or manufacturer in accordance with Substitutions Manufacturers article of this Section.
- .3 For products specified by proprietary specification and accompanied by words indicating that substitutions will not be accepted:
 - .1 Select any product or manufacturer named; substitutions are not permitted.
- .2 Substitution Requests Prior to Execution of Contract: Submit substitutions requests to Consultant no later than the time stated in the Instructions to Bidders.

1.4 <u>Substitutions – Products</u>

- .1 Substitute Products: Where substitute products are permitted, unnamed products may be accepted by the Consultant, subject to the following:
 - .1 Substitute products shall be the same type as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the specified products.
 - .2 Substitutions for Cause: Changes proposed by Subcontractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - .3 Substitutions for Convenience: Changes proposed by Subcontractor or Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor or Subcontractor.

1.5 <u>Substitutions – Manufacturers</u>

- .1 Substitute Manufacturers: Where substitute manufacturers are permitted, unnamed manufacturers will be accepted by the Consultant, subject to the following:
 - .1 Substitute manufacturers shall have capabilities comparable to those of the named manufacturers.
 - .2 In making a substitution Contractor and the Subcontractor represents that they have:
 - .1 Investigated substitute product or manufacturer, or both, and determined it meets or exceeds the criteria of the specified product, and;
 - .2 Will provide the same warranty for the Substitution as for the specified product.
 - .3 Will make any changes to the Work necessitated by substitution as required for Work to be complete in all respects, and;
 - .4 Waives claims for additional costs and time caused by substitution which may subsequently become apparent.
 - .5 Will reimburse Consultant's services for review or redesign, additional studies, investigations, review of submittals, and associated contract administration.
 - .6 Received necessary approvals of authorities having jurisdiction.
 - .7 Investigated the proposed substitute to determine if license fees and royalties are pending.
 - .8 If accepted, the substitution will not adversely affect the Construction Schedule.
 - .3 Do not install requested Substitutions without Consultant's acceptance.
 - .4 If, in the Consultant's opinion, a substitution does not meet requirements of

Contract Documents, Contractor shall, at no extra cost to Owner, provide a product which, in the Consultant's opinion, does meet requirements of Contract Documents.

1.6 <u>Proprietary Specifications</u>

.1 Notwithstanding specified proprietary names of either or both products or manufacturers, products provided shall meet other applicable requirements of Contract Documents. Modify products if necessary, to ensure compliance with all requirements of Contract Documents.

1.7 Changes to Accepted Products and Manufacturers

- .1 Products and manufacturers accepted by the Consultant for use in performance of Work of Contract shall not be changed without Consultant's written consent.
- .2 Submit requests to change accepted products and manufacturers to Consultant in writing, including product data indicated in Product Data article.

1.8 Product Data

- .1 When requested by the Consultant, submit complete data substantiating compliance of a product with requirements of Contract Documents. Include the following:
 - .1 Product identification, including manufacturer's name and address.
 - .2 Manufacturer's literature providing product descriptions, applicable reference standards, performance and test data, in form consistent with the Contract Documents and readily comparable with product being substituted and can provide the specified and indicated requirements.
 - .3 Samples, as applicable.
 - .4 Name and address of projects on which product has been used and date of each installation.
 - .5 Itemized comparison of substitution with named product(s). List significant variations.
 - .6 Designation of availability of maintenance services and sources of replacement materials
 - .7 Completed Substitutions Request Form. Incomplete forms will be rejected.

1.9 <u>Consultant Procedure</u>

.1 In reviewing the supporting data submitted for substitutions, Consultant will use, for purposes of comparison, all the characteristics of the specified material or

equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Specifications.

- .2 Consultant will review supporting data and will determine that the substitution in the Consultant's opinion is or is not able to meet or exceed the standards of quality, appearance and performance to the material specified.
- .3 Consultant will sign, date and issue the RFS indicating acceptance or refusal, with applicable pre-contract or contract documentation, to affected participants.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Requests for Information.
- .2 Submittal Procedures.
- .3 Screening of RFI's.
- .4 Response to RFI's.
- .5 Response Timing.

1.2 Request for Information (RFI)

- .1 A request for information (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents or to obtain additional information.
- .2 An RFI shall not constitute notice of claim for a delay.

1.3 <u>Submittal Procedures</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.
- .3 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.

.4 RFI Form:

- .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
- .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
- .3 Where RFI form does not have sufficient space to provide complete information thereon, attach additional sheets as required.
- .4 Submit with RFI form all necessary supporting documentation.
- .5 RFI Log:
 - .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
 - .2 Submit updated log of RFI's at each construction meeting.

- .6 Submit RFI's sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do so will not be paid by the Owner.
- .7 Only the Contractor shall submit RFI's to the Consultant.
- .8 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

1.4 <u>Screening of RFI's</u>

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

1.5 <u>Response to RFI's</u>

- .1 Consultant shall review RFI's from the Contractor submitted in accordance with this section with the following understandings:
 - .1 Consultant's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
 - .2 Only the Consultant shall respond to RFI's. Responses to RFI's received from entities other than the Consultant shall not be considered.

1.6 <u>Response Timing</u>

- .1 Allow 5 Working Days for review of each RFI by the Consultant.
- .2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.
- .3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.

- .4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.
- PART 2 PRODUCTS
- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

End of Section

15

PART 1 GENERAL

1.1 <u>Section Includes</u>

- .1 Administrative
- .2 Requests for Information
- .3 Shop Drawings and Product Data
- .4 Interference Drawings
- .5 Progress Photographs
- .6 Samples
- .7 Mock-Ups
- .8 Certificates and Transcripts

1.2 <u>Administrative</u>

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in metric units.
- .4 Where items or information is not produced in metric units converted values are acceptable.
- .5 Verify field measurements and affected adjacent work are coordinated.
- .6 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.
- .8 Keep one reviewed copy of each submission on site.

1.3 <u>Requests for Information (RFI's)</u>

.1 Refer to Section 01 26 15 – Requests for Information

1.4 <u>Shop Drawings and Product Data</u>

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, product data and other data which the Contractor provides to illustrate details of a portion of Work.
- .2 Coordinate each submission with requirements of Work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
- .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
- .7 Allow ten days for Consultant's review of each submission.
- .8 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .9 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

.10 Accompany submissions with transmittal letter containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.11 Submissions shall include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .12 After Consultant's review, distribute copies.
- .13 Submit one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
- .14 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .15 Delete information not applicable to project.
- .16 Supplement standard information to provide details applicable to project.

- .17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .18 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.5 Interference Drawings

- .1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.
- .2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.
- .3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.

1.6 <u>Progress Photographs</u>

.1 Progress photograph to be electronically formatted and labelled as to location and view.

1.7 <u>Samples</u>

.1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.

- .2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .3 Where colour, pattern or texture is criterion, submit full range of manufacturer's samples.
- .4 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .5 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.
- 1.8 Mock-Ups
 - .1 Erect mock-ups in accordance with 01 45 00 Quality Control.
- PART 2 PRODUCTS
- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>References</u>

- .1 CSA Group (CSA)
 - .1 CSA S350-M1980(R2003) Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2015 (NBC)
 - .1 NBC 2015, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2015 (NFC)
 - .1 NFC 2015, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.
- .5 Treasury Board of Canada Secretariat (TBS)
 - .1 Treasury Board, Fire Protection Standard April 1, 2010

1.2 <u>Action and Informational Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation [found in work plan].
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
- .3 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing [Building, Facility, Tenant's] Emergency Procedures and Evacuation Plan in place at the site. Departmental

Representative will provide Facility Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

- .4 Contractor's Safety Communication Plan.
- .5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing [Building, Facility, Tenant's] Emergency Response requirements and procedures provided by Departmental Representative.
- .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 2 days after receipt of comments from Departmental Representative.
- .7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 Submit names of personnel and alternates responsible for site safety and health.
- .9 Submit records of Contractor's Health and Safety meetings [when requested].
- .10 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant and authority having jurisdiction, [daily] [weekly].
- .11 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative daily weekly.
- .12 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .13 Submit copies of incident and accident reports.
- .14 Submit Safety Data Sheets (SDS).
- .15 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.
- 1.3 Filing of Notice
 - .1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 <u>Work Permit</u>

- .1 Obtain building permits related to project prior to commencement of Work.
- .2 Obtain Hot Work Permit from Property Manager.

1.5 <u>Safety Assessment</u>

.1 Perform site specific safety hazard assessment related to project.

1.6 <u>Meetings</u>

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- 1.7 <u>Regulatory Requirements</u>
 - .1 Comply with the Acts and regulations of the Province of Ontario.
 - .2 Comply with specified standards and regulations to ensure safe operations at site.
- 1.8 <u>Project Site Conditions</u>

1.9 General Requirements

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 <u>Compliance Requirements</u>

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

1.11 <u>Responsibility</u>

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.12 <u>Unforeseen Hazards</u>

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.13 Health and Safety Coordinator

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
 - .1 Have site-related working experience specific to activities associated with abatement of lead and asbestos containing materials.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.14 Posting of Documents

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
 - .1 Contractor's Safety Policy.
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Site Specific Safety Plan.
 - .11 Valid certificate of first aider on duty.
 - .12WSIB "In Case of Injury at Work" poster.
 - .13 Location of toilet and cleanup facilities.
- 1.15 <u>Correction of Non-Compliance</u>
 - .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
 - .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
 - .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.
- 1.16 Blasting
 - .1 Blasting or other use of explosives is not permitted.
- 1.17 <u>Powder Actuated Devices</u>
 - .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.18 Work Stoppage

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

PART 2 PRODUCTS

- 3.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.2 Not Used
 - .1 Not used
PART 1 GENERAL

- 1.1 <u>Section Includes</u>
 - .1 Administrative
 - .2 Fires
 - .3 Disposal of Wastes
 - .4 Drainage
 - .5 Site Clearing and Plant Protection
 - .6 Pollution Control
 - .7 Unanticipated Soil Contamination
- 1.2 <u>References</u>
 - .1 Statutes of Canada 1999 Chapter 33.
 - .1 Canadian Environmental Protection Act 1999.
 - .2 SOR/2003-289. Federal Halocarbon Regulations, 2003.
 - .3 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
 - .2 OPSS 805 "Construction Specification for Temporary Erosion and Sediment Control Measures".
 - .3 Province of Ontario Environmental Protection Act, R.S.O. 1990, c. E.19
 - .4 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

1.3 <u>Administrative</u>

- .1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.
- .2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.
- .3 It is the Contractor's responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.
- .4 It is the Contractor's responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.
- .5 All hazardous materials are to be stored with secondary containment

1.4 <u>Fires</u>

.1 Fires and burning of rubbish on site not permitted.

1.5 <u>Disposal of Wastes</u>

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.6 <u>Drainage</u>

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.
- .3 Protect storm drains against entry by sediment, debris, oil, or chemicals.
- .4 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.
- 1.7 Site Clearing and Plant Protection
 - .1 Protect trees and plants on site and adjacent properties.
 - .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
 - .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .4 Restrict tree removal to areas indicated.
 - .5 Prevent unnecessary disturbance of topsoil and underlying soil from vehicles and heavy equipment.
 - .6 Minimize stripping of topsoil and vegetation.
 - .7 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required

test reports, certificates and documentation.

1.8 <u>Pollution Control</u>

- .1 Maintain, inspect, and repair temporary erosion and pollution control features installed under this contract on a weekly basis. Submit inspection logs to the Owner when requested.
- .2 Control emissions from equipment and plant to conform to federal, provincial, and municipal requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .4 Take all measures necessary to prevent material and mud tracking on adjacent roads and streets.
- .5 Use mechanical sweepers as often as necessary to keep adjacent roads and streets clean of material and mud that is deposited from this project.
- .6 On site disposal or clean out of concrete trucks is not permitted. Any spillage of concrete onto asphalt or other surfaces must be cleaned up before spillage sets.

1.9 <u>Unanticipated Soil Contamination</u>

- .1 Should unanticipated soil contamination be discovered:
 - .1 Stop work and assess the situation for safety.
 - .2 If situation does not appear to be safe, evacuate workers from area.
 - .3 If safe to do so, take immediate steps to control any spread of contamination, in accordance with Contractor's spill prevention and response plan.
 - .4 Immediately contact the Consultant.
- .2 Removal and disposal off site of contaminated materials shall comply with the requirements of Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management.

PART 2 PRODUCTS

- 2.1 <u>Not Used</u>
 - .1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 References
- .2 Owner's Regulations
- .3 Standards and Definitions
- .4 Designated Substances
- .5 Hazardous Materials
- .6 Spills Reporting
- .7 Protection of Water Quality
- .8 Potable Water Systems
- .9 Soils Management
- .10 Access for Inspection and Testing
- .11 Other Regulatory Requirements

1.2 <u>References</u>

- .1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1:21, including all Supplements and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.
- .3 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
 - .3 Manufacturer's instructions.
- .4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.
- .5 Where the Building Code or the Contract Documents do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

1.3 <u>Owner's Regulations</u>

.1 Conform to requirements, regulations and procedures of the Owner.

1.4 <u>Standards and Definitions</u>

- .1 Where a reference is made to specification standards produced by various organizations and agencies, conform to latest edition of standards, as amended and revised to date of Contract.
- .2 Have a copy of each specified standard which relates to your work available on the site to be produced immediately on Consultant's request.

1.5 <u>Designated Substances</u>

- .1 Known designated substances are identified in the Designated Substance Report provided by the Owner.
- .2 Stop work immediately when material resembling asbestos, mould or any other designated substance which is not identified in the Designated Substance Report is encountered during the course of the work. Notify Owner and Consultant immediately.
- .3 The Owner will arrange for independent testing of suspected designated substances and removal of such substances encountered on the site during the course of the work which are not identified in the Designated Substance Report.

1.6 <u>Hazardous Materials</u>

- .1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.
- .2 Provide SDS for all materials brought to the Place of Work.
- .3 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.
- .4 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner's property.

.5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances.

1.7 Spills Reporting

- .1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.
- .2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.
- .3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.8 <u>Protection of Water Quality</u>

- .1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.
- .2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the watercourses.
- .3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.
- .4 Supply, install and maintain silt/sediment control fencing along the edge of the site to intercept construction runoff silt, to the satisfaction of the Owner.

1.9 <u>Potable Water Systems</u>

- .1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.
- .2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.10 Soils Management

.1 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.11 Access for Inspection and Testing

.1 Cooperate fully with and provide assistance to, all outside authorities including Building Inspectors, utilities, testing agencies and consultants, with the inspection of the Work.

1.12 Other Regulatory Requirements

- .1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.
- .2 Obtain required road occupancy permits.
- .3 Pay any required roadway damage deposits required by the local municipality.
- .4 Conform to the requirements of the Ontario Ministry of the Environment.
- .5 Conform to the requirements of the Ontario Ministry of Labour.
- .6 Conform to the requirements of the local Conservation Authority.
- .7 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

- 2.1 <u>Not Used</u>
 - .1 Not used

PART 3 EXECUTION

- 3.1 <u>Not Used</u>
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Inspection
- .2 Independent Inspection Agencies.
- .3 Access to Work
- .4 Procedures
- .5 Rejected Work
- .6 Reports
- .7 Contractors Responsibilities
- .8 Tests and Mix Designs
- .9 Mock-Ups
- .10 Equipment and Systems.

1.2 Inspection

- .1 Contractor is responsible for Quality Control (QC).
- .2 Allow Owner and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 Independent Inspection Agencies

.1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor and paid from the cash allowances specified in Section 01 21 13. Refer to Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re-inspection.

1.4 <u>Access to Work</u>

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

1.5 <u>Procedures</u>

- .1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples

1.6 <u>Rejected Work</u>

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other work damaged by such removals or replacements promptly.
- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Consultant will deduct from Contract Price difference in value between Work performed and that called for by

Contract Documents, amount of which will be determined by Consultant.

1.7 <u>Reports</u>

- .1 Submit electronic .pdf format inspection and test reports to Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.8 <u>Contractors Responsibilities</u>

- .1 Be responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.
- .2 Provide the Owner with a completed quality product for the Work. Contractor shall be responsible for any costs associated with re-testing and reperforming the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.
- .3 All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.
- .4 The Consultant will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed.
- .5 Failure by a Contractor to conduct its operations, means and methods and coordinate proper sequencing of the Work may cause the Owner to withhold payment or any other means deemed necessary to correct non-conforming Work.
- .6 The Owner shall engage a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner. The testing firm will determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.
- .7 Copies of test and inspection reports will be furnished to the Contractor. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the

Contractor of any of its responsibilities for compliance or making good workmanship or materials which are not in compliance with the requirements of the Contract Documents. The agency shall notify the Consultant and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services

- .8 Contractor's construction materials, procedures and work shall be subject to specified testing procedures and shall be in conformance with the Contract Documents as verified by Testing Agency.
- .9 Cooperate with the testing firm and provide labor to assist with sample preparations where applicable.
- .10 Except where specifically indicated to be provided by another entity as identified, inspections, tests, and similar quality control services including those specified to be performed by independent agency are the Contractor's responsibility, and costs thereof are not to be included in contract sum.
- .11 Cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at Project site.
- .12 Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need of removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests, taking of samples, and similar activities is Contractor's responsibility.
- .13 Where sampling and testing is required for Sections of Work listed in the Contract Documents, the tests shall be performed by an independent testing lab and paid for by the Contractor.
- .14 Test procedures to be used shall be submitted for approval of the Consultant where other than those specified are recommended by the testing agency.
- .15 Testing Agency Duties: The independent Testing Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, the Consultant and Contractors in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

- .16 Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.
- 1.9 <u>Tests and Mix Designs</u>
- .1 Furnish test results and mix designs as requested.

1.10 Mockups

- .1 Prepare mockups for Work specifically requested in specifications.
- .2 Construct in locations acceptable to Consultant.
- .3 Prepare mockups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mockups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Mock-ups may remain as part of Work unless indicated otherwise.

1.11 Equipment and Systems

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

PART 2 PRODUCTS

2.1 <u>Not Used</u>

.1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Appointment and payment.
- .2 Manufacturer's field review.

1.2 Related Sections

- .1 Particular requirements for testing and inspection to be carried out by testing laboratory designated by the Consultant are specified under various sections of the specifications.
- .2 Balancing and testing of systems under Divisions 21 through 28.

1.3 Appointment and Payment

- .1 From time to time during the progress of the Work, the Owner will require that testing and inspection be performed to determine that materials provided in the Work meet the requirements of the Contract Documents.
 - .1 Subcontractors shall verify with Contractor, in writing, portions of the Work that will require testing and/or inspection prior to commencing such affected work.
- .2 The Owner will appoint testing and inspection companies, representing, reporting and responsible to the Owner. Cost of testing and inspection will be authorized as a disbursement of the Cash Allowances as specified in Section 01 21 13 unless otherwise indicated or specified and except for the following:
 - .1 Testing and inspection required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Testing and inspection performed exclusively for Contractor's convenience.
 - .3 Testing, adjusting and balancing of conveying systems, mechanical and electrical equipment and systems. Refer to mechanical specifications for incontract air-balancing.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under supervision of the Consultant.
 - .6 Where tests or inspections by designated testing laboratory reveal work not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.

- .7 Additional testing required because of changes in materials, proportions of mixes, requested by the Contractor or Subcontractors as well as any extra testing of materials occasioned by lack of identification or failure of such materials being replaced to meet requirements of the Contract Documents or testing of structure or elements including load testing, shall be ac carried out at no additional cost to the Owner.
- .8 Where evidence exists that defective workmanship has occurred or that the Work has been carried out incorporating defective materials, the Consultant reserves the right to have tests, inspections or surveys performed, analytical calculation of structural strength made and the like in order to help determine the extent of defect and whether such work must be replaced. Tests, inspections or surveys carried out under these s circumstances will be made at the Contractor's expense and will not be paid for by the Owner.
- .9 Testing and compliance letters specified in other Sections.
- .3 Inspection and testing company shall submit monthly invoice original to the Contractor for review, relating invoices to tests and inspection reports. Provide original receipts for disbursements. Invoices will be forwarded by Contractor to the Consultant for inclusion in progress payment application.
- .4 The Consultant will work with the Owner's representative and the Contactor's commissioning team to review the work of the Contract during closeout procedures. The Contractor shall be responsible to correct all deficiencies as reported by the Consultant and Owner's representative, and in accordance with the Contract documents. Refer to Sections 01 77 00 for additional closeout requirements.
- .5 Testing and Inspection shall be performed by qualified and/or certified personnel under professional supervision or performed directly by a professional engineer qualified in conformance with applicable codes and certification programs.
- .6 Requirements of regulatory agencies:
 - .1 Testing shall be conducted in accordance with the requirements of the Building Code.
 - .2 Obtain certification where required by the building code and standards.
- .7 Cooperation with testing and inspection company.
 - .1 Provide inspection company with materials and installation information as required or as requested.
 - .2 Provide access to the work for representatives of the inspection and testing companies.

- .3 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .4 Cooperate with testing and inspection companies and give adequate notification of any changes in source of supply, additional work shifts or other proposed changes.
- .5 No Product nor part of the Work shall be installed before it is tested when a test is specified or required, nor shall work be executed where a test or inspection is required and the inspector cannot attend. Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by the Consultant.
- .6 Cooperate in permitting access to the Work for testing and inspection company wherever Work is in progress, or wherever Products, materials or equipment are stored prior to shipping.
- .7 Supply labour required to assist testing and inspection company in sampling and making tests.
- .8 Repair work damaged as a result of testing and inspection work.
- .9 Costs of above labour and material shall be borne by applicable Subcontractors.
- .10 The testing and inspection service does not relieve the Contractor of responsibility for normal shop and site inspection, and quality control of production.
- .11 Pay costs for removal and replacement of Work, or for remedial measures necessitated by faulty workmanship and materials which fail to meet requirement specified.
- .8 Prepare schedule for testing and inspection in accordance with Section 01 33 00 and as follows:
 - .1 Establishing Schedule:
 - .1 By advance discussion with the selected testing laboratory, determine the time required by the laboratory to perform its tests and issue each of its findings.
 - .2 Allow required time within Construction Schedule
 - .2 Adherence to Schedule:
 - .1 Contractor shall advise testing and inspection laboratory in advance when testing of the Work is required.
 - .2 When testing and inspection laboratory is ready to test according to predetermined schedule, but is prevented from testing or taking specimens due to incompleteness of the parts of the Work scheduled for testing and inspection, extra costs for testing attributable to the delay may be back-charged to the Contractor at no increase in the Contract Price.
 - .3 Notify Contractor and inspection company at least 3 Working Days before

work required to be inspected commences, and arrange for a meeting at the Place of the Work, to be held one Working day before the work starts with the following present:

- .1 Contractor, a principal of the Sub-contractor whose work is to be inspected or tested, testing and inspection company, manufacturer's res presentative and Consultant.
- .4 Give 2 Working Days prior notice to inspection company of the commencement of each phase of the Work requiring inspection and provide inspection company with materials and installation information.
- .9 Reports and Documents:
 - .1 Testing and Inspection companies shall submit shop inspection and site inspection reports within 5 Working days of each inspection.
 - .2 Distribute reports as follows:
 - .1 Owner.
 - .2 Consultant.
 - .3 Contractor.
 - .4 Consulting engineers as applicable.
 - .3 Inspectors shall submit a written report on each inspection or test, including pertinent data such as conditions at the Place of the Work, dates, test references, locations of tested materials, actual product identification, procedures and descriptions, site instructions given, recommendations and/or any other information required by standard applicable reporting of tests and inspections.
 - .4 Clearly indicate in report failure of Product or procedures to meet applicable standards, give recommendations for retesting or correction. Contact Consultant immediately when Product or procedure fails to meet applicable standards.
 - .5 Upon completion of those parts of the Work subject to independent testing and inspection, submit to the Consultant duplicate certificates of acceptance of the installation issued by independent testing and inspection company.

.10 Inspection and Test Specimens:

- .1 Testing and inspection will generally consist of procedures listed in the following paragraphs, but additional tests may be performed as required to verify conformance to Contract Documents.
- .2 Specimens and samples for testing, unless otherwise specified in the Contract Documents, will be taken by the testing laboratory; sampling equipment and personnel will be provided by the testing laboratory; and deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

- .3 Testing and inspection company shall take samples necessary to verify quality as specified by applicable standards or as specified herein. Taking of samples shall not endanger the structure or life and shall be taken so as to best represent the Work as a whole.
- .4 Samples shall be handled, packaged, stored and delivers so as to best ensure the validity of tests that will be performed on them. Sample handling where required shall duplicate conditions at the Place of the Work (such as site cured concrete cylinders).

1.4 <u>Manufacturer's Field Review</u>

- .1 Where manufacturer's field review is specified, manufacturer's representative shall review the relevant parts of work at the Place of Work, or wherever such affected work is in progress, to end sure that work is being executed in accordance with manufacturer's written recommendations.
- .2 Manufacturer's field review is to ensure that the Products specified are being used in the Work and are being applied on surfaces prepared in accordance with their recommendations and the requirements of the Contract Documents.
- .3 Manufacturer's representative shall undertake such review weekly, or additionally as necessary, to determine that the work is in accordance with manufacturer's written recommendations.
- .4 Manufacturer's representative shall submit a type written report on manufacturer's letterhead within 2 Working Days after each field review. Report shall document manufacturer's representative's field observations and recommendations.
- .5 Manufacturer's field review reports to be prepared and distributed following the procedures specified for pe reparation and submittal of testing and inspection reports given above.

PART 2 PRODUCTS

- 2.1 <u>Not Used</u>
 - .1 Not used

PART 3 EXECUTION

3.1 <u>Not Used</u>

.1 Not used

PART 1 <u>GENERAL</u>

- 1.1 <u>Section Includes</u>
 - .1 Temporary utilities

1.2 Installation and Removal

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

1.3 <u>Dewatering</u>

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 <u>Water Supply</u>

- .1 Existing sources of water can be made available to the Contractor at no charge, subject to operational requirements. Arrange for connection and pay all costs for installation, maintenance and removal. Conversions or alterations to existing sources of water to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

1.5 <u>Temporary Heating and Ventilation</u>

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted, unless prior approval is given by the Consultant.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

- .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10° C in areas where construction is in progress.
- .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Permanent heating system of building may not be used when available, unless there are savings to the Contract Price and Consultant's written permission is obtained stating conditions of use, provisions relating to guarantees on equipment and operation and maintenance of system. Be responsible for damage to heating system if use is permitted.
- .7 On completion of Work for which permanent heating system is used, replace filters.
- .8 Ensure Date of Substantial Performance and warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .9 Pay costs for maintaining temporary heat, when using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.
- .10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform to applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct fired combustion units to outside.

.11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 <u>Temporary Power and Light</u>

- .1 Existing sources of electric power can be made available to the Contractor. Conversions or alterations to existing sources of electric power to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected.
- 1.7 <u>Temporary Communication Facilities</u>
 - .1 Provide and pay for temporary telephone, fax, cellular data, lines and all equipment necessary for Contractor's own use.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 <u>Not Used</u>
 - .1 Not used

PART 1 GENERAL

- 1.1 <u>Section Includes</u>
 - .1 Construction aids.
 - .2 Site storage.
 - .3 Construction parking
 - .4 Offices
 - .5 Equipment, tool and material storage.
 - .6 Sanitary facilities.
 - .7 Signage.
 - .8 Shoring
- 1.2 <u>References</u>
 - .1 CSA Group (CSA)
 - .1 CAN/CSA Z321-96 (R2006) Signs and Symbols for the Workplace
 - .2 CAN/CSA Z797-18 Code of Practice for Access Scaffold
- 1.3 Installation and Removal
 - .1 Provide construction facilities in order to execute work expeditiously.
 - .2 Remove from site all such work after use.

1.4 <u>Scaffolding</u>

- .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.
- .3 Enclose and heat scaffolding during cold weather.
- 1.5 <u>Hoisting</u>
 - .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment.
 - .2 Hoists and cranes shall be operated by qualified operator.

1.6 <u>Site Storage/Loading</u>

- .1 Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.7 <u>Construction Parking</u>

- .1 Parking will be permitted on site at areas designated by the Owner provided it does not disrupt performance of Work or ongoing Owners operations.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.8 <u>Offices</u>

.1 General Contractor and Subcontractors may provide their own offices as necessary and subject to site constraints. Direct location of these offices.

1.9 Equipment, Tool and Material Storage

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

1.10 <u>Sanitary Facilities</u>

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 <u>Construction Signage</u>

- .1 Direct requests for approval to erect a Contractor signboard to Consultant.
- .2 Signs and notices for safety and instruction shall be in English. Graphic symbols

shall conform to CAN/CSA Z321.

- .3 Post "Construction Zone" signage outside barrier and entrance to all work areas.
- .4 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project.
- .5 Install signage to direct site traffic and deliveries to the Construction work areas.

1.12 Shoring

- .1 Examine the site to determine the conditions under which work will be performed.
- .2 Contractor shall formulate his own conclusions as to the extent of the existing conditions and shoring required.
- .3 The method of shoring shall be according to the Contractor's and his Engineer's directions.
- .4 All existing loads must be shored prior to commencement of demolition and removal of load bearing elements.
- .5 All shoring and frame braces must be supplied with a safe load rating which must not be exceeded. Install in accordance with manufacturer's recommended procedures and safety guidelines. Ensure that the safe load conditions of the shoring are not exceeded by dead, live or construction loads.
- .6 All shoring shall be subject to the Consultant's review and approval prior to commencing demolition work.
- .7 Completely remove all shoring after new structure is installed and all concrete is set.
- .8 Submit shoring drawings and a proposed installation procedure stamped by a professional engineer registered in the Province of Ontario. Procedures shall follow the information provided on these drawings. The shoring design engineer shall be retained and paid for by the Contractor. The shoring engineer shall review all existing conditions on site prior to completing shoring design.
- .9 Removal of existing materials without proper engineered shoring is a safety hazard and will not be permitted.
- .10 Make good all damage to the existing structure and adjoining structures and bear full responsibility for failure to provide adequate shoring.

.11 The failure or refusal of the Consultant to suggest the use of shoring, shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of the work or of any of their obligations under the Contract, nor impose any liability on the Owner or their agents; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or by any act of the Owner, or their agents, or employees, relieve the Contractor from necessity of properly and adequately protecting the existing structure from collapse or damage, nor from and of his obligations under the Contract relating to injury to persons or property, nor entitle him to any claims for extra compensation or an extension in schedule.

PART 2 PRODUCTS

- 2.1 <u>Not Used</u>
 - .1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Dielectric Separation
- .5 Tolerances for Execution of Work.
- .6 Protection of Work in progress.
- .7 Existing Utilities

1.2 <u>Definition – Basis of Design</u>

- .1 Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - .1 Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- .2 Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - .1 Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
- .3 Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 -Submittal Procedures.
- 1.3 <u>Quality</u>
 - .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of

products provided.

- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.
- 1.4 <u>Availability</u>
 - .1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
 - .2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.

- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Consultant.
- .9 Touch up damaged factory finished surfaces to Consultant's satisfaction. Use touch up materials to match original. Do not paint over name plates.
- 1.6 Transportation
 - .1 Pay costs of transportation of products required in performance of Work.
 - .2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.7 Manufacturer's Instructions

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

1.8 Quality of Work

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Immediately notify Consultant if required Work is such as to make it impractical to

produce required results.

- .3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.
- 1.9 <u>Coordination</u>
 - .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- 1.10 <u>Concealment</u>
 - .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
 - .2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.
- 1.11 <u>Remedial Work</u>
 - .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
 - .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.
- 1.12 Location of Fixtures
 - .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
 - .2 Inform Consultant of conflicting installation. Install as directed.
- 1.13 Fastenings
 - .1 Provide metal fastenings and accessories in same texture, colour and finish as

adjacent materials, unless indicated otherwise.

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

1.14 <u>Fastenings – Equipment</u>

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 <u>Dielectric Separation</u>

.1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

1.16 <u>Tolerances for Execution of Work</u>

- .1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.
- .2 Unless acceptable tolerances are otherwise specified in specification sections, or

are otherwise required for proper functioning of equipment, site services and mechanical and electrical systems:

- .1 "Plumb and level" shall mean plumb or level within 1 mm in 1m.
- .2 "Square" shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
- .3 "Straight" shall mean within 1 mm under a 1 m long straight edge.
- .4 "Flush" shall mean within:
 - .1 6 mm for exterior concrete, masonry and paving materials.
 - .2 1 mm for interior concrete, masonry, tile and similar surfaces.
 - .3 0.5 mm for other interior surfaces.
- .3 Allowable tolerances shall not be cumulative

1.17 Protection of Work in Progress

- .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Consultant, at no increase in Contract Price or Contract Time.
- .2 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Consultant.

1.18 Existing Utilities

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

1.19 <u>Hazardous Materials</u>

.1 Report any found or suspected hazardous materials to the Owner.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 <u>Not Used</u>
 - .1 Not used

PART 1 GENERAL

1.1 <u>Section Includes</u>

- .1 Safety Requirements
- .2 Fire Protection
- .3 Accident Reporting
- .4 Records on Site

1.2 <u>References</u>

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Fire Commissioners of Canada, FC 301, Standard for Construction Operations.
- .3 National Fire Protection Agency (NFPA)
 - .1 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Occupational Health and Safety Act.
 - .1 R.R.O. 1990, Reg. 860: Workplace Hazardous Materials Information System (WHMIS)
 - .2 O. Reg. 632/05: Confined Spaces
- .5 Ontario Building Code.

1.3 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit to Owner and Consultant copies of the following documents, including updates issued:
 - .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
 - .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
 - .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
 - .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
 - .3 Location of nearest medical facility and level of injury that each can service.
 - .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a "Fire Safety Plan" conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the "Fire Safety Plan" on site.
 - .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:

- .1 WHMIS.
- .2 Fall arrest and protection.
- .3 Suspended Access Equipment.
- .4 Erection of Scaffolding.
- .5 License for powder actuated devices.
- .5 On-site Contingency and Emergency Response Plan addressing:
 - .1 Standard procedures to be implemented during emergency situations.
 - .2 Preventative planning and protocols to address possible emergency situations.
- .3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.
- .4 Incident and accident reports, promptly if and upon occurrence
 - .1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
 - .2 Accident or Incident Reports, within 24 hours of occurrence.
- .5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.
- 1.4 <u>Compliance Requirements</u>
 - .1 Comply with the latest edition of the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act.

1.5 <u>Constructor</u>

- .1 Notify all regulatory bodies required for construction activities, (i.e., Notice of Project, employer notification, etc.). Notifications shall include, but not be limited to, the notification requirements laid out in OHSA Sec 51-53 and the requirements of Ontario Regulation 213/91 for Construction Projects, Sections 5, 6 and 7. For the purpose of this contract the Contractor shall be the "Constructor".
- .2 The "Constructor" will be solely responsible for the safety of all persons on the Site.
- 1.6 <u>Safety Requirements</u>
 - .1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects,
August 1997, Ontario Regulation 213/91 including amendments.

- .2 Hazardous Products Act and Canada Labour Code.
- .3 The Workplace Safety and Insurance Board, O. Reg 454.
- .4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
- .5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
- .6 National Fire Code of Canada.
- .7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
- .8 Environmental Protection Act.
- .9 The Power Commission Act.
- .10 The Boiler and Pressure Vessels Act.
- .11 The Elevators and Lifts Act.
- .12 The Operating Engineer's Act.
- .13 Municipal statutes.
- .2 Obey all Federal, Provincial and Municipal Laws, Acts, Statutes, Regulations, Ordinances and By-laws which could in any way, pertain to the work outlined in the Contract, or to any employees of the Contractor. Satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a Contractor, and Constructor and/or Employer with respect to or arising out of the performance of the Contractors obligations under this Contract.
- .3 Working at Heights: The supervisor of the project, will be responsible to ensure that his employees and subcontractors/suppliers have current Working at Heights and Fall Protection certification.
- .4 The supervisor of the project will be responsible for his employees and subcontractors/suppliers maintaining standard safety practices, as well as the specific safety rules listed below, while working on the Owner's property.
- .5 The Owner reserves the right to order individuals to leave the site if the individual is in violation of any safety requirement or any Act. Any expense incurred will be the responsibility of the Contractor.
- .6 Notify the Owner should any hazardous condition become apparent.
- .7 Enforce the use of CSA approved hard hats, reflective vests and safety boots for all persons entering or working at the construction site. Refuse admission to those refusing to conform to this requirement.
- .8 Provide safeguard and protection against accident, injury or damage to any person on the site, adjacent work areas and adjacent property.

1.7 <u>Confined Space</u>

- .1 Confined Space: Where applicable, provide the Consultant and all Regulatory Authorities with a copy of the Contractors' Confined Space Entry Procedure. In the event that defined procedures are not available, abide by the applicable requirements of the Occupational Health and Safety Act and all regulations made thereunder.
- .2 Persons intended to work in confined spaces, as defined by the Owner, must have formal training in performing work in confined spaces.
- .3 Provide proof of valid certificates of such training for all workers prior to entry of such workers into confined spaces.
- .4 Provide all necessary safety equipment for entry into confined spaces.
- .5 Where workers are required to enter a confined space, as defined by the OHSA, O. Reg. 632/05 Section 221.2, ensure that workers of the Contractor and all Subcontractors follow the requirements of the above legislation, including but not limited to:
 - .1 Having a method for recognizing each confined space to which the program applies
 - .2 Having a method for assessing the hazards to which workers may be exposed
 - .3 Having a method for the development of confined space entry plans (which include on-site rescue procedures)
 - .4 Having a method for training workers
 - .5 Having an entry-permit system.
 - .6 Supply the necessary tools and equipment to perform the confined space entry. These items include, but are not limited to, required documentation, gas detectors, breathing equipment, fall protection and rescue equipment.
- 1.8 <u>Safety Meetings</u>
 - .1 Site toolbox safety meetings will be held weekly for all Contractor employees and all sub trade contractors.
 - .2 Where a Joint Health and Safety Committee is required on a project, workers and supervisors, selected, as members of the committee must attend.
- 1.9 <u>Workplace Hazardous Materials Information System (WHMIS)</u>
 - .1 Be familiar with WHIMIS regulations and be responsible for compliance.

- .2 Provide to the Consultant a list of Designated Substances that will be brought to the site prior to commencing work. Safety Data Sheets (SDS) and the hazardous material inventory for each substance listed must be kept on the Project.
- .3 Be responsible for all other requirements of regulations as applicable to Employers.
- .4 All controlled products to be properly labelled and stored.
- .5 Immediately inform Owner and Consultant if any unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work.
- 1.10 <u>Fire Protection</u>
 - .1 Provide and maintain safeguard and protection against fire in accordance with current fire codes and regulations.
 - .2 Provide temporary fire protection throughout the course of construction. Particular attention shall be paid to the elimination of fire hazards.
 - .3 Comply with the requirements of FCC No. 301 Standards for Construction Operations issued by the Fire Commissioner of Canada and the National Building Code.
 - .4 Provide and maintain portable fire extinguishers during construction, in accordance with Part 6 of the National Fire Code of Canada 2015 and NFPA 241.
 - .5 Maintain unobstructed access for firefighting at all areas in accordance with the National Building Code of Canada.

1.11 First Aid

.1 Provide such equipment and medical facility as required by WSI Act to supply first aid services to anyone who may be injured at the place of Work. Report all accidents or injuries to the proper authorities and to the Owner and Consultant.

1.12 Accident Reporting

.1 Investigate and report incidents and accidents as required by Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

1.13 <u>Records on Site</u>

- .1 Maintain on site a copy of the safety documentation as specified in this Section and any other safety related reports and documents issued to or received from the authorities having jurisdiction.
- .2 Upon request, make copies available to the Consultant.

PART 2 PRODUCTS

- 2.1 <u>Not Used</u>
 - .1 Not used

PART 3 EXECUTION

- 3.1 <u>Not Used</u>
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 Field Engineering survey services.
- .2 Survey services to establish and confirm inverts for Work.
- .3 Recording of subsurface conditions found.

1.2 <u>References</u>

.1 Owner's identification of existing survey control points and property limits.

1.3 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit name and address of Surveyor to Consultant.
- .3 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .4 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.4 Examination of Work and Site

- .1 Examine the site and existing building to be fully informed of their particulars as related to the Work.
- .2 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it. Ensure that all necessary job dimensions are taken for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions.
- .3 No claims for extra payment will be paid for extra work made necessary or for difficulties encountered due to conditions of the site which were visible or reasonably inferable from an examination of the site at the time prior to tender closing date and furthermore, failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any condition of the site existing prior to tender closing date.

.4 As-found damage: Record by photography and submit evidence to Consultant before commencing work, any found damaged surfaces or materials adjacent to new work, and not included under scope of this new work. Remedial work to any damage, not so recorded, shall be the responsibility of the Contractor.

1.5 Qualifications of Surveyor

.1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.6 <u>Survey Reference Points</u>

- .1 Existing control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Consultant.
- .4 Report to Consultant when reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.7 <u>Survey Requirements</u>

- .1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Stake slopes and berms.
- .5 Establish pipe invert elevations.
- .6 Stake batter boards for foundations.

- .7 Establish foundation and floor elevations.
- .8 Establish lines and levels for mechanical and electrical work.

1.8 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.
- .3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.
- .4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.
- .6 All existing concrete floor slabs shall be scanned prior to any cutting or breaking of concrete. Employ a qualified concrete scanning company or inspection and testing agency to scan and map floor slabs for reinforcing, plastic and metal conduit, piping, grounding cables, embedment and the like. Map all slabs and provide copies to the Owner and Consultant.

1.9 Location of Services, Equipment and Fixtures

- .1 Location of services, equipment, fixtures and outlets indicated on drawings or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance. Include existing equipment which affects or will be affected by the work.
- .3 Inform Consultant of impending installation and obtain approval for actual location.

- .4 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.
- .5 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.
- .6 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- .7 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus and connections are coordinated.
- .8 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance and access are indicated and maintained.
- .9 Submit interference drawings to Owner and Consultant in accordance with Section 01 33 00.
- .10Unless specifically indicated by the Consultant, interference drawings will be received for information only and will not be reviewed.

1.10 Records

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.11 <u>Subsurface Conditions</u>

- .1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

PART 2 PRODUCTS

- 2.1 <u>Not Used</u>
 - .1 Not used

PART 3 EXECUTION

- 3.1 <u>Not Used</u>
 - .1 Not used

PART 1 <u>GENERAL</u>

- 1.1 <u>Section Includes</u>
 - .1 Requirements and limitations for cutting and patching the Work.

1.2 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit written request and obtain Consultant's approval 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
- .3 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 Date and time work will be executed.
- 1.3 <u>Materials</u>
 - .1 As specified and required for original installation.
 - .2 Change in Materials: Submit request for substitution in accordance with Section 01 25 00 Substitution Procedures.
 - .3 Requests for change in materials shall include documentation indicating conformance to project requirements and intent.

1.4 <u>Definitions</u>

- .1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- .2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 General: Comply with requirements specified in other Sections.
- .2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- .3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 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 or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide 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.

3.2 <u>General</u>

- .1 Carry out all cutting, fitting and patching required for the work of the Contract.
- .2 Repair all wall and floor surfaces where items have been removed.
- .3 Make good all finishes as required.
- .4 Repaint damaged wall surfaces.
- .5 Fit several parts together, to integrate with other Work.

- .6 Uncover Work to install ill-timed Work.
- .7 Remove and replace defective and non-conforming Work.
- .8 Provide cutting and patching of all openings in non-structural elements of Work as necessary to complete installation of mechanical and electrical Work. Include complete removal and replacement of such elements as necessary to provide construction access.
- .9 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .10 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .11 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval.
- .12 Restore work with new products in accordance with requirements of Contract Documents.
- .13 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .14 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with "ULC approved firestopping material, full thickness of the construction element. Include any openings in existing building elements created by removal of existing services or equipment.
- .15 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

3.3 Cutting and Patching

- .1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- .2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- .3 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

- .4 Temporary Support: Provide temporary support of work to be cut.
- .5 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- .6 Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 Summary of Work.
- .7 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- .8 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - .3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - .4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - .5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - .6 Proceed with patching after construction operations requiring cutting are complete.
- .9 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will

minimize evidence of patching and refinishing.

- .1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
- .2 Restore damaged pipe covering to its original condition.
- .3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.
 - .1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
- .4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- .5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- .10 Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.4 <u>Subfloor Levelling</u>

- .1 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove all flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Clean, patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.
- .2 Where new flooring is to be installed on new concrete slab or on framed floors, subfloor shall be levelled in accordance with flooring manufacturer's specifications and tolerances and with ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- 3.5 <u>Fire Barrier Seals</u>
 - .1 Ensure fire separations are maintained as indicated on the drawings. patch and firestop all penetrations accordingly.

PART 1 GENERAL

- 1.1 <u>Section Includes</u>
 - .1 Progressive Cleaning
 - .2 Final Cleaning

1.2 <u>References</u>

- .1 National Fire Protection Association (NFPA)
 - .1 NFPA 241-22 Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.3 <u>Project Cleanliness</u>

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use clearly marked separate bins for recycling.
- .7 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

PART 2 PRODUCTS

2.1 <u>Products</u>

- .1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including SDS for approval prior to commencement of cleaning operations.
- .2 Use only cleaning materials recommended by manufacturer of surface to be cleaned and recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.
- .6 Clean lighting reflectors, lenses, and other lighting surfaces. Clean and/or replace lamps, light fixtures, grilles and lenses.
- .7 HEPA vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .8 Thoroughly vacuum clean interior of electrical equipment.
- .9 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .10 Clean and seal concrete floor surfaces with non-skid matte sealer.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and

operation.

- .12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
- .13 Broom clean and wash exterior paved areas, walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs. Clear all drains, scuppers, gutters and downspouts.
- .16 Remove debris and surplus materials from crawl spaces and other accessible concealed spaces.
- .17 Remove snow and ice from access to building.
- .18 Under direction of Consultant, aim adjustable luminaires.

3.2 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

- .1 References.
- .2 Submittals.
- .3 Definitions.
- .4 Waste Management Goals for the Project.
- .5 Documents.
- .6 Waste Management Plan.
- .7 Materials Source Separation Program.
- .8 Disposal of Wastes.
- .9 Scheduling.
- .10 Storage, Handling and Protection.
- .11 Application.
- .12 Diversion of Materials.

1.2 <u>References</u>

- .1 O. Reg. 102/94 Waste Audits and Waste Reduction Work Plans.
- .2 O. Reg. 278/05 Occupational Health and Safety Act

1.3 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit a completed Waste Management Plan (WMP) prior to project start-up.

1.4 <u>Definitions</u>

- .1 Waste Management Plan (WMP): Contractor's approved overall strategy for waste management including waste reduction workplan and materials source separation program.
- .2 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Separate Condition: Refers to waste sorted into individual types.

1.5 <u>Waste Management Goals for the Project</u>

- .1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.
- .2 Of the waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized.

1.6 <u>Waste Management Plan</u>

- .1 Waste Management Plan: Submit a Waste Management Plan within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner. The Plan shall contain the following:
 - .1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared
 - .2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.
- .2 Post WMP or summary where workers at site are able to review its content.

1.7 <u>Materials Source Separation Program</u>

- .1 The Waste Management Plan shall include a Source Separation Program for recyclable waste and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.
- .2 Prepare MSSP and have ready for use prior to project start-up.

- .3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.
- .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.
- .5 Provide containers to deposit reusable and/or recyclable materials.
- .6 Locate containers to facilitate deposit of materials without hindering daily operations.
- .7 Locate separated materials in areas which minimize material damage.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.8 Disposal of Wastes

- .1 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .2 Provide appropriate on-site containers for collection of waste materials and debris. Containers for volatile wastes shall be closed containers and shall be removed from site daily.
- .3 Provide and use clearly marked separate bins for recycling.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
- .5 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .6 Do not permit waste to accumulate onsite.
- .7 Burying of rubbish and waste materials is prohibited.
- .8 Disposal of waste into waterways, storm, or sanitary sewers is prohibited.

1.9 <u>Scheduling</u>

.1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

1.10 Storage, Handling and Protection

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Owner.
- .2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.
- .3 Unless specified otherwise, materials for removal become Contractor's property.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 Application
 - .1 Do work in compliance with Waste Management Plan.
 - .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
 - .3 Source separate materials to be reused/recycled into specified sort areas.
- 3.2 <u>Designated Substances</u>
 - .1 All designated substances abatement, removal and disposal shall be completed in accordance with O. Reg 278/05 and all other applicable legislation.

3.3 Diversion of Materials

- .1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas.
- .2 On-site sale of materials is not permitted.

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

.1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 <u>References</u>

- .1 Canadian Construction Documents Committee .1 CCDC 2-2020 Stipulated Price Contract including Supplementary Conditions.
- .2 OAA/OGCA Document 100 Recommended Procedures Regarding Substantial Performance of Construction Contracts and Completion Takeover of Projects.
- .3 The Construction Act.

1.3 Inspection and Declaration

- .1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Consultant's review.
- .2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
 - .5 Operation of systems have been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for Final Review by the Consultant.
- .4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.

- .5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and Payment of Holdback for specifics to application.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.5 – Final Payment for specifics to application.
- .8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.4 Substantial Performance of Work and Payment of Holdback.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used

PART 3 EXECUTION

- 3.1 Not Used
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>Section Includes</u>

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

1.2 <u>Submittals</u>

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

1.3 <u>Submission</u>

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 At least 2 weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the draft Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 draft copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of final copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final Operating and Maintenance Manuals.
- .3 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.
- .4 Building will not be deemed ready for use unless the completed and submitted Operating and Maintenance Manuals and "As-built" Record Documents have been accepted by the Consultant.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

1.4 <u>Format</u>

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

1.5 <u>Contents Each Volume</u>

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

- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 Quality Control.

1.6 <u>As-Builts and Samples</u>

- .1 In addition to requirements in General Conditions, maintain at the site for Consultant one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

1.7 <u>Recording Actual Site Conditions</u>

- .1 Record information on set of drawings, provided by Consultant.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual

construction, including:

- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.
- .4 Submit following drawings:
 - .1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic "as-built" records on disk using latest version of AutoCad. Annotate "AS-BUILT RECORD" in each drawing title block.
 - .2 All changes shall be shown on a separate drawing layer named "as-built".
 - .3 At least 2 weeks prior to commencement of scheduled commissioning activities, submit one copy of the draft "As-built" Project Record Documents for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor the draft copy, with review comments, for revision. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final "As-built" Project Record Documents and disk of "as-built" record drawings.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- 1.8 Final Survey
 - .1 Submit final site survey certificate in accordance with Section 01 71 00 -Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.
- 1.9 <u>Equipment and Systems</u>
 - .1 Each Item of Equipment and Each System: include description of unit or system,

and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with Engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 Quality Control.
- .15 Additional requirements: as specified in individual specification sections.

1.10 <u>Materials and Finishes</u>

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

1.11 Spare Parts

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Spare parts as identified in individual sections are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.12 Maintenance Materials

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Maintenance materials are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.13 Special Tools

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Special tools are to be delivered to the Owner prior to the application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.14 Storage, Handling and Protection

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

1.15 <u>Warranties and Guarantees</u>

- .1 Separate each warranty or guarantee with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and guarantees, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.

- .6 Co-execute submittals when required.
- .7 Retain warranties and guarantees until time specified for submittal.

1.16 Independent Specialty Engineers Sign-Off

.1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

PART 2 PRODUCTS

- 2.1 Not Used
 - .1 Not used
- PART 3 EXECUTION
- 3.1 Not Used
 - .1 Not used

PART 1 <u>GENERAL</u>

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

.1 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 <u>References</u>

- .1 The National Building Code of Canada 2020, Part 8-Safety Measures on Construction and Demolition Sites.
- .2 CSA Group (CSA)
 - .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
- .3 ASTM International (ASTM)
 - .1 ASTM F710-22 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- .4 Ontario Provincial Regulations
 - .1 Ontario Regulation 102/94 Waste Audits and Waste Reduction Work Plans.
 - .2 Ontario Regulation 103/94 Environmental Protection Act.
 - .3 Ontario Regulation 213/07 The Fire Code.
 - .4 Ontario Regulation 232/98 Landfilling Sites.
 - .5 Ontario Regulation 278/05 Designated Substance Asbestos on Construction Projects and in Buildings and Repair Operations.
 - .6 Ontario Regulation 347 Environmental Protection Act, General Waste Management.
 - .7 Ontario Regulation 332/12 The Building Code.
- .5 The Workplace Health and Safety Act, and Regulations for Construction Projects.
- .6 The Contractors Health and Safety Policy.
- .7 Laws, rules and regulations of other authorities having jurisdiction.
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Submit detailed written schedule, methodology and proposed procedures for demolition, including a Safe Work Plan for review prior to commencement of demolition.

- .3 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures and underpinning.
- .4 Drawings for structural elements of the demolition process including shoring, underpinning and installation of new lintels or beams in existing load bearing walls, shall bear signature and stamp of qualified professional engineer registered in the Province of Ontario.
- .5 Submit proposed dust-control measures.
- .6 Submit proposed noise-control measures.
- .7 Submit schedule of demolition activities indicating the following:
 - .1 Detailed sequence of demolition and removal work, including start and end dates for each activity.
 - .2 Dates for shutoff, capping, and continuation of utility services.
- .8 If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- .9 At Project Closeout: Submit record drawings in accordance with Section 01 78 00. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions
- 1.5 <u>Permits</u>
 - .1 Obtain and pay for all permits and comply with all laws, rules, ordinances, and regulations relating to Demolition of Building and preservation of Public Health and Safety.
 - .2 The Consultant will complete General Review during demolition in accordance with the Ontario Building Code. All other engineering required for shoring design and for other structural elements of the demolition work will be completed by the Contractor's own engineer and paid for by the Contractor.

1.6 <u>Waste Management Plan</u>

.1 All work of this section shall be completed in accordance with the contractors approved Waste Management Plan specified in Section 01 74 19.

1.7 <u>Definitions</u>

- .1 Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- .2 Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.
- .3 Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.
- .4 Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively for the purpose of disposal.
- .5 Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.
- .6 Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A landfill must have a solid waste facilities permit from the Ministry of the Environment and be in conformance to O. Reg 232/98.
- .7 Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
- .8 Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.

- .9 Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.
- .10 Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by law.

1.8 <u>Quality Assurance</u>

- .1 Demolition Firm Qualifications: Demolition contractor shall be an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.
- .2 Regulatory Requirements: Comply with governing regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Obtain and pay for all permits required.
- .3 Pre-demolition Conference: Conduct a conference at Project site.
 - .1 Review the environmental goals of this Project and make a proactive effort to increase awareness of these goals among all labor forces on site.
 - .2 Review schedule and scheduling procedures.
 - .3 Review health and safety procedures.
 - .4 Review of Project conditions including review of record photographs.
- 1.9 <u>Project Conditions</u>
 - .1 Construct safety barriers, barricades, fencing and hoarding to separate public from work areas as described in Section 01 56 00.
 - .2 The Owner assumes no responsibility for the actual condition of the structures to be demolished.
 - .3 Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. Variations within the structures may occur by the Owner's salvage operations prior to start of demolition.
1.10 <u>Designated Substances</u>

- .1 Refer to Designated Substances Update and Controlled Products Survey # 12-1187-0086 (1034) dated February 5, 2013; prepared by Golder & Associates.
- .2 Should any other material not identified in the above referenced reports resembling asbestos or other hazardous substances be encountered in course of demolition work, immediately stop work and notify the Owner's Representative. Refer to Section 01 41 00.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Provide all materials necessary for temporary shoring. On completion, remove temporary materials from site.
- .2 All building materials removed from the building shall become the property of the Contractor unless specified otherwise and shall be reused in new construction or removed from the Site.
- .3 All concrete, masonry, asphalt and similar materials shall be crushed prior to disposal.

2.2 <u>Salvage</u>

- .1 All items of salvageable value must be salvaged.
- .2 Provide a schedule of items to be salvaged and clearly indicate which items are to be retained by Owner. Clearly identify and tag each salvageable item.
- .3 Transport salvaged items from the site as they are removed.
- .4 Items of salvageable value to the Contractor may be removed from the structure as the work progresses, if such items are not claimed by the Owner.

2.3 <u>Reuse</u>

.1 Salvage and reuse materials as indicated on the drawings.

2.4 <u>Recycle</u>

- .1 All materials from demolition and land clearing which can be recycled through local municipal programs and which is not scheduled for salvage shall be sorted and separated in accordance with Regional, Provincial and Municipal standards and regulations.
- .2 Provide recycling receptacles for the duration of construction activities at the building site.

PART 3 EXECUTION

3.1 Examination

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition, salvage and recycling required.
- .2 Verify that utilities have been disconnected and capped.
- .3 Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.
- .4 Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.
- .5 Perform surveys and tests as the Work progresses to detect hazards resulting from demolition activities.
- .6 Preliminary Survey:
 - .1 The Demolition Plans indicate the general extent of existing conditions based upon drawings provided by the Owner and existing site conditions. Review all areas of work to determine full extent of areas to be demolished, altered or renovated and become familiar with actual conditions and extent of work required.
 - .2 Before commencing demolition operations, examine Site and provide engineering survey to determine type of construction, condition of structure, and Site conditions. Assess strength and stability of damaged or deteriorated structures.

- .3 Assess potential effect of removal of any part or parts on the remainder of structure before such part(s) are removed.
- .4 Assess effects of demolition at adjacent structures and consider need for underpinning, shoring and/or bracing.
- .5 Investigate for following conditions:
 - .1 load bearing walls and floors
 - .2 structure suspended from another
 - .3 effects of soils, water, lateral pressures on retaining or foundations walls
 - .4 presence of tanks and other piping systems
 - .5 presence of designated substances and hazardous materials.
- .7 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential damage areas and photograph each for record purposes before starting work.

3.2 <u>Preparation</u>

- .1 Erect and maintain dustproof and weatherproof partitions as required to prevent spread of dust, fumes and smoke to other parts of building. Maintain fire exits. On completion, remove partitions and make good surfaces to match adjacent surfaces of building.
- .2 Provide all shoring and bracing required for the execution of the work.
- .3 Ensure all sedimentation controls as required are in place prior to commencement of demolition activities.
- .4 Before commencing demolition, verify that existing water, gas, electrical and other services in areas being demolished are cut off, capped diverted or removed as required. Post warning signs on electrical lines and equipment which must remain energized to serve adjacent areas during period of demolition.
- .5 Conduct demolition operations and remove materials from demolition to ensure minimum interference with roads, streets, walks, and other adjacent occupied and utilized facilities.
- .6 Do not close or obstruct streets, walks, or other adjacent occupied or utilized facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.3 <u>Utilities</u>

- .1 Contact authorities or utility companies for assistance in locating and marking services passing under, through, overhead or adjacent to structure to be demolished. Such services include:
 - .1 Electrical power lines
 - .2 Gas mains
 - .3 Communication cables
 - .4 Fibre optic cables
 - .5 Water lines.
 - .6 Drainage piping (storm and sanitary).
- .2 Before disconnecting, removing, plugging or abandoning any existing utilities serving the building:
 - .1 Notify the Owner, applicable utility companies, and local authorities having jurisdiction.
 - .2 Cut off and cap utilities at the mains on the property or in the street as required by the Owner and responsible utility company. Maintain fire protection to the existing buildings at all times.
 - .3 Remove, cut off and plug, or cap all utilities within the existing building areas to be demolished, except those designated to remain

3.4 <u>Protection</u>

- .1 Erect and maintain temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Maintain such areas free of snow, ice, water and debris. Lighting levels shall be equal to that prior to erection.
- .2 Provide safe access and egress from working areas using entrances, hallways, stairways or ladder runs, protected to safeguard personnel using them from falling debris.
- .3 Do not interfere with use and activities of adjacent buildings and site. Maintain free and safe passage to and from buildings.
- .4 Where demolition operations prevent normal access to adjacent properties, provide and maintain suitable alternative access.

- .5 Provide flagmen where necessary or appropriate, to provide effective and safe access to site to vehicular traffic and protection to Owner's personnel. Refer to Division 1 for safety requirements.
- .6 Protect existing site improvements, appurtenances, and landscaping that are designated to remain in place.
- .7 Ensure that all necessary controls are in place at the beginning of each work period which will prevent the spread of contaminated material beyond the work area limits. Stop work immediately if there exists any possibility of the spread of contaminated materials.
- .8 Keep dust from entering existing facilities and areas of building not affected by the Work. Comply with Ministry of Health requirements regarding debris control.
- .9 Ensure scaffolds, ladders, equipment and other such equipment are not accessible to public. Protect with adequate fencing or remove and dismantle at end of each day or when no longer required.
- .10 Take precautions to guard against movement, settlement or collapse of adjacent structures, services or driveways. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.
- .11 If Owner considers additional bracing and shoring necessary to safeguard and prevent such movement or settlement, install bracing or shoring upon Owner's orders.
- .12 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing premises.
- .13 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.
- .14 At all times protect the structure from overloading.
- .15 Provide protection around floor and/or roof openings.
- .16 Protect from weather, parts of adjoining structures not previously exposed.

- .17 Protect interiors of building parts not to be demolished from exterior elements at all times.
- .18At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling.

3.5 <u>Temporary Ventilation</u>

- .1 Provide all required temporary ventilation for demolition work.
- 3.6 <u>Environmental Controls</u>
 - .1 Comply with provincial and municipal regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.
 - .2 Protection of Natural Resources:
 - .1 Preserve the natural resources.
 - .2 Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.
 - .3 Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters. Provide sedimentation control where necessary.
 - .4 Store and service construction equipment at areas designated for collection of oil wastes.
 - .5 Oily Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.
 - .3 Dust Control, Air Pollution, and Odour Control: Prevent creation of dust, air pollution and odors.
 - .1 Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
 - .2 Store volatile liquids, including fuels and solvents, in closed containers.
 - .3 Properly maintain equipment to reduce gaseous pollutant emissions.
 - .4 Noise Control: Perform demolition operations to minimize noise.
 - .1 Provide equipment, sound deadening devices, and take noise abatement measures that are necessary to comply with municipal regulations.
 - .5 Salvage, Re-Use, and Recycling Procedures:

- .1 Identify re-use, salvage, and recycling facilities.
- .2 Develop and implement procedures to re-use, salvage, and recycle demolition materials.
- .3 Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
- .4 Source-separate clean and uncontaminated demolition materials including, but not limited to the following types:
 - .1 Concrete, Concrete Block, Concrete Masonry Units (CMU), Brick.
 - .2 Metal (ferrous and non-ferrous).
 - .3 Wood.
 - .4 Glass.
 - .5 Plastics and Insulation.
 - .6 Gypsum Board.
 - .7 Porcelain Plumbing Fixtures.
 - .8 Fluorescent Light Tubes.
 - .9 Paper: Bond, Newsprint, Cardboard, Paper, Packaging Materials.
 - .10 Other materials as appropriate.

3.7 <u>Performance</u>

- .1 Ensure demolition work is supervised by competent foreman at all times.
- .2 Demolition shall proceed safely in systematic manner. Work on each floor level shall be complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.
- .3 Until acceptance, maintain and preserve active utilities traversing premises.
- .4 Provide enclosed chutes for disposal of debris from heights more than 1 storey in accordance with CSA S350.
- .5 Maintain safety of site by shoring below-grade-structures and excavations resulting from demolition against collapse.

3.8 <u>Demolition</u>

.1 Review demolition procedures to ensure no personnel or equipment are located or working without additional safe working platforms or working surface adequate to support the operations.

- .2 Any damage caused to the adjacent buildings or properties by the neglect of the Contractor or any of his forces shall be made good at the expense of the Contractor including all costs and charges which may be claimed by the Owner for damages suffered.
- .3 Demolish in a manner to minimize dusting. Keep dusty materials wetted at all times.
- .4 Demolition: Use methods required to complete Work within limitations of governing regulations and as follows:
 - .1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .2 Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.
 - .3 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - .4 Break up and remove concrete slabs on grade in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.
 - .5 Remove all disconnected, abandoned utilities.
 - .6 Remove all finishes, fixtures, fitments and services as indicated
 - .7 Damages: Promptly repair damages to adjacent facilities caused by demolition operations.
 - .8 Prevent access to excavations by means of fences or hoardings.

3.9 <u>Selective Demolition</u>

- .1 Carefully dismantle and remove all items in as shown and as necessary to complete the work.
- .2 Salvage items scheduled for reuse or to be handed over to the Owner.
- .3 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger the existing buildings.
- .4 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building

drawings and remove and replace existing concrete floor toppings as necessary and where required.

- .5 Return areas to condition existing prior to the start of the work unless indicated otherwise.
- .6 At exterior and interior bearing walls to be removed, include breaking out and removal of existing concrete foundations to a minimum of 200 mm below new finished floor level.
- 3.10 Handling of Demolished Materials
 - .1 Conform to the approved Waste Management Plan.
 - .2 Do not allow demolished materials to accumulate or be stored on-site for more than 5 days.
 - .3 Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.
 - .4 Pallet and shrink-wrap materials scheduled for re-use and stockpile where directed on site.
 - .5 Disposal: Transport demolished materials off Owner's property and legally reuse, salvage, recycle, or dispose of materials. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.
 - .6 Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.
- 3.11 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.
 - .2 Clean adjacent streets and driveways of dust, dirt and materials caused by demolition operations.
 - .3 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

- .4 Upon completion of demolition work, remove debris, trim surfaces and leave work site clean.
- .5 Video storm and sanitary sewers and jet clean where debris may have accumulated

End of Section

Part 1 General

- 1.1 General
- .1 Conform to the requirements of Division 1.
- 1.2 Related Sections
- .1 Section 03 20 00 Concrete Reinforcing
- .2 Section 03 30 00 Cast-in-Place Concrete
- .3 Section 05 50 00 Metal Fabrications
- 1.3 References
- .1 ASTM International (ASTM)
- .1 ASTM D1751-04(2013)e1 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- .2 ASTM D1752-04a(2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
- .2 American Concrete Institute (ACI)
- .1 ACI 117-10, Standard Specifications for Tolerances for Concrete Construction and Materials.
- .2 ACI 347R-14 Guide to Formwork for Concrete
- .3 SP-4 Formwork for Concrete
- .3 CSA Group (CSA)
- .1 CSA A23.1/A23.2-14 Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CAN/CSA S269.3-M92 (R2013) Concrete Formwork.
- .3 CSA O86-14 Engineering Design in Wood
- 1.4 Submittals
- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop Drawings:
- .1 Submit shop drawings showing type, extent and locations of items to be built into concrete.
- .2 Sleeving Drawings: Submit drawings showing sleeves required through floors, roof and other structural members.
- .3 Submit drawings showing size and spacing of conduits and piping, if requested by Consultant.

- .4 Coordinate with other Divisions prior to submittal.
- .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
- .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
- .7 Consultant will review and return submitted drawings in accordance with an agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement, and shall not relieve Contractor of responsibility for errors or omissions in submitted drawings or of responsibility for meeting requirements of Contract Documents.
- .8 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .9 Do not commence placing sleeves, conduits, or piping before drawings have been reviewed and Consultant's comments incorporated on drawings issued to site.
- .10 Assume responsibility for accuracy of Work. Review of submitted shop drawings does not relieve Contractor from compliance with requirements of Contract Documents.
- .3 Submit shop drawings as follows:
- .1 4 copies for review before any Work commences.
- .2 1 additional copy for distribution as directed by Consultant.
- .3 1 copy to Inspection and Testing Company.
- .4 Required by Regulatory Agencies: Submit shop drawings bearing signature and seal of Professional Engineer responsible for formwork design, as may be required by regulatory Agencies. Proceed with construction of formwork only with their approval.
- 1.5 Requirements of Regulatory Agencies
- .1 Conform to local and provincial regulations, including construction safety regulations.
- 1.6 Quality Assurance
- .1 Obtain a copy of CSA A23.1-14/A23.2-14 and maintain on site
- .2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CAN/CSA S269.3-M92 (R2013) and CAN/CSA O86-14, as applicable.

- .1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor.
- 1.7 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.
- 1.8 Waste Management and Disposal
- .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.
- Part 2 Products
- 2.1 Materials
- .1 All materials shall be new, in accordance with referenced standards.
- .2 Plywood: Douglas Fir, conforming to CSA O121-08. Sound undamaged sheets finished one side, fabricated especially for use as concrete form panels, with sealed edges. Minimum 17mm thickness.
- .3 Lumber: Conforming to CSA O141-05 (R2009), with grade stamp clearly visible.
- .4 Chamfers: Cut from 19mm x 19mm wood, smooth with no open defects.
- .5 Form Ties: snap ties, with spreader washer and 25mm break back.
- .6 Joint Tape: non-staining, water impermeable, self-release.
- .7 Nails, Spikes and Staples: Galvanized, conforming to CSA B111-1974 (R2003).
- .8 Form Release Agent: Colourless mineral oil which will not stain concrete.

Part 3 Execution

3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Notify the Consultant of any conditions which would prevent proper completion of this work.
- .3 Commencement of work implies acceptance of existing conditions.

3.2 Erection

- .1 Verify lines, levels and centres before proceeding with formwork. Ensure dimensions agree with drawings.
- .2 Align joints and make watertight, to prevent leakage of cement paste and disfiguration of concrete.
- .3 Construct formwork to produce concrete with dimensions, lines and levels within tolerances specified in ACI 347R-14.
- .4 Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.
- .5 Install chamfers at all external corners exposed to view.
- .6 Adequately brace and shore formwork to sustain loads (both concrete and working loads) applied during construction.
- .7 Be responsible for safety of the structure both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

3.3 Built-In Work

- .1 Form openings and build in anchors, inserts, sub-frames, key-ways, sleeves, miscellaneous metal items, reglets and similar items furnished under Work of other Sections, which are indicated on Drawings and on shop drawings of other trades, and as required for proper completion of Work.
- .2 Do not embed wood in concrete.
- .3 Anchor Bolts: Tie anchor bolts securely in position to prevent movement during concrete placing. Use template to locate bolts. Verify that bolts have specified projection above concrete.

- .4 Openings or Sleeves Not Shown on Structural Drawings:
- .1 Obtain Consultant's written approval before forming openings of sleeves through columns and beams, or through slabs within 1800 mm of their supports.
- .2 Obtain Consultant's written approval before forming openings or sleeves larger than 200 mm square in any location.
- .5 Embedded Pipe or Conduit Not Shown or Detailed on Structural Drawings:
- .1 Obtain Consultant's written approval before placing conduit or pipe which would be embedded in finished structure.
- .6 Confirm that built-in items that penetrate surface waterproofing are installed to meet requirements of waterproofing trade.
- 3.4 Construction Joints
- .1 Form construction and expansion joints with bulkheads to ensure straight lines. Immediately before subsequent pour at construction joint, remove bulkhead and tighten forms so that concrete surfaces will be on same plane with no overlapping of concrete.
- .2 Review with Consultant proposed location and details of construction joints in walls, columns, beams and slabs.
- .1 Construction joints shall present appearance of normal form panel joint.
- .2 Install continuous shear key in construction joints in walls and framed floors which are 152mm or more thick.
- .3 Provide vertical construction joints in walls at not more than 20 metres centre to centre.
- 3.5 Treatment of Formwork Surfaces
- .1 Form Release Agent:
- .1 Coat formwork with form release agent before reinforcement, anchors, accessories, and other built in items are installed.
- .2 Do not coat plywood forms pre-treated with release agent.
- .3 On surfaces to receive finish materials, adhesives, sealers, paint or other coatings or materials, use a compatible release agent.
- 3.6 Stripping of Formwork
- .1 Strip formwork on vertical surfaces when concrete has hardened sufficiently that no damage will result from stripping operations.
- .2 Do not remove plywood formwork by jerking loose or by metal pinch bars. Use wood

wedges and gradually force panels loose. Leave plywood forms in place as long as possible to permit maximum shrinkage away from concrete.

- .3 Take particular care not to damage external corners when stripping formwork.
- .4 When forms are stripped during curing period, cure and protect exposed concrete in accordance with Section 03 30 00 Cast-in-Place Concrete.
- 3.7 Defective Work
- .1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective work.
- .2 Replace defective work, as directed by Consultant.
- .3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if work has proven to be deficient.
- .4 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost.
- 3.8 Cleaning
- .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

Part 1 General

- 1.1 General
- .1 Conform to the requirements of Division 1.
- 1.2 Related Sections
- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 30 00 Cast-in-Place Concrete
- .3 Section 04 05 19 Masonry Anchorage and Reinforcing
- .4 Section 04 22 00 Concrete Unit Masonry
- .5 Section 05 50 00 Metal Fabrications
- 1.3 References
- .1 ASTM International (ASTM)
- .1 ASTM A143/A143M-07(2014) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
- .2 ASTM A1064/A1064M-17 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- .2 American Concrete Institute (ACI)
- .1 ACI SP-66 (04) ACI Detailing Manual.
- .3 CSA Group (CSA)
- .1 CSA A23.1/A23.2-14 Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA A23.3-14, Design of Concrete Structures.
- .3 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
- .4 CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .5 CSA W186-M1990 (R2012) Welding of Reinforcing Bars in Reinforced Concrete Construction
- .4 Reinforcing Steel Institute of Canada (RSIC)
- .1 RSIC Reinforcing Steel Manual of Standard Practice.
- 1.4 Submittals
- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop Drawings:
- .1 Submit shop drawings, including placing drawings and bar lists.
- .2 Prepare placing drawings and bar lists in accordance with the American Concrete

Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.

- .3 Prepare placing drawings to minimum scale of 1:50.
- .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
- .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
- .6 Show concrete cover to reinforcement.
- .7 Show location of construction joints.
- .8 Prior to submission to Consultant, review all shop drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each shop drawing with the requirements of Work and Contract Documents.
- .9 Review of each shop drawing shall be indicated by stamp, date, and signature of a responsible person.
- .10 At time of submission, notify Consultant in writing of any deviations in shop drawings from requirements of Contract Documents.
- .11 Consultant will review and return shop drawings in accordance with the agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement, and shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of Contract Documents.
- .12 Make any changes in shop drawings which Consultant may require consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .13 Do not commence fabrication of reinforcement before drawings have been reviewed and Consultant's comments incorporated on drawings issued to fabricating shop.
- .3 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.
- .1 Distribute inspection reports as follows:
- .1 2 copies to Consultant.
- .2 1 copy to Consulting Structural Engineer
- .3 1 copy to Contractor.
- .4 Quality Assurance Submittals:
- .1 Mill Test Report: upon request, provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Upon request submit in writing to Consultant proposed source of reinforcement material to be supplied.

- 1.5 Quality Assurance
- .1 Obtain a copy of CSA A23.1-09, and maintain on site.
- .2 Qualifications:
- .1 Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186-M1990 (R2012).
- .3 Source Quality Control:
- .1 Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.
- .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.
- .6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.
- 1.6 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 Waste Management and Disposal
- .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.
- Part 2 Products
- 2.1 Materials
- .1 In accordance with reference standards.
- .2 Substitute different size bars only if permitted in writing by Consultant.

- .3 Bar Reinforcing Steel:
- .1 Bars which are to be welded by arc-welding process: to CSA G30.18-09, Grade 400W.
- .2 Other bars: to CSA G30.18-09, Grade 400R.
- .4 Plain round bars: to CSA G40.20-04/G40.21-04 (R2009).
- .5 Welded Wire Fabric: to ASTM A1064/A1064M-15 and in flat sheets, not rolls.
- .6 Cold-drawn annealed steel wire ties: to ASTMA497/A497M-07.
- .7 Chairs, bolsters, bar supports, spacers: to CSA A23.1-09.
- .8 Mechanical splices: subject to approval of Consultant.
- 2.2 Fabrication
- .1 Fabricate reinforcing steel only in permanent fabricating shop.
- .2 Fabricate reinforcing steel in accordance with shop drawings.
- .3 Tag reinforcing bars to indicate placement as designated on shop drawings.
- .4 Splices:
- .1 Provide splices only where specifically indicated on Drawings.
- .2 Stagger alternate mechanical splices 750 mm apart.
- .3 Stagger alternate end bearing splices 750 mm apart.
- .4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

Part 3 Execution

- 3.1 Examination
- .1 Before starting this work, examine work done by others which affects this work.
- .2 Examine formwork to verify that it has been completed, and adequately braced in place.
- .3 Notify the Consultant of any conditions which would prejudice proper completion of this work.
- .4 Commencement of work implies acceptance of existing conditions.

- 3.2 Installation
- .1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3-04.
- .2 Adequately support reinforcing and secure against displacement within tolerances permitted.
- .3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.
- .4 Do not cut reinforcement to incorporate other Work.
- .5 Relocate or rebend bars only on written instructions of Consultant.
- .6 Tie, do not weld, reinforcement in place.
- 3.3 Adjusting and Cleaning
- .1 Adjust and secure reinforcement in correct position immediately before concrete is placed.
- .2 Remove contaminants which lessen bond between concrete and reinforcement.
- 3.4 Field Quality Control
- .1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.
- .2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before each concrete placement, and correct as necessary.
- .3 Be aware that Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only, and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.
- 3.5 Defective Work
- .1 Incorrectly fabricated, misplaced or omitted reinforcement, will be considered defective Work.
- .2 Replace or adjust defective reinforcement before concrete is placed as directed by

Consultant.

- .3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.
- .4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.
- 3.6 Cleaning
- .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

Part 1 General

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 20 00 Concrete Reinforcing
- .3 Section 04 05 19 Masonry Anchorage and Reinforcing
- .4 Section 04 22 00 Concrete Unit Masonry
- .5 Section 07 26 00 Vapour Barriers
- .6 Section 07 92 00 Joint Sealants

1.3 References

- .1 ASTM International (ASTM)
- .1 ASTM C150/C150M-15 Standard Specification for Portland Cement
- .2 ASTM C309-11 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
- .3 ASTM C330/C330M-14 Standard Specification for Lightweight Aggregates for Structural Concrete
- .4 ASTM C494/C494M-15a Standard Specification for Chemical Admixtures for Concrete
- .5 ASTM C881/C881M-14 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
- .6 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
- .7 ASTM C1107/C1107M-14a Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- .8 ASTM D412-06a(2013) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- .9 ASTM D624-00(2012) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- .10ASTM D1751-04(2013)e1 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- .11ASTM D1752-04a(2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
- .12ASTM D2240-05(2010) Standard Test Method for Rubber Property—Durometer Hardness

- .2 American Concrete Institute (ACI)
- .1 ACI 117-10, Standard Specifications for Tolerances for Concrete Construction and Materials.
- .2 ACI 232.1R-12, Use of Raw or Processed Natural Pozzolans in Concrete
- .3 CSA Group (CSA)
- .1 CSA A3000-13 Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005), Includes Update No. 1 (2014), Update No. 2 (2014), Update No. 3 (2014)
- .2 CSA A23.1/A23.2-14 Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .3 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.
- .4 Ontario Provincial Standard Specifications (OPSS)
- .1 OPSS 1010, Material Specification for Aggregates Granular A, B, M and Select Subgrade Material.
- .2 OPSS 1212, Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.
- 1.4 Submittals
- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Samples: Submit for inspection, material samples of specified mix designs.
- .3 Concrete Mix Designs:
- .1 Submit concrete mix designs for review; when optimum bulk density of aggregates is specified, provide supporting evidence of compliance with requirements.
- .2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
- .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1-14, Clause 7. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
- .4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1-14.
- .5 Submit mix design for each type of concrete. Specify intended use for each mix design.
- .6 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
- .7 Submit in writing, proposed method of in-situ strength testing.
- .4 Inspection Reports: Inspection and Testing Company shall:
- .1 Submit written reports of inspection and tests.
- .2 Distribute reports as follows:
- .1 2 copies to Consultant;

- .2 1 copy to Consulting Structural Engineer;
- .3 1 copy to Contractor.
- .3 On concrete cylinder test reports, include:
- .1 Specific location of concrete represented by sample
- .2 Design strength.
- .3 Unit weight of sample
- .4 Class of exposure
- .5 Aggregate size and mixtures incorporated
- .6 Date, hour and temperature at time sample taken
- .7 Percentage air content
- .8 Test strength of cylinder
- .9 Type of failure if test fails to meet specification.
- 1.5 Quality Assurance
- .1 Obtain a copy of CSA A23.1-14/A23.2-14, and maintain on site.
- .2 Source Quality Control:
- .1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.
- .2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or nonperformance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .3 Inspection and Testing Company shall be certified under CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
- .4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
- .5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
- .6 Perform Work of source quality control in accordance with CSA A23.2-09 and to include:
- .1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
- .2 Review of proposed concrete mix designs.
- .3 Sampling, inspection, and testing of materials as may be required.
- .3 Field Quality Control:

- .1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
- .2 Perform sampling, inspection and testing in accordance with CSA A23.2-14, and to include:
- .1 Making of standard slump tests.
- .2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
- .3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
- .4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.
- .3 Inspection for Tolerances:
- .1 Confirm that concrete work meets specified tolerance requirements.
- .2 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
- .4 Slabs-on-Grade:
- .1 Observe application of curing compound to sample slab, recording rate of application.
- .2 Monitor on a random basis acceptable to the Consultant, that slab is being saw cut before slab temperature starts to fall.
- .3 Qualifications: Floor finishing shall be undertaken only by contractors with at least 10 years of experience.
- .4 Sample of Finish Flooring:
- .1 Finish an area of floor slab where directed by Consultant to provide sample of finish for approval.
- .2 Protect new sample area until finish is approved.
- .3 If liquid membrane curing compound is to be used on Project, determine and apply correct quantity required to meet rate of coverage recommended by manufacturer for measured test area.
- .4 Approved sample will provide standard by which subsequent finishing will be judged and will be incorporated into Work.

1.6 Tolerances

- .1 In accordance with ACI 117-10 and CSA A23.1-14.
- .2 Difference between elevation of high point and low point in specified area not to exceed:
- .1 In any bay up to 100 m2: 12 mm.
- .2 In any bay up to 400 m2: 25 mm.

- .3 Straightedge method: Finish floor slabs to meet following tolerances when measured at 72 +/- 12 hours after completion of floor finishing, before shores are removed from formed slabs, by placing a freestanding unleveled straight edge anywhere on slab and allowing it to rest on two high points. Gap between straightedge placed on two high points and slab not to exceed:
- .1 3 metre straightedge: 8 mm (Class A).
- .2 2 metre straightedge: 4 mm.
- 1.7 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 Common Product Requirements.
- 1.8 Job Conditions
- .1 Protect floor slabs, and concrete surfaces exposed to view or on which finishes are to be applied, from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.
- .2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1-14, the following shall apply to Work of this Section:
- .1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21° C for three days after placing, not less than 10°C for the next two days and above freezing for the next two days.
- .2 Do not permit alternate freezing and thawing for fourteen days after placing.
- .3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.
- .4 Provide protection to maintain concrete continuously moist during curing period.
- .5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.
- .6 Do not place bonded toppings on rough slabs that are less than 15°C.
- .7 Do not grout at ambient air temperatures or concrete surface temperatures less than 5°C, or when temperature is forecast to fall to less than 5°C within 24 hours of grouting.
- .8 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5° C.
- 1.9 Project Records
- .1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.

- .2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure, cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.
- 1.10 Waste Management and Disposal
- .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

Part 2 Products

- 2.1 Materials
- .1 To meet specified requirements of referenced Standards.
- .2 Cement:
- .1 Portland Cement: to ASTM C150/C150M-12.
- .2 Cementitious Hydraulic Slag: to ACI 232.1R-12
- .3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.
- .4 Coarse Aggregates:
- .1 20 mm to 5 mm (No. 4 sieve) except as specified below.
- .2 For slabs-on-grade 125 mm and thicker: 40 mm to 5 mm (No. 4 sieve); combine at least two of the single sizes specified in Table 5 Group II of CSA A23.1-14, one of which is to be 40 mm, to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
- .3 For slabs-on-grade: Abrasion loss not to exceed 35%. Petrographic number of aggregate not to exceed 125 when tested in accordance with ASTM C295/C295M-12 Standard Guide for Petrographic Examination of Aggregates for Concrete.
- .4 For toppings 50 mm thick and less: 12 mm to 5 mm (No. 4 sieve).
- .5 .Admixtures:
- .1 Conform to Reference Standards for chemical admixtures.
- .2 Provide only admixtures that are free of chlorides.
- .3 When requested, provide evidence acceptable to Consultant that superplasticizer does no increase shrinkage of concrete.
- .6 .Premoulded Expansion Joint Filler:
- .1 Asphalt impregnated fibreboard conforming to ASTM D1751-04(2008), sizes indicated on drawings.

- .7 Bonding Agent: To ASTM C881/C881M-10, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.
- .8 Saw Cut Filler: Semi-rigid flexible epoxy joint filler shall be a two-component, pourable, moisture insensitive formulation and possess the following characteristics:
- .1 Compliance to ACI 302.1R for joint fillers used in control and construction joints.
- .2 Solids, % by weight, ASTM D1259-06(2012): 100%.
- .3 Tensile adhesion to concrete 24° C, ASTM D5329-09: 290 psi.
- .4 Shore D Hardness (7 days), ASTM D2240 05(2010): 60.
- .5 Shore A Hardness (7 days), ASTM D2240 05(2010): 95.
- .6 Tensile Strength, ASTM D638-10.
- .1 24° C, (3 days): 660 psi.
- .2 24°C, (7 days): 770 psi.
- .7 Elongation, ASTM D638-10.
- .1 24° C, (3 days): 72%.
- .2 24° C, (7 days): 53%
- .8 Water Absorption 24° C (24 hrs.), ASTM D570-98(2010)e1: 0.56% by weight.
- .9 Sealant: Refer to Section 07 92 00 Joint Sealants
- .10 Mechanical Anchors: 'Kwik' Bolts, 'Cinch' Anchors or Parabolts.

2.2 Concrete Mixes

- .1 Ready Mix, with 28 day compressive strength as indicated on Drawings.
- .2 Design concrete mix in conformance with CSA A23.1-14, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
- .1 Slabs-on-Grade:
- .1 Use type 20 Portland cement, or replace 35 percent type Portland cement with cementitious hydraulic slag.
- .2 When mean daily temperature exceeds 25° C at time of placement, replace 25 percent of type 20 cement, or 50 percent of type 10 cement, with cementitious hydraulic slag.
- .3 Use water/cementing materials ratio 0.45 maximum.
- .4 Use aggregates specified in paragraphs 2.1.3.
- .5 Cementing materials content 325 kg/m.
- .6 Modulus of rupture 3.5 MPa average, 3.0 MPa minimum.

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- .7 Slump at delivery, before addition of superplasticizer, 50 mm; add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement.
- .2 Interior Concrete, other than specified above, and not exposed to freezing and thawing or the application of deicing chemicals: select water/cementing materials ratio and cementing materials content on basis of strength, workability, and finishing requirements.
- .3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.
- .4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.
- .5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m; adjusted proportionally for maximum air content listed in CSA A23.1-14, Clause 15, Table 10.
- 2.3 Admixtures
- .1 Chemical Admixture: Incorporate water-reducing admixture, type WN, in all concrete.
- .2 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.
- 2.4 Concrete Toppings
- .1 Provide topping with minimum 28 day compressive strength of 32 MPa.
- 2.5 Premixed Grout
- .1 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107/C1107M-14a. Compressive strength at 28 days: 59 MPa.
- .2 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM ASTM C1107/C1107M-14a. Compressive strength at 28 days: 59 MPa.

Part 3 Execution

- 3.1 Examination
- .1 Before starting this work, examine work done by others which effects this work.

- .2 Notify Consultant of any condition which would prejudice proper completion of this work.
- .3 Commencement of work implies acceptance of existing conditions.
- .4 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.
- 3.2 Treatment of Formed Surfaces
- .1 Conform to the requirements of CSA A23.1-14, and as additionally specified herein.
- .2 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.
- 3.3 Placing Concrete
- .1 Place concrete in accordance with requirements CSA A23.1-14.
- .2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.
- .3 Do not place concrete in water or open frozen surfaces.
- .4 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.
- .5 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- .6 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.
- .7 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.
- .8 Place floor slabs to depth indicated on the drawings with 25 MPa minimum concrete unless otherwise noted on drawings but consistent with minimum cement content specified for exposed floors in this specification.
- .9 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.

- 3.4 Finishing Concrete
- .1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1-14, and as specified herein.
- .2 Screed the top of rough floor slabs to an even level or sloping surface at the proper elevation to receive the finish or topping specified on the drawings and in finish schedule.
- .3 Provide a smooth steel trowel finish on all areas scheduled to receive a covering, or painted finish.
- .4 Curb Edging: Finish external corners of curbs rounded and smooth.
- 3.5 Curing
- .1 Cure concrete in accordance with CSA A23.1-14.
- 3.6 Grouting
- .1 Mix prepackaged grout with water in accordance with manufacturer's instructions.
- .2 Dampen concrete surfaces immediately before installing grout.
- .3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.
- .4 Slope grout beyond edge of plate at 45 degrees.
- .5 Provide same environmental protection and curing as specified for concrete.
- 3.7 Joint Sealant
- .1 Apply sealant to thoroughly dry surfaces only, at ambient air temperatures above 5° C.
- .2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.
- .3 Confirm that preformed joint filler and backer rod are compatible with sealant.
- .4 Caulk joints in accordance with the following:
- .1 Do not commence joint preparation until concrete is at least 28 days old.

- .2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
- .3 Blow clean with compressed air with oil trap on line, or vacuum clean.
- .4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
- .5 Prime joint if required, as recommended by sealant manufacturer.
- 3.8 Defective Work
- .1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.
- .2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.
- .3 Replace or repair defectively placed or finished concrete as directed by the Consultant.
- .4 Testing and Replacement of Deficient Concrete in Place:
- .1 Pay for additional testing and related expenses if concrete has proven to be deficient.
- .2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.
- 3.9 Cleaning
- .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 04 27 00 Multiple Wythe Unit Masonry
- .3 Section 05 12 23 Structural Steel
- .4 Section 05 50 00 Metal Fabrications

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .2 CSA Group (CSA)
 - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
 - .2 CSA S304-14 (R2019) Design of Masonry Structures.
 - .3 CSA A370-14 (R2018) Connectors for Masonry.
 - .4 CAN/CSA A371-14 (R2019) Masonry Construction for Buildings.
 - .5 CSA G30.3-M1983 (R1998) Cold-Drawn Steel Wire for Concrete Reinforcement.
 - .6 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
 - .7 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
- .3 American Concrete Institute (ACI)
 - .1 Detailing Manual
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 Reinforcing Steel Manual of Standard Practice

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit the following samples:
 - .1 Two of each type of masonry reinforcing and connector specified.

- .3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .4 Shop Drawings:
 - .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
 - .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
 - .3 Prepare placing drawings to minimum scale of 1:50.
 - .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
 - .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
 - .6 Show cover to reinforcement
 - .7 Show location of construction joints.
- 1.5 <u>Design Criteria</u>
 - .1 Non-conventional Masonry Connectors
 - .1 Deflection: maximum 2.0 mm, including free play when acted upon by 0.45 kN lateral load, in all possible positions of adjustment.
 - .2 Positive restraint at position of maximum adjustment.
 - .2 Multi-component Ties Free Play: Maximum 1.2 mm, when assembled in any possible configuration.

1.6 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 <u>Waste Management and Disposal</u>

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 All metal components: hot dipped zinc galvanized to CSA S304 unless otherwise indicated.
- .2 Bar Reinforcement: To CSA A371 and CSA G30.18, grade 400R, deformed billet steel bars.
- .3 Column Ties: Fero CAT Tie (Column Adjustable Tie), spot weld to columns at 400 mm c/c.
- .4 Connectors: to CSA A370 and CSA S304.
 - .1 Finish: Steel components, hot dip galvanized to CAN/CSA A370.
 - .2 For steel stud/masonry veneer application; length to suit combined total wall thickness; with polyethylene insulation support where required.
 - .3 Side Mounting Rap Ties:
 - .1 Flat-Plate: Length to suit steel stud width and thickness of gypsum sheathing, membrane and insulation.
 - .2 V-Tie: Length to provide placement of legs at centerline of solid unit veneer.
 - .3 Insulation support.
 - .4 Basis of Design: Side Mounting Rap Ties by Fero Corporation
 - .4 Strip Ties: Prescriptive corrugated strip tie. 100 mm x 22 mm x 0.91 mm thick corrugated tie conforming to CSA A370.
- .5 Wire Reinforcement: To CSA A371 and CSA G30.3.
 - .1 Interior walls: hot dipped galvanized to CSA S304
 - .1 4.76 mm wire diameter hot dipped galvanized to CSA S304 for interior bearing walls.
 - .2 3.66 mm wire diameter bright wire finish, standard duty for interior non-bearing walls and partitions
 - .3 Truss Type: Blok-Trus BL-30 by Blok-Lok Ltd. for non-vertically reinforced walls
 - .4 Ladder Type: Blok-Trus BL-10 by Blok-Lok Ltd. for vertically reinforced walls
- .6 Equivalent products as manufactured by the following manufacturer's may be used subject to submission and acceptance by the Consultant of technical data: .1 Hohmann and Barnard Inc.
- .7 Epoxy Adhesive: Hilti HIT-HY 2270 Adhesive anchor.

2.2 <u>Fabrication</u>

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

PART 3 EXECUTION

- 3.1 Installation
 - .1 Install masonry reinforcement, connectors and anchors in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304 unless indicated otherwise.

3.2 <u>Reinforcement</u>

- .1 Unless otherwise noted, all masonry walls shall be reinforced with joint reinforcement.
- .2 Reinforcement shall be installed in the first and second bed joints, 200 mm apart immediately above lintels and below sill at openings, and in bed joints at 400 mm vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 600 mm beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 150 mm at splices.
- .3 Use prefabricated corner and tee sections for continuous reinforcement at corners and intersecting walls.

- .4 Vertical reinforcement shall have a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.
- .5 All block cores containing vertical reinforcing and/or anchor bolts shall be solidly filled with non-shrink grout.
- .6 Place reinforcement and ties in grout spaces prior to grouting.
- .7 Cleanouts: Provide cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 1.5 m.
- .8 Construct cleanouts so that the space to be grouted can be cleaned and inspected. In solid grouted masonry, space cleanouts horizontally a maximum of 800 mm on center.
- .9 Construct cleanouts with an opening of sufficient size to permit removal of debris. The minimum opening dimension shall be 76 mm.
- .10 After cleaning, close cleanouts with closures braced to resist grout pressure.

3.3 Bonding and Tying

- .1 Bond walls of two or more wythes using seismic connectors and ladder type reinforcement in accordance with CSA S304, CSA A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with CSA S304, CSA A371 and as indicated.
- .3 Masonry ties shall be installed as per the requirements of CSA A371 with maximum spacing of 400 mm vertically and 400 mm horizontally.

3.4 Reinforced Lintels and Bond Beams

- .1 Reinforce masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA S304.
- 3.5 <u>Metal Anchors</u>
 - .1 Do metal anchors as indicated.

3.6 Lateral Support and Anchorage

- .1 Do lateral support and anchorage in accordance with CSA S304 and as indicated.
- .2 Anchor new masonry to existing with steel dowels as indicated. Drill into existing masonry and set reinforcing bars in epoxy adhesive in accordance with manufacturer's instructions.

3.7 <u>Control Joints</u>

- .1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.
- .2 Control joints shall be stepped to avoid cutting lintel beams. Under no circumstance shall the control joints be placed to compromise the bearing for the lintel.
- 3.8 <u>Field Bending</u>
 - .1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.
 - .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
 - .3 Replace bars and connectors which develop cracks or splits.

3.9 <u>Field Touch Up</u>

- .1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.
- 3.10 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 <u>GENERAL</u>

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 20 00 Concrete Reinforcing
- .3 Section 03 30 00 Cast-in-Place Concrete
- .4 Section 04 05 19 Masonry Anchorage and Reinforcing
- .5 Section 04 27 00 Multiple Wythe Unit Masonry
- .6 Section 05 12 23 Structural Steel
- .7 Section 05 50 00 Metal Fabrications
- .8 Section 06 10 00 Rough Carpentry
- .9 Section 07 84 00 Firestopping
- .10 Section 07 92 00 Joint Sealants
- .11 Section 08 11 00 Metal Doors and Frames
- .12 Section 09 21 16 Gypsum Board
- .13 Section 09 91 23 Interior Painting

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM C90-22 Standard Specification for Loadbearing Concrete Masonry Units
 - .2 ASTM C129-22 Standard Specification for Nonloadbearing Concrete Masonry Units
 - .3 ASTM C150/C150M-22 Standard Specification for Portland Cement
 - .4 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes.
 - .5 ASTM D2240-15(2021) Standard Test Method for Rubber Property— Durometer Hardness.
 - .6 ASTM D5249-10(2021) Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.
- .2 CSA Group (CSA)
 - .1 CSA A23.1-14/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
 - .2 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units.
 - .3 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
 - .4 CSA A370-14 (R2018) Connectors for Masonry.

- .5 CSA A371-14 (R2019) Masonry Construction for Buildings.
- .6 CSA S304-14 (R2019) Design of Masonry Structures.
- .3 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Data: Submit manufacturer's printed product literature, specifications and data sheets
- .3 Submit the following samples:
 - .1 Two (2) of each type of concrete masonry units specified.
 - .2 Two (2) of each type of masonry accessory specified.
- .4 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
- .5 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.
- .6 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .7 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.
 - .1 Distribute inspection reports as follows:
 - .1 Consultant.
 - .2 Structural Engineer
 - .3 Contractor.

1.5 <u>Quality Assurance</u>

.1 The masonry sub-contractor shall have a minimum of five years of continuous documented Canadian experience in work of the type and quality shown and specified. Proof of experience shall be submitted when requested by the Consultant and shall be subject to the approval of the Consultant.

- .2 Pre-installation meeting: conduct pre-installation meeting to verify project requirements manufacturer's instructions and manufacturer's warranty requirements.
- .3 Field Quality Control:
 - .1 Inspection and testing will be carried out by Testing Laboratory designated by Owner.
 - .2 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
 - .3 Inspection and Testing Company shall perform sampling, inspection and testing of masonry work at site, in accordance with referenced standards, including but not limited to the following:
 - .1 Masonry Placement Inspection
 - .2 Reinforcing Steel Placement
 - .3 Grout and Mortar Testing
 - .4 CMU Testing
 - .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
 - .5 Provide access to Work for inspectors.
- 1.6 <u>Shipping, Handling and Storage</u>
 - .1 Refer to Section 01 61 00 Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Materials shall be kept clean and dry.
 - .4 Deliver cement, lime and mortar ingredients with manufacturer's seal and labels intact.
 - .5 Cementitious material and aggregates shall be stored in accordance with the requirements of CSA A23.1.
 - .6 Exposed units which become stained or chipped, surface marked or scratched, and materials which are affected by inadequate protection shall be replaced, at no additional expense to the Owner.

1.7 <u>Project Conditions</u>

- .1 Provide heat enclosures and heat as required.
- .2 Work to be undertaken shall be carried out according to CAN3-A371, Clause 5.15.2.
- .3 Maintain temperature of mortar between 5 ° C and 50 ° C until batch is used.
- .4 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.
- .5 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- 1.8 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Masonry Units: Concrete Block: Modular, conforming to CCMPA requirements and CSA A165.1.
 - .1 H/20/A/M concrete masonry units to be used at all load bearing masonry walls.
 - .2 H/15/A/M concrete, masonry units, at all other locations unless noted otherwise.
 - .3 SS/15/A/M semi-solid concrete masonry units to be used at all 2 hour rated fire walls.
 - .4 Refer to drawings for Fire Resistance Ratings. Type of concrete and block to conform to Table 5.0, Fire Resistance Rating of Concrete Block in Hours, of the Canadian Concrete Masonry Producers Association Handbook.
 - .5 Special shapes: provide special shapes indicated or required including bullnose and corner blocks, base blocks, fillers, and the like as may be required. Provide purpose made shapes for lintels and bond beams.
 - .6 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.

- .2 Bar Reinforcement, wire reinforcement, connectors and ties: as specified in Section 04 05 19 Masonry Anchorage and Reinforcing.
- .3 Control Joint Filler: to ASTM D5249-10, Type 1, Round, flexible, continuouslength, nonabsorbent, nongassing, nonstaining, and nonshrinking. Extruded from a cross-linked polyethylene. Flexibile foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.
- .4 Pre-manufactured Masonry Control Joint: Pre-manufactured polyvinylchloride control joints may be used in lieu of the specified built-up type of joint.
- .5 Mortar: Conforming to CSA A179.
 - .1 Use same brand of material and source of aggregate for entire project.
 - .2 Aggregate: CSA A179, fine grain aggregates.
 - .3 Cement: normal Portland to ASTM C150, Type 10.
 - .4 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
 - .5 Hydrated Lime: Type 'S' to ASTM C207.
 - .6 Type 'S' mortar shall be used for all concrete block masonry work.
 - .7 Proprietary Mortar Mixes: conform to mix requirements specified
 - .8 Mortar colour for concrete unit masonry work shall be grey.
 - .9 Admixtures of any kind are not allowed.
- .6 Grout: to CSA A179, Table 3: Premixed, non-shrink non-metallic grout.
- .7 Other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant

2.2 <u>Mixes</u>

- .1 Mixing: Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use.
- .2 Mix proprietary mortars in strict accordance with manufacturer's instructions to produce the specified mortar types in accordance with CSA A179. Do not use retempered mortars.
- .3 Take representative samples for testing consistency of strength and colour according to CSA A179.

2.3 Damp Course and Flashings

- .1 Peel and stick modified SBS bitumen membrane reinforced with proprietary glass screen, minimum thickness of 1.0 mm.
- .2 Lap Sealant: recommended by flashing manufacturer.

2.4 <u>Accessories</u>

.1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

PART 3 EXECUTION

3.1 Examination

- .1 Examine work of other trades for defects or discrepancies and report same in writing to Consultant.
- .2 Installation of any part of this work shall constitute acceptance of such surfaces as being satisfactory.

3.2 <u>General</u>

- .1 Do masonry work in accordance with CSA A371 except where specified otherwise.
- .2 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section.
- .3 Coordinate work of this Section with others such as, field welding of anchors to steel work, insulation application, and the like. Prepare all items for built-in as the work proceeds, either supplied and installed by other trades or installed under this Section.
- .4 Unless otherwise indicated on the drawings, all interior masonry partitions shall extend from floor level to the underside of floor or roof structures above.

3.3 Installation

.1 Build 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 Lay block with webs to align plumb over each other with thick ends of webs up. The top course of all partitions which do not pass through a ceiling or up to the underside of a roof deck shall have the open cells filled solid.
- .4 Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush mounted electrical outlets, grilles, pipes, conduits, leaving 3 mm maximum clearance.
- .5 Fill all vertical and bed joints, including plain end faces, through the entire wall thickness solidly with mortar.
- .6 Do not break bond of exposed walls where partitions intersect and if bond would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.
- .7 Bond intersecting block walls in alternate courses.
- .8 Terminate non load bearing walls within 20 mm of structure above unless indicated otherwise.
- .9 Where walls are pierced by structural members, ducts, pipes, fill voids with mortar to within 20 mm of such members.
- .10 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, is not permitted. Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.
- .11 Do not wet concrete masonry before or during laying in wall.
- .12Bed and vertical joints shall be evenly and solidly filled with mortar.
- .13 Provide reinforced bond beams where indicated on structural drawings.
- .14 Provide vertical reinforcement as indicated on structural drawings. Fill all reinforced cores solid with grout as indicated. Provide cleanout port at bottom of each grouted core when required by Consultant.

3.4 Exposed Masonry

- .1 Do not use chipped, cracked or stained, and otherwise damaged units or unsatisfactory material in exposed and load bearing masonry walls.
- .2 Lay all joints 10 mm thick (uniform). All joints shall be full of mortar except where specifically designated to be left open.
- .3 All joints shall be slightly concave. Use sufficient force to press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing by means of a trowel or rubbing with burlap bag.
- .4 Provide bullnose block at all exposed masonry corners.

3.5 <u>Tolerances</u>

.1 Tolerances in notes to Clause 5.3 of CSA A371 apply.

3.6 <u>Reinforcement and Connectors</u>

.1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.7 <u>Concrete Masonry Lintels</u>

- .1 Refer to Section 04 05 19 Masonry Anchorage and Reinforcing.
- .2 Lintels in non-load-bearing walls shall be constructed with special bond or lintel block units unless shown otherwise on plans. Lintels shall bear 200 mm minimum and bearing shall be isolated with two layers of heavy asphalt coated paper.
- .3 Reinforcing steel in lintels shall be 2 x 20 M bars minimum specified under Section 04 05 19 Masonry Anchorage and Reinforcing, or as noted on drawings.
- .4 Concrete fill for lintels shall be 25 MPa or as noted on the drawings. Concrete shall be as specified in Section 03 30 00.

3.8 Loose Steel Lintels

.1 Install loose steel lintels. Centre over opening width.

.2 Lintels supplied under Section 05 50 00 – Metal Fabrications.

3.9 <u>Control Joints</u>

- .1 Provide continuous joints as indicted and at spacing not to exceed 6000 mm c/c unless noted otherwise on drawings.
- .2 Break vertical mortar bond with extruded neoprene gasket or building paper.
- .3 Prime control joint to prevent drying out of caulking material.

3.10 <u>Support of Loads</u>

- .1 Use 25 MPa concrete unless specified otherwise on the Drawings, where concrete fill is used in lieu of solid units.
- .2 Use grout to CSA A179 where grout is used in lieu of solid units.
- .3 Install building paper below voids to be filled with grout. Keep paper 25 mm back from face of units.
- 3.11 Lateral Support and Anchorage
 - .1 Do lateral support and anchorage of masonry in accordance with CSA S304.1 and as indicated.

3.12 Grouting

.1 Grout masonry in accordance with CSA S304.1 and as indicated.

3.13 <u>Temporary Wall Bracing</u>

- .1 Design and provide all required temporary engineered wall bracing.
- .2 Brace masonry walls to resist wind pressure and other lateral loads during construction period.
- .3 Provide temporary bracing of masonry work during and after erection until mortar has cured and permanent lateral support is in place
- 3.14 <u>Built-ins</u>

- .1 Build in items required to be built into masonry and provided by other Sections, including bearing plates, door frames, anchor bolts, sleeves and inserts. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.
- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill voids between masonry and metal frames with masonry mortar or insulation, as indicated on drawings or as required to provide a neat, finished appearance.
- .4 Set wall plates on masonry in non-shrink grout in accordance with manufacturer's instructions.
- .5 Do all cutting, fitting, drilling, patching and making good for other trades in masonry work.
- 3.15 Protection
 - .1 Protect masonry units from damage resulting from subsequent construction operations.
 - .2 Use protection materials and methods which will not stain or damage masonry units.
 - .3 Remove protection materials upon Substantial Performance, or when risk of damage is no longer present.
- 3.16 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.
 - .2 Allow mortar droppings on unglazed concrete masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.
 - .3 Remove mortar from concrete floor slabs and leave entire area vacuum clean.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 20 00 Concrete Reinforcing
- .2 Section 03 30 00 Cast-in Place Concrete
- .3 Section 04 05 19 Masonry Anchorage and Reinforcing
- .4 Section 04 22 00 Concrete Unit Masonry
- .5 Section 05 50 00 Metal Fabrications
- .6 Section 06 10 00 Rough Carpentry
- .7 Section 07 84 00 Firestopping
- .8 Section 07 92 00 Joint Sealants
- .9 Section 08 11 00 Metal Doors and Frames

1.3 <u>References</u>

- .1 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.
- .2 ASTM International (ASTM)
 - .1 ASTM C90-22 Standard Specification for Loadbearing Concrete Masonry Units
 - .2 ASTM C129-22 Standard Specification for Nonloadbearing Concrete Masonry Units
 - .3 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes
 - .4 ASTM D2240-15(2021) Standard Test Method for Rubber Property-Durometer Hardness
 - .5 ASTM D5249-10(2021) Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
- .3 American Concrete Institute (ACI)
 - .1 ACI 530.1-05/ASCE 6-05/TMS 602-05 Specification for Masonry Structures.
- .4 CSA Group (CSA)
 - .1 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units.
 - .2 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
 - .3 CSA A370-14 (R2018) Connectors for Masonry
 - .4 CSA A3000-18 Cementitious Materials Compendium
 - .5 CSA A371-14 (R2019) Masonry Construction for Buildings.
 - .6 CSA S304-14 (R2019) Design of Masonry Structures

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit full range of manufacturer's standard colour samples of coloured mortar for selection of colours by the Consultant.
- .3 Data: Submit manufacturer's printed product literature, specifications and data sheets
- .4 Submit the following samples:
 - .1 Two of each type of clay brick masonry units and two concrete masonry units specified.
 - .2 Two of each type of masonry accessory specified.
 - .3 Submit samples of coloured mortar selected by the Consultant.
- .5 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
- .6 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.

1.5 <u>Quality Assurance</u>

- .1 The masonry sub-contractor shall have a minimum of five (5) years of continuous documented Canadian experience in work of the type and quality shown and specified. Proof of experience shall be submitted when requested by the Consultant and shall be subject to the approval of the Consultant.
- .2 Mockup
 - .1 Refer to Section 01 45 00 Quality Control.
 - .2 Prior to proceeding with the work of this section, construct a 1200 mm long x 1000 mm high panel mock-up, to establish for the Consultant's review and acceptance, the general construction and appearance of the installed masonry walls including mortar colours. Mock-up panel shall incorporate each type of masonry unit, use of reinforcement, connectors, through wall flashings, air barriers, weep holes, jointing, coursing, mortar and workmanship.
 - .3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with the work.

- .4 Erect as many panels as are necessary to obtain Consultant's acceptance without additional cost to the Owner. Remove rejected panels from site.
- .5 Upon the Consultant's acceptance, complete all masonry work in strict accordance with the standards established in the mock-up.
- .6 The accepted mock-up panel shall remain intact until the work of this Section has been accepted by the Consultant and shall serve as the basis of standard for the work.
- 1.6 <u>Shipping, Handling and Storage</u>
 - .1 Refer to Section 01 61 00 Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Materials shall be kept clean and dry.
 - .4 Deliver cement, lime and mortar ingredients with manufacturer's seal and labels intact.
 - .5 Cementitious material and aggregates shall be stored in accordance with the requirements of CAN A23.1.
 - .6 Exposed units which become stained or chipped, surface marked or scratched, and materials which are affected by inadequate protection shall be replaced.
 - .7 Masonry units shall be delivered to site in protective film and shall be stored without contact with ground or ground water.
- 1.7 <u>Cold Weather Requirements</u>
 - .1 Provide heat enclosures and heat as required.
 - .2 Work to be undertaken shall be carried out according to CAN3-A371, Clause 5.15.2.
 - .3 Maintain temperature of mortar between 5 °C and 50 °C until batch is used.
- 1.8 Hot Weather Requirements
 - .1 Protect freshly laid masonry from drying too rapidly by means of waterproof,

non-staining coverings.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Concrete Masonry Units:
 - .1 Concrete Block: Modular, conforming to CCMPA requirements and CSA A165.
 - .2 H/20/A/M concrete masonry units to be used at all multiple wythe exterior walls.
 - .3 Special shapes: provide special shapes indicated or required including bullnose and corner blocks, base blocks, fillers, and the like as may be required. Provide purpose made shapes for lintels and bond beams.
 - .4 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.
- .2 Reclaimed Facebrick: Existing clay brick masonry units to be reused for patching and repair of existing masonry walls shall be cleaned of all mortar materials prior to reuse. Do not use chipped, cracked or stained units. Refer to Section 02 41 19.13.
- .3 Masonry Reinforcement and Connectors: Bar Reinforcement, wire reinforcement, connectors and ties: as specified in Section 04 05 19.
- .4 Control Joint Filler: to ASTM D5249, Type 1, Round, flexible, continuous-length, nonabsorbent, non-gassing, non-staining, and non-shrinking. Extruded from a cross-linked polyethylene. Flexible foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall: Sealtight Cera-Rod by W. R. Meadows Canada Limited.

.5 Mortar and Grout:

- .1 Conforming to CSA A179
- .2 Use same brand of material and source of aggregate for entire project.
- .3 Aggregate: CSA A179 coarse sharp clean sand, free from salt, alkaline or other organic substances, specifically graded for masonry use.
- .4 Cement: To CSA A3000, masonry cement. Type S. Blended mixes of Portland cement to CSA A3000 and double hydrated lime to ASTM C207.
- .5 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
- .6 Hydrated Lime: Type 'S' to ASTM C207.

- .7 Type 'S' mortar shall be used for all masonry work.
- .8 Proprietary Mortar Mixes: St. Lawrence Cement Company, Blue Circle Cement, Daubois Inc., Lafarge Canada. Mortar mixes shall conform to mix requirements specified.
- .9 Mortar colour for concrete block masonry work shall be grey.
- .10 Mortar for facebrick units shall be coloured with ground coloured natural aggregates. Up to three (3) colours will be selected by the Consultant.
 - .1 Coloured mortar: colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample.
- .11 Admixtures of any kind are not allowed except as specified for coloured mortar.
- .12 Grout: to CSA A179, Table 3.
- .13 Premixed, non-shrink non-metallic grout: Non Shrink Grout by C.P.D., V3 Grout by W.R. Meadows of Canada, NS Grout by Euclid.
- .14 Parging Mortar: Type N, to CSA A179.
- .6 Other Materials: all other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant.
- 2.2 <u>Mixes</u>
 - .1 Mixing: Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use. Mix proprietary mortars in strict accordance with manufacturer's instructions to produce the specified mortar types in accordance with CSA A179. Do not use retempered mortars.
 - .2 Admixtures: in accordance with manufacturer's printed directions.
 - .3 Use mortar within 2 hours after mixing at temperatures of 26 °C, or 2-1/2 hours at temperatures under 10 °C.
 - .4 Take representative samples for testing consistency of strength and colour according to CSA A179.

2.3 Damp Course and Flashings

- .1 Fully compatible with air barrier membrane specified in Section 07 27 13. Self-adhesive modified SBS bitumen membrane reinforced with proprietary glass screen, minimum thickness of 1.0 mm:
 - .1 Vedagard Non-slip by Bakor Inc.

- .2 Perm-A-Barrier Wall Flashing by W.R. Grace & Co.
- .3 Mel-Dek by W.R. Meadows
- .4 Enverge Flashguard by Firestone.
- .2 Lap Sealant: recommended by flashing manufacturer.
- .3 Surface primers and conditioners as recommended by membrane manufacturer.

2.4 <u>Accessories</u>

- .1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.
- .2 Packing Insulation: loose glass fibre insulation or mineral wool with minimum density of 17.6 kg/m³.

2.5 Fabrication

- .1 Lintels in non-load-bearing walls shall be constructed with special bond or lintel block units unless shown otherwise on plans. Lintels shall bear 150 mm minimum and bearing shall be isolated with two layers of heavy asphalt coated paper.
- .2 Reinforcing steel in lintels shall be 2 x 20 M bars or as noted on drawings.
- .3 Concrete fill for lintels shall be 20 MPA or as noted on the drawings. Concrete shall be as specified in Section 03 30 00.

PART 3 EXECUTION

3.1 Existing Conditions

- .1 Examine work of other trades for defects or discrepancies and report same in writing to Consultant.
- .2 Installation of any part of this work shall constitute acceptance of such surfaces as being satisfactory.

3.2 <u>General</u>

.1 Do masonry work in accordance with CSA A371 except where specified otherwise.

- .2 Refer to structural drawings for additional requirements for load bearing masonry walls.
- .3 Build masonry plumb, level and true to line, with vertical joints in alignment.
- .4 Lay out coursing and bond to achieve correct coursing heights and continuity of bond above and below openings, with minimum cutting.
- .5 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section. The workmanship in construction of exposed masonry walls shall be of highest calibre and first class in all respects.
- .6 Chipped, cracked or stained, and unsatisfactory material or workmanship of all masonry work shall be replaced with undamaged units.
- .7 Co-ordinate work of this Section with others such as, field welding of anchors to steel work, insulation application, installation of conduit and the like. Prepare all items to built-in as the work proceeds, either supplied and installed by other trades or installed under this Section.
- .8 Walls shall be constructed as true planes and when tested with a 3 metre straight edge placed anywhere on the wall in any direction shall be true within 3 mm.
- .9 Variation in the Sizes of Wall Openings: A 6 mm maximum variation is allowed from the actual designated size of wall openings.
- .10 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, will not be permitted. Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply. Bed and vertical joints shall be evenly and solidly filled with mortar.
- .11 All mortar shall be used and placed in final position within 2 hours of mixing. Mortar not used within this time limit shall be discarded.
- .12 Lay all joints 10 mm thick (uniform) unless otherwise specified or otherwise indicated on drawings. All joints shall be full of mortar except where specifically designated to be left open.

- .13 All joints shall be slightly concave. Use sufficient force to press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing by means of a trowel or rubbing with burlap bag.
- .14 Coordinate with Electrical and Mechanical trades and set smooth faced block at locations of all outlets, boxes, switches, thermostats and other devices.

3.3 <u>Blockwork</u>

- .1 Provide special shapes and sizes as required such a halves, jambs, lintels, solids, corners, bullnoses and double bullnoses, semi-solids, ashlar, etc.
- .2 Lay block with webs to align plumb over each other with thick ends of webs up.
- .3 Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush mounted electrical outlets, grilles, pipes, conduits, leaving 3 mm maximum clearance.
- .4 Do not wet concrete masonry before or during laying in wall.
- .5 Fill all vertical and bed joints, including plain end faces, through the entire wall thickness solidly with mortar.
- .6 Bond intersecting block walls in alternate courses.
- .7 Provide bullnose block at all exposed masonry corners.
- .8 Provide reinforced bond beams where indicated on structural drawings.
- .9 Provide vertical reinforcement as indicated on structural drawings.
- .10 Where walls are pierced by structural members, ducts, pipes, fill voids with mortar to within 20 mm of such members.
- .11 All exposed interior block corners shall be bullnose.

3.4 Interior Multi-Wythe Walls

.1 Interior wall construction shall be erected as shown on the drawings of reclaimed clay brick and concrete block.

- .2 Bond walls of two or more wythes and tie masonry veneer to backing in accordance with NBC, CSA S304, CSA A371, and as indicated.
- .3 Masonry units shall be laid up in running bond unless indicated otherwise.
- .4 Place continuous dampcourse and flashing membrane at the bottom of all exterior walls, including at bottom of walls and over all openings. Extend flashing from exterior face of exterior wythe, turned up backing face minimum 150 mm and built into the first horizontal block joint or bonded to sheathing with adhesive, unless otherwise indicated. Lap all joints 150 mm and seal with adhesive.
- .5 Jointing: allow joints to dry just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints.

3.5 <u>Reinforcement</u>

.1 Refer to Section 04 05 19 and structural drawings.

3.6 <u>Connectors</u>

.1 Refer to Section 04 05 19.

3.7 Control Joints

- .1 Provide continuous joints as indicated.
- .2 Joints shall be full height and thickness of wall and shall be 10 mm wide.
- .3 Break vertical mortar bond with extruded neoprene gasket or building paper.
- .4 Prime control joint to prevent drying out of caulking material.

3.8 <u>Concrete Masonry Lintels</u>

- .1 Install reinforced concrete block lintels over openings in masonry walls where steel or reinforced concrete lintels are not indicated.
- .2 End bearing: not less than 200 mm.

.3 Refer to Section 04 05 19 and drawings.

3.9 Loose Steel Lintels

.1 Install loose steel lintels. Centre over opening width. Lintel sizes indicated on structural drawings and supplied under Section 05 50 00.

3.10 Grouting

.1 Grout masonry in accordance with CSA S304 and as indicated.

3.11 <u>Support of Loads</u>

- .1 Use 20 MPa concrete unless specified otherwise on the Drawings, where concrete fill is used in lieu of solid units. Refer to structural drawings.
- .2 Use grout to CSA A179 where grout is used in lieu of solid units.
- .3 Install building paper below voids to be filled with grout. Keep paper 25 mm back from face of units.

3.12 Lateral Support and Anchorage

.1 Refer to Section 04 05 19.

3.13 <u>Temporary Wall Bracing</u>

- .1 Design and provide all required temporary engineered wall bracing.
- .2 Brace masonry walls to resist wind pressure and other lateral loads during construction. Bracing of all masonry walls during construction and prior to completion of supporting structures is a mandatory requirement.

3.14 <u>Built-Ins</u>

- .1 Build in items provided by other Sections, including bearing plates, door frames, anchor bolts, sleeves, inserts and loose steel lintels. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.
- .2 Fill voids between masonry and metal frames with masonry mortar or insulation, as indicated on drawings or as required to provide a neat finished appearance.

- .3 Set wall plates on masonry in non-shrink grout in accordance with manufacturer's instructions.
- .4 Do all cutting, fitting, drilling, patching and making good for other trades in masonry work.
- .5 Consultant's approval shall be obtained before cutting.

3.15 <u>Protection</u>

- .1 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Protect masonry units from damage resulting from subsequent construction operations.
- .4 Use protection materials and methods which will not stain or damage masonry units.
- .5 Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

3.16 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Obtain and follow material manufacturer's written instructions for Cleaning. Test sample area, 3.0 m x 3.0 m, to judge effectiveness of cleaning procedures.
- .3 Keep wall clean and free of mortar stains during laying.
- .4 Protect windows, trim and metal.

- .5 Remove mortar with wood paddles and scrapers before wetting. Saturate masonry with clean water and flush off loose mortar and dirt. Clean masonry work using water, scrubbing brushes and wood paddles only.
- .6 Remove mortar from concrete floor slabs and finished surfaces.
- .7 Leave entire area vacuum clean.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 04 22 00 Concrete Unit Masonry
- .3 Section 04 27 00 Multiple Wythe Unit Masonry
- .4 Section 05 50 00 Metal Fabrications
- .5 Section 09 91 23 Interior Painting

1.3 <u>References</u>

- .1 ASTM International, (ASTM)
 - .1 ASTM A108-18 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
 - .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .4 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
 - .5 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .6 ASTM A1011/A1011M-23 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
 - .7 ASTM F3125/F3125M-22 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .2 CSA Group (CSA)
 - .1 CSA G40.20/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16:19 Design of Steel Structures.
 - .4 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members

- .5 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
- .6 CSA-W48.1-M1991 (R1998) Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
- .7 CSA-W55.3-08 (R2013) Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .8 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
- .9 CSA W178.1-18 Certification of Welding Inspection Organizations.
- .10CSA W178.2-18 Certification of Welding Inspectors.
- .3 American Welding Society (AWS)
 - .1 AWS A2.4:2020 Standard Symbols for Welding, Brazing, and Nondestructive Examination
- .4 Structural Steel Painting Council
 - .1 SSPC-SP 6-91 Commercial Blast Cleaning.
- .5 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)
 - .1 CISC/CPMA 1-73a Quick-Drying, One-Coat Paint for Use on Structural Steel.
- .6 American Institute of Steel Construction (AISC)
 - .1 Code of Standard Practice for Steel Buildings and Bridges, Section 10, Architectural Exposed Structural Steel, latest edition.
- .7 The National Building Code of Canada.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit shop and erection drawings. Submit typical details of connections and any special connections for review before preparation of shop drawings. Assume responsibility for the accuracy of Work. Review of submitted shop drawings is to ensure only that the Contract Documents are being correctly interpreted.
- .3 Professional Engineer responsible for connection design shall sign and seal each shop drawing.
- .4 Show on shop drawings the size, spacing, and the location of structural steel members; connections; attachments; reinforcing; anchorage and required inserts; and all necessary plans, elevations and details.
- .5 Show splice locations and details.

- .6 Welded connections shall be designated by welding symbols in compliance with AWS A2.4:2020 and indicate clearly net weld lengths.
- .7 Submit design calculations if requested by the Consultant.
- .8 Submit diagrams showing methods of erection.
- .9 Field Work Drawings shall be submitted as shop drawings.
- .10 Notify Consultant in writing of any deviations in shop drawings from the requirements of the Contract Documents.
- .11 Submit a schedule of fabrication to the Consultant and the Testing Agency, prior to commencement of fabrication.

1.5 Qualifications

.1 Undertake welding and/or welding inspection by welders fully approved to one or more of the reference codes and standards where applicable.

1.6 Quality Assurance

- .1 Connections:
 - .1 Connections designed by Engineer: Submission of shop drawings for connection which have been detailed on Drawings shall represent acceptance by Contractor that connection can be executed successfully.
 - .2 Design of other connections which cannot be selected from standard designs tabulated in CISC Handbook of Steel Construction shall be by a Professional Engineer, licensed in the Province of Ontario, experienced in structural steel connection design.
 - .3 Consultant will review connection arrangement to verify general conformance with overall design concept of structure.
 - .4 Connection design engineer shall be insured for professional liability in accordance with section 74 subsection (1) of Regulation 941 of the Ontario Professional Engineers Act. The alternative of compliance with subsection (2) is not acceptable.
 - .5 Provide connections adequate to resist reaction of beam, when beam is loaded to maximum flexural capacity under uniformly distributed load, unless reaction or connection detail is shown on Drawings.
 - .1 Provide flexible beam connections for unrestrained members in accordance with CSA S16.1, unless shown otherwise on Drawings.

- .2 Select connections, wherever possible, from standard designs tabulated in current edition of CISC Handbook of Steel Construction, except that length of beam web angles shall not be less than half the depth of beam, and single angles shall not be used.
- .3 Provide direct connections to flanges of spandrel beams (exterior perimeter beams) to restrain twisting.
- .2 Design:
 - .1 Connections:
 - .1 Provide bolted or welded connections, unless shown otherwise on Drawings.
 - .2 Use high strength bolts to ASTM F3125 for all connections.
 - .3 Use slip resistant (friction-type) connections for bolted joints designed to resist reversible forces.
 - .4 Provide tension adjustment hardware at rod type bracing and at flat bar type bracing.
 - .5 Do not permit connections to encroach on clearance lines required for installation of Work of other Sections.
- .3 Random Splicing: Obtain in writing from Consultant, prior to commencement of shop drawings, special requirements that will be imposed as a necessary condition of acceptance of members with randomly located butt welded splices.
- .4 All edge perimeter angles and bent plates installed at roof framing level shall be joined by butt weld splices designed for full tension capacity of members being joined.
- 1.7 <u>Tolerances</u>
 - .1 In addition to tolerances specified in CSA S16, erect shelf angles and sash angles attached to steel frame within a tolerance of 3 mm plus or minus, with abutting ends of members at the same level.

1.8 Inspection and Testing

- .1 Refer to Section 01 45 00 Quality Control.
- .2 Inspection and testing of materials and shop fabrication of Work of this Section, and field quality control, will be performed by an independent Inspection and Testing Company. Refer to Section 01 45 00 - Quality Control.

- .3 The Inspection and Testing Company shall meet qualification requirements of CSA W178.1 and shall be certified by the Canadian Welding Bureau in Category 1 Buildings.
- .4 Welding Inspectors and supervisors shall be certified by Canadian Welding Bureau to CSA W178.2, to minimum level 2 certification.
- .5 Provide free access for inspectors to all places work is being performed, whether on site or off.
- .6 Mill inspection shall ensure that materials conform to specified requirements. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests.
- .7 Shop inspection shall ensure that structural steel is fabricated in accordance with the shop drawings, and the specified fabrication and welding procedures.
- .8 The cost of inspection and testing of splices introduced by the fabricator and not required on the Contract Documents will be paid by the Contractor.
- .9 Inspection and Testing Company when appointed shall carry out shop inspection to verify:
 - .1 Structural materials and paint conform to Specifications. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests of structural materials.
 - .2 Fabrication and welding conforms to Specifications and dimensioned shop drawings.
 - .3 Shop cleaning and preparation and prime painting to conform to specified requirements.
 - .4 Surfaces inaccessible for cleaning and painting after assembly are treated before assembly.
 - .5 For surfaces painted with zinc rich paint or zinc primer, specified surface preparation is followed and specified paint thickness is applied.
- .10 Non-destructive Testing of Welded Connections: Carry out non-destructive testing of welded connections chosen at random as follows:
 - .1 Check and record steel member sizes for 20% of columns, beams and girders.
 - .2 Check 5% of all welds by magnetic particle inspection.
 - .3 Check 25% of moment connections and all connections subject to direct tension involving use of full penetration groove welds by ultrasonic testing.

- .4 Check 10% (minimum 2 per connection) in accordance with Section 23 of CSA S16 of pretensioned connections including main building bracing connections.
- .11 More frequent testing and inspection shall be completed if random tests described above are not satisfactory. These costs are to be paid by the Contractor.

1.9 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver products that are only supplied under work of this Section to those who are responsible for their installation, to the work site as directed and to meet construction schedule.
- .3 Handle and store structural steel in such a manner that no damage, including corrosion, is caused to the stored or erected work, or to other property.
- .4 Store structural steel off of ground on timber supports.
- 1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal. PART 2 <u>PRODUCTS</u>

2.1 <u>Materials</u>

- .1 Rolled shapes, hollow structural sections, plates and rods: new steel, in compliance with CSA and/or ASTM Standards indicated on Structural Drawings.
- .2 Welding Electrodes: to meet the requirements set forth in the applicable standard of the CSA W48 Series on welding electrodes. (Any process which produces deposited weld metal meeting the requirements of the applicable W48 Series Standard for any grade of arc welding electrodes shall be accepted as equivalent to the use of such electrodes.)
- .3 High Strength Bolts: to meet specified requirements of ASTM F3125
- .4 Machine Bolts: to meet specified requirements of ASTM A307.
- .5 Anchor Bolts: To CSA-G40.20/G40.21, Grade 300W.

- .6 Shop Coat Paint:
 - .1 Interior structural steel: To meet specified requirements of CISC/CPMA 1-73a and compatible with Master Painters Institute INT 5.1S or 5.1X Institutional low odour/low VOC semi-gloss finish. Colour to be grey.
- .7 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A153.

PART 3 EXECUTION

- 3.1 <u>Fabrication</u>
 - .1 Fabricate work of this Section in compliance with CSA S16, and as specified following.
 - .2 Connections:
 - .1 Make bolted or welded connections.
 - .2 Use high strength bolts unless otherwise noted on Drawings.
 - .3 Use friction type high strength bolts for the connections of bracing members (diagonal kickers) resisting the effects of applied lateral loads. Provide tension adjustment at flat bar and rod type lateral bracing.
 - .4 Do not permit connections to encroach on the clearance lines required for the installation of work of this Section.
 - .3 Beam Connections:
 - .1 Provide beam connections adequate to resist the reactions produced by the framing or load conditions.
 - .2 Provide beam to column connections that apply vertical reaction with negligible eccentricity at the connecting face of the column, such as single or double beam web connections, end plate connections or un-stiffened seats, unless otherwise shown on Drawings. Submit for review, in advance of the preparation of shop drawings, connections which do not meet these requirements.
 - .3 Provide connections complying with the requirements of the CISC Handbook of Steel Construction, except that the length of beam web angles shall not be less than half the depth of the beam and single angles shall not be used.
 - .4 Provide direct connections to flanges of spandrel beams to restrain twisting.
 - .4 Holes in Structural Members:

- .1 Punch holes 11 mm to 27 mm in diameter as required for attaching the work of other Sections to structural steel members. Locate holes so that no appreciable reduction of the strength of members is caused.
- .2 Provide holes for pipes and ducts, and reinforce openings as indicated on drawings. Cutting of holes in structural members in the field will not be permitted except with written approval of the Consultant.
- .3 Provide effective drainage holes to prevent the accumulation of water in tubular members.
- .5 Member Separators: Provide separators at approximate spacing of 1200 mm o.c. for double beams and channels as follows:
 - .1 For beams and channels 225 mm or less in depth: one or two rows of pipe separators.
 - .2 For beams and channels over 225 mm in depth: channel separators, unless otherwise detailed on Drawings.
- .6 Built up Compression Members General Requirements: Comply with the requirements of CSA-S16, for all built up compression members.
- .7 Column Bearing Plates: Mill column bearing plates under column bearing unless plate is sufficiently flat to give adequate contact bearing between column and plate.
- .8 Structural Steel Painting: All prime painting shall be shop applied and the responsibility of the steel fabricator. Refer to specific priming requirements specified in Section 09 91 23 Interior Painting.
 - .1 Paint in accordance with manufacturer's published directions. Paint steel in the shop under cover. Keep painted members under cover until the paint has dried.
 - .2 Clean and prepare surfaces, as appropriate for paint specified, in accordance with Commercial Blast Cleaning is only required where zinc rich paint is to be applied. All other steel to be or clean steel in compliance with SSPC SP6 where zinc rich paint is shop applied.
 - .3 Where paint is applied adjacent to welded joints, remove it to bare metal for a distance of at least 50 mm beyond sides of joints.
 - .4 Do not paint surfaces and edges to be field welded, contact surfaces of friction type connections assembled by high strength bolts, surfaces encased in or in contact with concrete.
- .9 Galvanizing: Galvanize members as indicated and in accordance with reference standards, after shop welding is complete.

- .1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.
- .2 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
- .3 Coating Requirements:
 - .1 Weight: the weight of the galvanized coating shall conform with Table 1 of CSA G164 or paragraph 6.1 of ASTM A123 and Table 1 of ASTM A153 (as appropriate).
 - .2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article.
- .4 The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
- .5 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.2 Examination

.1 Verify, before delivery of structural steel, that work of other Sections on which work of this Section is dependent is correctly installed and located.

3.3 <u>Preparation</u>

.1 Supply anchor bolts, base and bearing plates and other members to be built in under work of other Sections as the work progresses. Cooperate with installers of this work and provide instructions for setting items to be built in.

3.4 <u>Erection</u>

- .1 Comply with CSA S16 and work site safety plans in erection of work of this Section.
- .2 Make adequate provision for horizontal and vertical erection loads and for sufficient temporary bracing to keep structural frame plumb and in true alignment until the completion of erection, and the installation of masonry, concrete work, and floor and roof decks which provide the necessary permanent bracing.
- .3 Provide temporary steel members as may be required for erection purposes and remove them when no longer required.

- .4 Installation of Bearing and Column Base Plates: Install bearing plates and standard wall anchors for beams bearing on masonry or concrete.
 - .1 Set loose beam bearing plates and column base plates, at proper elevation, true and level, with steel shims, ready for grouting as specified under work of other Sections.
 - .2 Set loose bearing plates and/or levelling plates to be cast into concrete.

3.5 <u>Coating Touch-Up</u>

- .1 Clean welds with wire brushes and wash down with clean water to ensure no residue from electrodes is present.
- .2 After erection, give one coat of prime coat or zinc rich paint as applicable and specified for shop coat to field bolts, field connections, burnt areas, and abrasions or damage to shop coats.
- .3 Touch up all areas with a specified paint film thickness.
- .4 Give areas of bare metal on galvanized members two coats of zinc-rich paint. Repair coating on architecturally exposed galvanized metals in accordance with reference standards and as directed by the Consultant. Replace any materials where damage cannot be repaired to the satisfaction of the Consultant.

3.6 Field Quality Control

- .1 Inspection and Testing Company, when appointed as specified in Source Quality Control elsewhere in this Section, shall perform:
 - .1 Inspection of erection and fit-up, including placing, plumbing, levelling and temporary bracing and conformance with specified tolerances.
 - .2 Inspection of bolted connections, including verification that ASTM A307, ASTM F3125 snug tight only bolts, and ASTM F3125 pre-tensioned bolts have been installed and used appropriately, and that threads are excluded from shear plane where required.
 - .3 Inspection of welded joints, including slag removal.
 - .4 General inspection of field cutting and alterations; report immediately to Consultant, any alterations or cutting not shown on reviewed shop drawings.
 - .5 General inspection of shop coating touch-up.
 - .6 Inspection of zinc primer and zinc-rich paint, including surface preparation and coating thickness.
- 3.7 <u>Defective Work</u>

- .1 Variations in excess of specified tolerances, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective Work performed by this Section.
- .2 Replace defective Work, as directed by Consultant.
- .3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses if Work has proven to be deficient.
- 3.8 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section
PART 1 <u>GENERAL</u>

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 04 05 19 Masonry Anchorage and Reinforcing
- .3 Section 04 22 00 Concrete Unit Masonry
- .4 Section 04 27 00 Multiple Wythe Unit Masonry
- .5 Section 05 12 23 Structural Steel
- .6 Section 06 10 00 Rough Carpentry
- .7 Section 06 20 00 Finish Carpentry
- .8 Section 09 21 23 Interior Painting

1.3 <u>References</u>

- .1 The Ontario Building Code.
 - .1 MMAH Supplementary Standard SB-8, September 14, 2012. Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders.
- .2 ASTM International (ASTM)
 - .1 ASTM A53/A53M-22 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
 - .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .4 ASTM A240/A240M-23a Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - .5 ASTM A264-12(2019) Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate
 - .6 ASTM A269/A269M-22 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .7 ASTM A276/A276M-24a Standard Specification for Stainless Steel Bars and Shapes
 - .8 ASTM A307-21 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .9 ASTM A312/A312M-22a Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
 - .10ASTM A380/A380M-17 Standard Practice for Cleaning, Descaling, and

Passivation of Stainless Steel Parts, Equipment, and Systems

- .11ASTM A385/A385M-22 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
- .12ASTM A511/A511M-21a Standard Specification for Seamless Stainless Steel Mechanical Tubing and Hollow Bar
- .13ASTM A1008/A1008M-23e1 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

.14ASTM A1011/A1011M-23 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

- .15ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- .16ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- .17ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
- .18ASTM F593-22 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- .19ASTM F594-22 Standard Specification for Stainless Steel Nuts
- .20ASTM F3125/F3125M-23 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .3 CSA Group (CSA)
 - .1 CSA G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S16.1-M Limit States Design of Steel Structures.
 - .4 CSA S136-12 Cold Formed Steel Structural Members.
 - .5 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel Structures.
 - .6 CSA W59-18 Welded Steel Construction
 - .7 CSA W178.1-18 Certification of Welding Inspection Organizations
 - .8 CSA W178.2-18 Certification of Welding Inspectors
 - .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.40-97 Anticorrosive Structural Steel Alkyd Primer
 - .2 CAN/CGSB 1.181-99 Ready Mixed, Organic Zinc Rich Coating.
 - .5 Canadian Sheet Steel Building Institute (CSSBI)
 - .6 Steel Structures Painting Council, Systems and Specifications Manual.
 - .1 CISC/CPMA 1-73a-1975 A Quick drying One-coat Paint for Use on Structural Steel.

- .2 CISC/CPMA 2-75-1975 A Quick Drying Primer for Use on Structural Steel.
- .7 American Welding Society AWS D1.6, Structural Welding Code Stainless Steel.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit Shop and Erection Drawings for review.
 - .2 Verify site dimensions before proceeding with shop fabrication and to suit field conditions and field openings.
 - .3 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
 - .4 Indicate connections to building structure.
 - .5 Shop drawings for all metal fabrications shall be stamped and signed by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.
- .3 Submit duplicate minimum 300 x 300 mm samples of stainless steel materials in specified finish.
- 1.5 <u>Qualifications</u>
 - .1 Work of this Section shall be executed by a firm thoroughly conversant with laws and regulations which govern and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work and having a minimum ten (10) years proven experience in the fabrication of high quality metal fabrications. Use workmen skilled in work of this Section.
 - .2 Welding shall be performed by trades persons certified by The Canadian Welding Bureau under CSA Standard W47.1.

1.6 <u>Design Requirements</u>

- .1 Design metal stair, handrail, guardrail, landing and ladder construction and connections to OBC vertical and horizontal live load requirements.
- .2 Stairs shall be designed and constructed to safely sustain a live load of 4.8 kPa

evenly distributed over treads and landings with a maximum deflection of L/360. Furnish all supporting members required to connect to the building.

- .3 Design service access ladders, stairs and guards to Ministry of Labour requirements.
- .4 All access ladders shall be designed to the minimum requirements noted on the drawings and MMAH Supplementary Standard SB-8, whichever is more stringent. This shall include through-bolting anchors at masonry walls.
- .5 Elevator pit access ladders shall meet requirements of the elevator supplier and TSSA.
- .6 Except where specified otherwise, and where required by applicable codes, detail and fabricate stairs to NAAMM Metal Stairs Manual.
- .7 Design trench drain grates and frame assemblies, in accordance with OBC loading requirements for vehicular traffic.

1.7 <u>Examination</u>

.1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.
- .3 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.
- .4 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, denting or coarse grinding.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Structural Steel Sections and Steel Plate: CSA G40.20-13/G40.21-13, Grade 350W.
- .2 Architectural and Miscellaneous Mild Steel: CSA G40.20-13/G40.21-13, Grade 300W.
- .3 Machine Bolts and Nuts: ASTM Standard A307-10 low carbon steel externally and internally threaded standard fasteners. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.
- .4 High Strength Bolts and Nuts: ASTM F3125. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.
- .5 Sheet Steel: (Commercial Quality) ASTM A1008 stretcher leveled or temper rolled.
- .6 Steel Pipe: ASTM A53 Schedule 40, Grade B.
- .7 Welding Materials: CSA W59.
- .8 Welding Electrodes: CSA W48 Series.
- .9 Sulphur: Commercial Grade for setting of steel posts.
- .10 Grout: non-shrink, non-metallic, non-stain, flowable, to ASTM C1107, 15 MPa at 24 hours.
- .11 Isolation Coating: Alkali resistant bituminous paint to ASTM D1187.
- .12 Adhesive Anchors: HILTI or Rawl Epoxy Adhesive Anchors sized to suit loading conditions, suitable for substrate. Adhesive to be low VOC type (maximum 250 g/l)

to SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

2.2 <u>Stainless Steel</u>

- .1 Stainless steel shall be grade and type designated below for each form required:
 - .1 Plate ASTM A264 Type 316L
 - .2 Bar Stock ASTM A276 Type 316L
 - .3 Tubing ASTM A511 Type 316L
 - .4 Pipe ASTM A312 Type 316L
 - .5 Sheet ASTM A167 Type 316L
 - .6 Tubing ASTM A269 Type 316L
 - .7 Bolts ASTM A593 Type 316L
 - .8 Nuts ASTM A594 Type 316L
 - .9 Pickle and passivate stainless steel prior to fabrication and installation to remove any latent black steel to ASTM A380.
- .2 Stainless Steel Bolts and Nuts: To ASTM F593 and ASTM F594

2.3 <u>Finishes</u>

- .1 Primers: All primers for metal fabrications are to be factory applied under the requirements of this Section. Refer to Finish Schedules in Section 09 91 23 for types of primers required for each application. Colour to be grey.
- .2 Pre Paint Finish: For galvanized surfaces to be exposed and finish painted, to ASTM D6386.
- .3 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A385.
 - .1 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
 - .2 Galvanized coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips: Galvanized after all welding and grinding complete. No welding or grinding of galvanized products allowed.
- .4 Zinc Rich Primer: zinc rich, organic, ready mix to CAN/CGSB 1.181. Low VOC type.
- .5 High Build Epoxy Coating: to CAN/CGSB 1.153.
- .6 Stainless Steel: NAAMM AMP-504 Finish No. 4.

PART 3 EXECUTION

3.1 <u>Fabrication</u>

- .1 Fabricate to reviewed shop drawings and in general to details, sizes and materials indicated on drawings and specified herein.
- .2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .3 Fabricate work complete with all components required for anchoring; bolting or welding to structural frame; standing free or resting in frames or sockets; in a safe and sure manner.
- .4 Where possible fit and shop assemble various sections of the work and deliver to site in largest practicable sections. Where shop fabricating is not possible, make trial assembly in shop.
- .5 Ensure exposed welds are continuous for length of each joint.
- .6 Grind and fill all welds after inspection and acceptance and leave ready for prime painting.
- .7 Fill all open joints, depressions, seams with metallic paste filler or by continuous brazing or welding and grind smooth to true sharp arises and profiles.
- .8 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings.
- .9 Supply all fastenings, anchors, accessories required for fabrication and erection of work of this Section. Make thread dimensions such that nuts and bolts will fit without re-threading or chasing threads.
- .10 Welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59 and AWS D1.6 for stainless steel. The welding operators shall be currently certified under CSA W47.1 for the work they are performing.
- .11 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated.

- .12 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.
- .13 Appearance, quality of welds made, methods of correcting defective work shall be in accordance with CSA W59.

3.2 Shop Painting

- .1 Cleaning Steel:
 - .1 Clean steel, whether it is to be painted or not, to the degree required by CISC/CPMA 1-73a, except as specified below.
 - .2 Prepare galvanized items scheduled to be painted in accordance with the requirements of Section 09 91 23, and ASTM D6386.
 - .3 Steel to receive a shop or field paint finish shall be cleaned in accordance with Sections 09 91 23 or SSPC SP6, whichever produces a surface which has less rust and mill scale.
 - .4 Clean steel which is specified to be painted to CISC/CPMA 2-75 in accordance with that Standard.
 - .5 Clean steel which is specified to receive an organic zinc-filled epoxy primer, or zinc-rich paint, or inorganic zinc primer, in accordance with SSPC-SP 6, Commercial Blast Cleaning.
 - .6 Clean welds by wire brushing and wash down with clean water, to remove the chemical residues left by the electrodes, prior to painting.
- .2 The following surfaces shall not be painted:
 - .1 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 50 mm on all sides of the joint, to ensure proper fusion of the metal.
 - .2 The contact surfaces of friction type connections assembled by high strength bolts.
 - .3 Portions of steel members which are to be encased in or in contact with concrete or masonry.
 - .4 Galvanized items not specifically indicated to be painted.
- .3 Preparation and priming of all metal work which will be exposed to view and which is scheduled to be finish painted, shall be in accordance with the requirements of Section 09 91 23.
- .4 All other concealed or unpainted ferrous metal work shall be given one prime paint coat type CGSB 1.40 and in accordance with CISC/CPMA 2-75. Work paint into all corners and all joints. Metal parts in contact shall be primed before shop assembly.

Priming damaged during erection or through lack of protection shall be cleaned and touched up.

- .5 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 ° C.
- .6 Metals in contact with other dissimilar metals, concrete or masonry materials shall be insulated or separated from one another to prevent corrosion, staining or electrolysis by use of bituminous paint.

3.3 <u>Miscellaneous Framing and Supports</u>

- .1 General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- .2 Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - .1 Furnish inserts for units installed after concrete is placed.
- .3 Galvanize miscellaneous framing and supports where indicated.
- .4 Prime miscellaneous framing and supports with primer specified in Section 09 91 13 Exterior Painting or Section 09 91 23 Interior Painting.

3.4 Angle Lintels

- .1 Provide all loose steel angle lintels required to support openings and recesses in masonry walls, whether indicated on the drawings or not. Refer to Architectural, Structural and Mechanical drawings for locations of openings. Lintels shall be as scheduled on the Structural drawings.
- .2 Steel angles: CSA G40.21, Grade 300W, sizes indicated for openings. Provide 150 mm minimum bearing at ends unless otherwise indicated.
- .3 Weld or bolt back-to-back angles to profiles as indicated.
- .4 Supply for installation by Sections 04 22 00 and 04 27 00.
- .5 Lintels shall be prime painted unless otherwise indicated.
- 3.5 Vanity Support Brackets

- .1 Provide supports to vanities and shelves where indicated, constructed of 3.0 mm steel plate with 38 mm wide horizontal and vertical legs formed to profile indicated. Locate supports at end of vanity, as detailed.
- .2 Finish: Shop coat primer. Fabrications in wet areas to be shot blasted and painted with zinc rich primer.

3.6 <u>Bench Support Brackets</u>

- .1 Provide steel angle and steel post bench support framing and anchors as detailed. All rough edges to be ground smooth.
- .2 Steel to be prime painted.
- .3 Predrill bench support assemblies for anchor bolts and screws.

3.7 Folding Grilles

- .1 Provide hanger and track support framing for folding grilles. Coordinate with Section 08 35 16.
- .2 Pre-drill flanges of track support framing in accordance with templates provided by grille supplier.
- .3 Install at locations and within tolerances indicate. Brace track support assemblies.

3.8 <u>Miscellaneous Steel Trim</u>

- .1 Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- .2 Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - .1 Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- .3 Galvanize exterior miscellaneous steel trim.

3.9 Steel Weld Plates and Angles

.1 Provide steel weld plates and angles not specified in other Sections, for items

supported from concrete or masonry construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete or masonry.

- 3.10 Installation
 - .1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts is cause for rejection of base plates.
 - .2 Provide all bracing and shoring required to support the work of this Section during installation.
 - .3 Work shall be fabricated and erected square, plumb and true, straight, level and accurately fitted to size detailed on reviewed Shop Drawings. All joints shall be welded unless otherwise indicated. Exposed welds shall be ground smooth and/or flush. Exposed work shall be finished smooth and even, close joints and neat connections. Exposed welds continuous for full length of joints.
 - .4 Where anchors or fastenings, sleeves, have to be built in by other trades, supply all necessary templates, instructions and supervision to ensure satisfactory installation.
 - .5 Do all drilling, cutting and fitting necessary to attach this work to adjoining work and make it complete.
 - .6 Provide all components required for anchoring. Make anchoring in concealed manner where possible. Exposed anchors shall be approved by the Consultant, shall be neat, and of the same material, colour, texture and finish of base metal on which they occur. Exposed fastenings shall be evenly spaced.
 - .7 Grind all field welds smooth.
 - .8 Touch up shop coat of prime paint where damaged by field erection.
 - .9 Touch up galvanized finishes with zinc rich paint.

3.11 Fasteners and Anchors

- .1 Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
- .2 Securely anchor components in place. Unless otherwise indicated, anchor

components as follows:

- .1 To concrete and solid masonry with expansion or epoxy adhesive type anchors.
- .2 To hollow construction with toggle bolts.
- .3 To thin metal with screws or bolts.
- .4 To thick metal with bolts or by welding.
- .5 Fill space between railing members and sleeves with non-shrink grout.
- .3 Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
- .4 Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
- .5 Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
- .6 Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

3.12 <u>Schedule</u>

- .1 General:
 - .1 Supply and install all metal fabrications indicated on Drawings, and not included in the work of other Sections.
 - .2 Coordinate and sequence the work to ensure timely delivery to the site, of all items to be built in.
 - .3 Where items are required to be built into masonry, concrete or other work supply such items to respective Sections with all anchors and accessories for building in.
 - .4 All items shall be of sizes and as detailed on drawings.
 - .5 Coordinate with Section 09 91 13 and 09 91 23 for preparation of exposed metal items required to have finish coatings applied in the field.
 - .6 Review all coordination drawings prior to installation of materials, to ensure that no interferences with the work of other Sections will occur.

3.13 <u>Cleaning</u>

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Clean exposed prefinished and plated items and items fabricated from stainless steel as recommended by the metal manufacturer and protect from damage until Substantial Performance of the project.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 30 00 Cast-In-Place Concrete
- .3 Section 04 22 00 Concrete Unit Masonry
- .4 Section 05 50 00 Metal Fabrications
- .5 Section 06 20 00 Finish Carpentry
- .6 Section 08 11 00 Metal Doors and Frames
- .7 Section 10 51 23 Laminate Lockers

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .2 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
 - .3 ASTM D2559 12a(2018) Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions
 - .4 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 CSA Group (CSA)
 - .1 CSA A247- M86 (R1996) Insulating Fiberboard.
 - .2 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
 - .3 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA O80 SERIES-15 Wood Preservation
 - .5 CSA O86-14 Engineering Design in Wood
 - .6 CSA O121-17 Douglas Fir Plywood.
 - .7 CSA O141:23 Canadian Standard Lumber.
 - .8 CSA O151-17 Canadian Softwood Plywood
 - .9 CSA O437 Series-93 (R2011) Standards on OSB and Waferboard
 - .10CSA Z809-08 Sustainable Forest Management
- .3 Underwriters Laboratories Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 National Lumber Grading Authority (NGLA)

- .1 Standard Grading Rules for Canadian Lumber, Latest Edition.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 When required by authorities having jurisdiction, submit sequential erection drawings indicating all necessary false work, temporary construction bracing and hoisting.
- .3 Certified Wood: Submit listing of wood products and materials used, produced from wood obtained from forests certified by FSC Accredited Certification Body in accordance with FSC-STD-01-001.
- 1.5 <u>Quality Assurance</u>
 - .1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.
- 1.6 Shipping, Handling and Storage
 - .1 Protect materials, under cover, both in transit and on the site.
 - .2 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.
 - .3 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.
- 1.7 <u>Waste Management and Disposal</u>
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Timber Material shall be 'Grade Stamped'.
- .2 CSA Z809 or FSC Certified.
- .3 Construction Lumber: To CSA O141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
 - .1 Framing lumber, plates, furring, blocking, No. 1 SPF.
 - .2 Nailing strips, furring and strapping: No. 4 S-P-F.
 - .3 Fitment framing: No. 1 S-P-F.
- .4 Canadian Softwood Plywood: to CSA O151-M, standard construction, good one or both sides as required, thickness as shown or specified.
 - .1 Douglas Fir Plywood: To CSA O121-M, standard construction, good one side, thickness as shown on the drawings.
 - .2 Plywood used for exposed interior work shall have select grade veneer, one or both faces where exposed, with fire retardant finish. Fire retardant shall be in accordance with CAN/CSA-080.1, and all treated materials shall bear a ULC approval stamp.
 - .3 Poplar Plywood: to CSA 0153, standard construction.
 - .4 Mat formed structural panel board (oriented strand board): to CSA O437, square edge, 12.7 mm thickness.
- .5 Nails, Spikes and Staples: To ASTM F1667.
- .6 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.
- .7 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
- .8 Wood Preservative to CSA O80 SERIES.
- .9 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to ASTM D2559.
- .10 Fibreglass Insulation: to CSA A101, loose batt type, minimum density of 24 kg/m³.

- .11 Galvanizing: to CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.
- .12 Fire Retardant Treatment
 - .1 Arch Wood Protection, Inc., "Dricon FRT" or equal by Chemical Specialties, Inc., D-Blaze", Hoover Treated Wood Products "Pyro-Guard" or Osmose Wood Preserving Co., Inc. "FirePRO" interior Type A fire-retardant wood treatment.
 - .2 Pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWPA C20 (lumber) and C27 (Plywood), respectively, for treatment type indicated; identify "fire-retardant-treated wood" with appropriate classification marking of Underwriters Laboratories, Inc., or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - .1 Treated materials shall meet FR-S ratings of not more than 25 for flame spread, smoke developed and fuel contributed when tested in accordance with UL 723 or ASTM E84, with no increase in flame spread and evidence of significant progressive combustion upon continuation of test for additional 30 minutes.
 - .2 No increase in above ratings when subjected to standard ASTM D2898 rain test.
 - .3 For interior locations use fire-retardant chemical formulation that produces "Interior Type A" treated lumber and plywood with the following properties under conditions present after installation:
 - .1 No reduction takes place in bending strength, stiffness and fastener holding capacities below values published by manufacturer of chemical formulation that are based on tests by a qualified independent testing laboratory of treated wood products identical to those indicated for this Project under elevated temperature and humidity conditions simulating installed conditions.
 - .2 No other form of degradation occurs due to acid hydrolysis or other causes related to manufacture and treatment.
 - .3 No corrosion of metal fasteners results from their contact with treated wood.
 - .4 Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.
 - .5 Kiln-dry all lumber and plywood materials after treatment to maximum 15% moisture content.

PART 3 EXECUTION

3.1 Installation

- .1 Workmanship
 - .1 Execute work using skilled mechanics according to best practice, as specified here.
 - .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.
- .2 Rough Hardware: Include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.
- .3 Erection of Framing Members
 - .1 Install members true to line, levels and elevations. Space framing members and frame all openings as detailed on the drawings.
 - .2 Construct continuous members from pieces of longest practical length.
 - .3 Install spanning members with crown edge up.
 - .4 Anchor wood framing to supporting walls with galvanized metal strap ties.
- .4 Provide treated wood nailers, blocking, cants, grounds, furring and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.
- .5 Electrical Equipment Backboard: provide backboards for mounting electrical equipment as indicated. Use 19 mm thick fir face veneer fire retardant softwood plywood on 19 x 38 mm furring around perimeter and at maximum of 305 mm intermediate spacing.
 - .1 Install plywood backboards with countersunk screws.
- .6 Blocking: Provide solid wood backing to support millwork, cabinetwork, equipment, fixtures, railings and accessories and the like, as required. Coordinate with work of other Sections and install all required backing. Any such equipment mounted on gypsum wallboard assemblies or similar assemblies shall be adequately supported.
 - .1 Provide solid wood blocking in all partitions where wall stops are specified in the hardware schedule.
- 3.1 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning. End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 06 40 00 Architectural Woodwork
- .4 Section 06 61 16 Solid Surfacing
- .5 Section 07 92 00 Joint Sealants
- .6 Section 08 11 00 Metal Doors and Frames
- .7 Section 08 71 10 Door Hardware
- .8 Section 09 21 16 Gypsum Board
- .9 Section 09 91 23 Interior Painting
- .10 Section 10 28 10 Toilet and Bath Accessories

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM E1333-22 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
 - .2 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 CSA Group (CSA)
 - .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O112 SERIES-M1977 (R2006) Standards for Wood Adhesives
 - .4 CSA O121-17 Douglas Fir Plywood.
 - .5 CSA O141:23 Canadian Standard Lumber.
 - .6 CSA O151-17 (R2022) Canadian Softwood Plywood
 - .7 CSA O153-13 (R2017) Poplar Plywood.
 - .8 CSA Z760-94 (R2001) Life Cycle Assessment
- .3 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009 Particleboard.
 - .2 ANSI A208.2-2016 Medium Density Fibreboard (MDF) for Interior Applications.
 - .3 ANSI/HPVA HP-1-2016 Standard for Hardwood and Decorative Plywood.
 - .4 ANSI/NEMA LD 3-2005 High Pressure Decorative Laminates
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

- .1 Architectural Woodwork Quality Standards Illustrated.
- .5 Canadian Plywood Association (CanPly)
 - .1 The Plywood Handbook 2005.
- .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-V4-0 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.
- .7 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.
- .8 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2005.
- .9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-03 Adhesives and Sealants Applications
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Submit shop drawings.
 - .1 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .2 Indicate materials, thicknesses, finishes and hardware.
 - .3 Submit duplicate 300 mm long samples of each type of solid wood or 300 x 300 mm square type of plywood to receive stain or natural finish.
 - .4 Submit samples of plastic laminate materials.
- 1.5 <u>Quality Assurance</u>
 - .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
 - .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
 - .3 Wood materials certified by Forestry Stewardship Council.
- 1.6 <u>Shipping, Handling and Storage</u>
 - .1 Refer to Section 01 61 00 Common Product Requirements.

- .2 Protect materials against dampness during and after delivery.
- .3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

- 2.1 <u>Lumber Materials</u>
 - .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CSA 0141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC custom premium grade, moisture content as specified.
 - .4 Machine stress-rated lumber is acceptable.
 - .2 Hardwood Lumber: To NHLA requirements, moisture content of 6% maximum, maple species, AWMA Custom Grade.
 - .1 Bench Slats: Select Grade Maple.

2.2 Panel Materials

- .1 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.
- .2 Canadian Softwood Plywood (CSP): to CSA O151, standard construction.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.
- .3 Hardwood Veneered Plywood: To CSA O115, of thickness indicated, Type II Select Grade Maple, where transparent finish is required and Solid Grade where paint finish is required. Good two sides for work with two sides exposed to view; good one side for work with one side exposed to view. Use particle board core with Type I bond.
- .4 Particleboard: to ANSI A208.1.
 - .1 Forestry Stewardship Council (FSC) certified.

- .2 Urea-formaldehyde free.
- .5 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m³.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.

2.3 <u>Accessories</u>

- .1 Rough Hardware: Bolts, lag screws, anchors, nails and expansion shields required to secure this portion of work. Rough hardware hot dip galvanized conforming to latest edition of CSA G164. All fasteners used in damp or wet areas to be suitable for use in corrosive environment. Use hot dipped galvanized or other material approved by the Consultant.
- .2 Nails and staples: to ASTM F1667 galvanized.
- .3 Wood screws: to CSA B35.4 plain type and size to suit application.
- .4 Stainless Steel hardware: Type 316 Stainless steel for exposed or wet locations, tamper proof.
- .5 Splines: wood or metal to suit application.
- .6 Adhesive: recommended by manufacturer, waterproof type, maximum VOC limit 30 g/L SCAQMD Rule 1168 Adhesives and Sealants Applications.

PART 3 EXECUTION

3.1 <u>Construction</u>

- .1 Fastening:
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
 - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Interior and exterior frames: Set frames with plumb sides, level heads and sills, and secure.

3.2 <u>Fabrication</u>

- .1 General:
 - .1 Field measure all dimensions.
 - .2 Fabricate all finish carpentry items to AWMAC premium grade, and in accordance with the reviewed shop drawings.
 - .3 Set nails and screws, apply stained plain wood filler to indentations, sand smooth and leave ready to receive finish.
 - .4 Provide 10 mm thick solid matching wood strip on plywood and particle board edges 13 mm or thicker, exposed in final assembly.
 - .5 Ease edges of solid lumber components to 1.6 mm radius.

3.3 Installation

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 All fastenings shall be concealed.
- .3 Provide heavy duty grounds as necessary for secure installation of finish carpentry work.
- .4 All wood surfaces shall be sanded smooth, ready to receive finish.
- .5 Scribe and cut as required, fit to abutting walls and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .6 Form joints to conceal shrinkage.
- .7 Set and secure materials and components in place, rigid plumb and square.
- .8 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .9 Set finishing nails to receive filler. Where screws are used to secure members, countersink screws in round, cleanly cut hole and plug with wood plug to match material being secured.
- .10 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

- .11 Install window stools with wood levelling shims, after installation of windows and interior finishing is complete. Screw levelling shims to metal stud framing with self-tapping sheet metal screws. Bond stools to shims with waterproof adhesive. Tightly butt all joints and bond together with adhesive and concealed splines. Cut to fit tight to all penetrations.
- .12 Apply mildew resistant sealant to perimeter of all vanity tops and window stools as specified in Section 07 92 00.
- 3.4 <u>Door Installation</u>
 - .1 Install doors in accordance with instructions in Section 08 11 00 and Section 08 14 16 and manufacturer's printed instructions.

3.5 <u>Finish Hardware Installation</u>

- .1 Finish hardware will be supplied for installation under this Section.
- .2 Prepare doors and frames in accordance with manufacturer's instructions and templates. Install finish hardware complete in all respects, hang doors and make adjustments necessary.
- .3 Doors shall swing freely. Where thresholds are to be used, door bottom shall be finished to suit thresholds as required.
- .4 Where indicated on door schedules or drawings, under-cut doors.

3.6 <u>Miscellaneous</u>

- .1 Install Toilet and Bath Accessories as specified in Section 10 28 10, including accessories supplied by Owner.
- 3.7 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 06 20 00 Finish Carpentry
- .4 Section 06 61 16 Solid Surfacing
- .5 Section 07 92 00 Joint Sealants
- .6 Section 09 21 16 Gypsum Board
- .7 Section 09 91 23 Interior Painting

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM F1667/F1667M-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 Architectural Woodwork Manufacturer's Association of Canada (AWMAC)
 - .1 Architectural Woodwork Standards Manual
- .3 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009 Particleboard
 - .2 ANSI/NPA A208.2-2009 Medium Density Fibreboard (MDF)
 - .3 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
 - .4 ANSI/HPVA HP-1-2009 Standard for Hardwood and Decorative Plywood
- .4 CSA Group (CSA)
 - .1 CSA 0112 SERIES-M1977 (R2006) Wood Adhesives
 - .2 CSA O121-08 (R2013) Douglas Fir Plywood
 - .3 CSA O151-17 (R2022) Canadian Softwood Plywood
 - .4 CSA O153:19 Poplar Plywood
 - .5 CSA Z809-08 Sustainable Forest Management
- .5 Canadian General Services Board (CGSB)
 - .1 CAN/CGSB-11.3-M, Hardboard
- .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit shop drawings conforming to AWMAC's STANDARDS (NAAWS).
 - .1 Show proposed assembly, connections, anchorage, materials, dimensions, thickness, and finishes.
 - .2 On casework and countertop elevations show location of backing required for attachment within walls.
- .3 Samples:
 - .1 Submit duplicate, 300 mm long samples of each type of solid wood and 300 x 300 mm samples of each type of plywood used in exposed work and scheduled to receive stained or natural finish, complete with specified finish, prior to fabrication of cabinetwork.
 - .2 Veneer samples minimum 304 mm x 304 mm. Each sample set of three to represent range of colour and grain expected.
 - .3 Submit full range of manufacturer's standard plastic laminates for selection by the Consultant.
 - .4 Submit sample of each type of cabinet hardware component used.

1.5 Quality Assurance

- .1 Unless otherwise specified, carry out finish carpentry work in accordance with the requirements of "Millwork Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.
- .2 Woodwork Manufacturer Qualifications:
 - .1 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.
- .3 Preinstallation Conference:
 - .1 Before framing completed hold a meeting with the contractor, casework manufacturer, casework installer, and framing sub-contractor.
 - .2 Review locations of backing required for casework installation as shown on casework shop drawings.
 - .3 Review method of attachment for backing to wall system as shown on architectural drawings.
- .4 Mock-up: Prepare mock-ups in accordance with Section 01 45 00 Quality Control.
 - .1 Provide mockups of one base cabinet, one wall hung cabinet, and one

countertop. Base cabinet to have minimum one drawer. Mockup of material and finish to be provided. Approved mockup may be incorporated in the project.

- 1.6 <u>Definition</u>
 - .1 "Exposed" when referred to in this Section, shall mean all parts which can be viewed and shall include interiors of cabinets, backs of doors, shelving and gables.
- 1.7 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16 ° C, and relative humidity of 25% to 55%.
 - .4 Cover plastic laminate faces at shop with heavy Kraft paper.
 - .5 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather
 - .6 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent excessive moisture gain of materials.
- 1.8 <u>Protection</u>
 - .1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.
- 1.10 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 <u>Materials</u>
 - .1 All materials CSA Z809 or FSC Certified.
 - .2 Solid Wood:
 - .1 Unless otherwise indicated, provide AWMAC Custom Grade.
 - .2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.
 - .3 All wood shall be kiln dried to a maximum moisture content of 7%.
 - .4 Softwood: to CSA O141, dressed all sides used in concealed locations.
 - .3 Veneers: As required by AWMAC's STANDARDS (NAAWS) for its use and Grade specified. Flat sliced maple veneers from architectural grade flitches to provide uniform grain pattern and colour throughout, free of dark streaks and blemishes. Sharp variation of grain patterns and colour between adjacent jointed pieces is not acceptable.
 - .4 Plywood:
 - .1 Veneer core plywood: hardwood with a non-telegraphing grain manufactured with exterior glue. To ANSI/HPVA HP-1-09, minimum five (5) plies.
 - .2 Soft Plywood: to CSA O151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.
 - .3 To ANSI/HPVA HP-1-09, Grade A face, book matched, flat cut maple face and No. 3 edge.
 - .5 Particleboard: Meeting requirements of AWMAC's STANDARDS (NAAWS). To ANSI A208.1, minimum density of 720kg/m3 Grade "R".
 - .6 MDF: Medium Density Fiberboard meeting requirements of AWMAC's STANDARDS (NAAWS).
 - .7 Hardboard: To CGSB 11-GP-3M, Type 2, 6 mm thick or as indicated.
 - .8 Fasteners and Adhesive:
 - .1 Nails and staples: ASTM F1667, galvanized, spiral head nails.

- .2 Screws: Zinc, cadmium or chrome plated steel.
- .3 Splines: wood or metal, to suit application.
- .4 Adhesive: Type 1 waterproof. To CSA O112-M, type as appropriate for the intended application. Complying with ANSI/WDMA I.S-1 series. Contact bond not acceptable.
- .5 Avoid the use of adhesives, preservatives, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.

2.2 Fabrication

- .1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
 - .1 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.
- .2 Wood Casework: AWMAC Standard Custom Grade.
- .3 Construction Type: Frameless
- .4 Cabinet and door interface: Flush overlay.
- .5 Exposed joints and edges:
 - .1 Uniformly space exposed joints unless otherwise indicated.
 - .2 No edge grain shall be visible; mitre external corners, house internal fasteners. Glue mitred corners.
 - .3 All exposed edges of plywood and particle board shall have solid wood edging, pressure glued. AWMAC No. 3 edge.
 - .4 Ease edges of solid lumber components to 1.6 mm radius.
- .6 Mechanical Fasteners:
 - .1 Inconspicuously locate mechanical fasteners. Wherever possible, conceal fastenings.
 - .2 Countersink nail heads.
 - .3 Where exposed to view, countersink screw and bolt heads and fill holes with matching wood plugs.
 - .4 Cutting and fitting: make cut-outs in work of this Section as required to accommodate work of other Sections.
 - .5 Make provisions in cabinetwork to accept built-in appliances, provided by others.
- 2.3 <u>Wood Casework</u>

- .1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
- .2 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.
- .3 Wood Casework:
 - .1 Grade: AWMAC's STANDARDS (NAAWS) Custom Grade
- .4 Exposed Surfaces [[species], [cut]], [[book][slip] matched] [material suitable for opaque finish]] meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.
- .5 Exposed interior surfaces: Veneer of same species and cut [and grade] as exposed exterior surfaces.

2.4 Solid Surface Countertops

.1 As specified in Section 06 61 16

2.5 <u>Finishes</u>

- .1 All exposed exterior surfaces: plastic laminate as indicated. Colours selected by the Consultant.
- .2 Wood Finish: 3 coats clear polyurethane finish on all sides as specified in Section 09 91 23. Factory finish wherever practical.
- .3 All exposed interior surfaces: melamine unless indicated otherwise.
- .4 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.
- .5 Apply finishes in accordance with the AWMAC Manual.
- .6 Stainless Steel: Type 316 stainless steel, brushed finish.

PART 3 EXECUTION

3.1 Examination

- .1 Verify mechanical, electrical, plumbing, HVAC and other building components, affecting work in this Section are in place and ready.
- .2 Verify HVAC controls and systems are operating properly.
- .3 Verify adequacy of backing and support framing. Advise Contractor of areas and surfaces requiring further modifications for plumb, level, even or square fitting.

3.2 Installation

- .1 Install work in accordance with AWMAC Installation Manual, Custom grade.
- .2 Secure all work in place, square, plumb, and level.
- .3 Accurately scribe and closely fit components to irregularities of adjacent surfaces.
- .4 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.
- .5 Countersink mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end.
- .6 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.
- .7 Install plastic laminate components using concealed fastening devices.
- .8 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.
- .9 Where cabinetwork abuts other building elements, provide wood trim matching cabinetwork except where otherwise detailed.
- .7 Cut equipment cutouts shown on plans using templates provided.
 - .1 Radius internal corners at least 3 mm and chamfer edges.
 - .2 Where core edge is to remain exposed, cover with plastic laminate edging.
 - .3 Where core edge is to be concealed, seal with sealer.
- .10 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required and secure with four brass screws.

- .11 Provide for wiring and cable management systems wiring grommets as indicated on the drawings.
- .12 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.3 Adjustment

- .1 Adjust all moving and operating parts to function smoothly and correctly.
- .2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items.
- .3 Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.
- 3.4 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.
 - .2 Upon completion of installation, clean installed items of pencil and ink marks and broom clean the area of operation.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.
- 1.2 <u>Related Sections</u>
 - .1 Section 06 40 00 Architectural Woodwork
 - .2 Section 07 92 00 Joint Sealants

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
- .2 CSA Group (CSA)
 - .1 CSA O151-17 Canadian Softwood Plywood
- .3 Architectural Woodwork Institute (AWI)
 - .1 AWI/AWMAC/WI's Architectural Woodwork Standards
- .4 International Surface Fabricators Association (ISFA) .1 ISFA 2-01 (2013) Classification and Standards for Solid Surfacing Material
- .5 American National Standards Institute (ANS)
 - .1 ANSI ICPA-SS-1 (2001) Performance Standard for Solid Surface Materials
- 1.4 Submittals
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Product Data: Include detailed specification of construction and fabrication, manufacturer's installation instructions, and manufacturer's detailed recommendations for handling, storage, installation, protection, and maintenance.
 - .3 Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, terminations, and cutouts.
 - .1 Show locations and details of joints.
 - .2 Show direction of directional pattern, if any.
 - .4 Samples:
 - .1 Full range of colours and patterns for initial selection by Consultant.
 - .2 Samples of three colours, 76 x 76 mm for final selection by Consultant.

- .5 Certificates: For the following certifications:
 - .1 United States Food and Drug Administration (FDA) compliance for food contact materials described in 21 CFR 174 to 21 CFR 190.
 - .2 ANSI/NSF 51 "food zone" and FDA "direct-food contact" compliant.
- .6 Provide maintenance data for solid surface material countertops for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 Closeout Submittals.

1.5 Quality Assurance

- .1 Source Limitations: Obtain materials and products from single source.
- .2 Fabricator Qualifications: Certified solid surface fabricator/installer.
- .3 Installer Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, including specific requirements indicated. Acceptable to or licensed by manufacturer.

1.6 <u>Field Conditions</u>

- .1 Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.
- .2 Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.7 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.
- .4 Store in racks in near vertical position. Prevent warpage and breakage. Store Inside away from direct exposure to sunlight.
- 1.8 <u>Waste Management and Disposal</u>

- .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.
- 1.9 <u>Warranty</u>
 - .1 Furnish manufacturer's 10-year material warranty.

PART 2 PRODUCTS

2.1 <u>Manufacturer</u>

- .1 Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of drawings and specifications:
 - .1 Corian by DuPont
 - .2 Wilsonart
 - .3 Formica

2.2 Solid Surface Material

- .1 Composition Solid-Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1 and ISFA-2.
- .2 Panel thickness: 12.7 mm.
- .3 Panel weight: 21.5 kg/m²
- .4 Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - .1 Flame-Spread Index: 25 or less.
 - .2 Smoke-Developed Index: 50 or less.
 - .3 Flammability: To NFPA 101, Class A.
- .5 Pattern and Finish: Colour to be selected by the Consultant from manufacturer's full range of available selections.
- .6 Plywood: Exterior softwood plywood complying with CSA O151, CSP, B1 face, C-C inner plies and back. Touch Sanded.
- 2.1 <u>Accessories</u>
 - .1 Adhesive for Bonding to other products: as recommended by solid surface material manufacturer.

- .2 Sealant for Countertops: Comply with applicable requirements in Section 07 92 00.
- .3 Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- .4 Insulating Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.2 <u>Fabrication</u>

- .1 Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI Architectural Woodwork Standards.
- .2 Grade: Premium.
- .3 Configuration:
 - .1 Front: Pencil round edge 3.0 mm radius.
 - .2 Backsplash and side splash: Pencil round edge 3.0 mm radius.
- .4 Countertops: 12.7 mm thick, solid surface material with front edge built up with same material.
- .5 Backsplashes: 12.7 mm thick, solid surface material.
- .6 Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- .7 Fabricate with loose backsplashes and end splashes for field assembly.
- .8 Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated on reviewed shop drawings.
 - .1 Joint Locations: Not within 76 mm of a cutout or cooktop, 25 mm from inside corner for conventional seams, and not where countertop sections less than 900 mm long would result, unless unavoidable.
- .9 Cutouts and Holes:
 - .1 Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
- .1 Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop.
- .2 Provide vertical edges, rounded to 10 mm radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom.
- .2 Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
- .3 Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

PART 3 EXECUTION

3.1 Examination

- .1 Examine substrates to receive solid surfacing. Identify conditions detrimental to proper or timely installation. Do not commence installation until conditions have been corrected.
- .2 Verify that substrates supporting solid surfacing are plumb, level, and flat to within 3.0 mm/3.0 metres.

3.2 <u>Preparation</u>

.1 Precondition solid surfacing in accordance with manufacturer's printed instructions.

3.3 Installation

- .1 Install components plumb and level, in accordance with reviewed shop drawings, Project installation details, and manufacturer's printed instructions.
- .2 Joints between adjacent pieces of surfacing shall be flush, tight fitting, level, and neat. Securely join adjacent pieces with manufacturer's adhesive. Fill joints level to polished surface.
- .3 Install countertops level to a tolerance of 3 mm in 2.4 m, 6 mm maximum. Do not exceed 0.4 mm difference between planes of adjacent units.
- .4 Fasten countertops by adhering with 100-percent silicone material in dab format (not bead format) to base units into underside of countertop at 457 to 610 mm o.c. Shim as needed to align subtops in a level plane.

- .5 Align adjacent surfaces and, using adhesive in colour to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- .6 Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- .7 Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- .8 Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- .9 Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- .10 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.
- 3.4 <u>Protection</u>
 - .1 Protect surfaces from damage until date of Substantial Performance. Repair or replace damaged components that cannot be repaired to Consultant's satisfaction.
- 3.5 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 GENERAL

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 07 92 00 Joint Sealants
- .3 Section 09 21 16 Gypsum Board

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM E119-20 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .3 ASTM E136-19a Standard Test Method for Behavior of Material in a Vertical Tube Furnace at 750° C
 - .4 ASTM E814-13a (2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .5 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
 - .6 ASTM E2307-20 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 ULC 101-2014 Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .2 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
 - .3 ULC 115-2018 Standard Method of Fire Tests of Firestop Systems
- .3 National Fire Protection Association (NFPA)
 - .1 NFPA 252 Standard Methods of Fire Test and Door Assemblies
- .4 South Coast Air Quality Management District (SCAQMD) California State .1 SCAQMD Rule 1168-03: Adhesives and Sealants.
- .5 Ontario Building Code
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Product Data: Submit manufacturer's printed product literature, specifications and

datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Shop Drawings: Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .4 Samples: Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.
- .5 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 Quality Control.
 - .1 Test reports: in accordance with ULC 101 for fire endurance and ULC 102 for surface burning characteristics.
 - .2 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties
 - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 <u>Definitions</u>

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

1.6 <u>Quality Assurance</u>

.1 One installer shall install all firestopping on the project. Each trade shall not firestop their own service penetrations. Installer shall be certified by fire stopping manufacturer.

- .2 Qualifications:
 - .1 Qualified Installer: specializing in fire stopping installations with 5 years documented experience approved and trained by manufacturer.
- .3 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .4 Site Meetings:
 - .1 As part of Manufacturer's Services described in 3.5- Field Quality Control, schedule site visits, to review Work, at stages listed.
 - .2 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
 - .3 Twice during progress of Work at 25% and 60% complete.
 - .4 Upon completion of Work, after cleaning is carried out.
 - .5 Single Source Responsibility: Obtain through-penetration fire-stop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- .5 Field-Constructed Mockup: Prior to installing fire-stopping, erect mockups for each different through-penetration fire-stop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.
 - .1 Locate mockups on site in locations indicated or, if not indicated, as directed by Consultant.
 - .2 Notify Consultant one week in advance of the dates and times when mockups will be erected.
 - .3 Obtain Consultant's acceptance of mockups before start of final unit of Work.
 - .4 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
 - .5 Accepted mockups in an undisturbed condition at time of Substantial Performance may become part of completed unit of Work.

1.7 <u>Sustainable Requirements</u>

- .1 Materials shall be Low VOC type conforming to SCAQMD Rule 1168-03. Maximum VOC level of firestopping materials shall be 250 g/l.
- 1.8 <u>Project Conditions</u>

- .1 Environmental Conditions: Do not install fire-stopping when ambient or substrate temperatures are outside limits permitted by fire-stopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- .2 Ventilation: Ventilate fire-stopping per fire-stopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.9 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .4 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 All fire stopping shall consist of ULC listed firestop system.
- .2 Applications: Provide fire-stopping systems composed of materials specified in this Section that comply with system performance and other requirements.
- .3 General: Provide fire-stopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
- .4 All firestopping material shall be:
 - .1 From one manufacturer;
 - .2 Intumescent where an appropriate system exists.

- .5 Fire stopping and smoke seal systems: ULC listed in accordance with ULC 115.
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of ULC 115 and not to exceed opening sizes for which they are intended.
- .6 Service penetration assemblies: ULC listed systems tested to ULC 115.
- .7 Service penetration fire stop components: ULC listed and certified by test laboratory to ULC 115.
- .8 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .9 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .10 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .11 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .12 Water: potable, clean and free from injurious amounts of deleterious substances.
- .13 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .14 F-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with F ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
- .15T-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with T ratings, in addition to F ratings, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupy-able floor areas. T-rated assemblies are required where the following conditions exist:
 - .1 Where fire-stop systems protect penetrations located outside of wall cavities.
 - .2 Where fire-stop systems protect penetrations located outside fire-resistive shaft enclosures.
 - .3 Where fire-stop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
 - .4 Where fire-stop systems protect penetrating items larger than a 100 mm diameter nominal pipe or 10,000 mm² in overall cross-sectional area.

- .16 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs. Sealants for vertical joints: non-sagging.
- .17 For fire-stopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - .1 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration fire-stop systems.
 - .2 For floor penetrations with annular spaces exceeding 100 mm or more in width and exposed to possible loading and traffic, provide fire-stop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
 - .3 For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- .18 For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450.
- .19Compatibility: Provide fire-stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by fire-stopping manufacturer based on testing and field experience.
- .20 Accessories: Provide components for each fire-stopping system that are needed to install fill materials and to comply with "System Performance Requirements". Use only components specified by the fire-stopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistancerated systems. Accessories include but are not limited to the following items:
 - .1 Permanent forming/damming/backing materials including the following:
 - .1 Semi-refractory fibre (mineral wool) insulation.
 - .2 Ceramic fibre.
 - .3 Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - .4 Fire-rated formboard.
 - .5 Joint fillers for joint sealants.
 - .2 Temporary forming materials.
 - .3 Substrate primers.
 - .4 Collars.
 - .5 Steel sleeves.

PART 3 EXECUTION

BARRY BRYAN ASSOCIATES

3.1 <u>Manufacturer's Instructions</u>

.1 Compliance: comply with manufacturer's written recommendations or specifications.

3.2 <u>Preparation</u>

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
- .2 Ensure that substrates and surfaces are clean, dry and frost free.
- .3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour retarder.
- .5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 Installation

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing and as necessary to maintain fire resistance ratings of floor and wall assemblies.
- .2 Provide fire stopping for all disciplines.
- .3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .4 Fill spaces between openings, ducts, pipes and unused sleeves passing through fire separations with firestop material and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.
- .5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .6 Tool or trowel exposed surfaces to neat finish.

.7 Remove excess compound promptly as work progresses and upon completion.

3.4 <u>Sequences of Operation</u>

- .1 Proceed only when submittals have been reviewed by Consultant.
- .2 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

3.5 <u>Field Quality Control</u>

- .1 Inspections: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.
- .2 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site.
- .3 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in Article 1.4 Submittals.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in Article 1.6 Quality Assurance.

3.6 <u>Commissioning</u>

- .1 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site. Submit DRI's written reports within 3 days of review, verifying compliance of Work.
- .2 Perform a thorough examination of the fire stopping system to determine if the assembly is installed as per its ULC listing.
- .3 Allow for destructive testing of installed firestopping. Repair all tested assemblies.
- .4 The examination shall take place prior to close-up to confirm assembly components and installation configuration.
- .5 Any and all deviations from the ULC listed system shall be considered grounds for rejection and replacement.

3.7 <u>Schedule</u>

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated partitions and walls.
 - .2 Perimeter of fire-resistance rated partitions.
 - .3 Intersection of fire-resistance rated partitions.
 - .4 Control and sway joints in fire-resistance rated partitions and walls.
 - .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .6 Around mechanical and electrical assemblies penetrating fire separations.
 - .7 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
 - .8 All electrical boxes installed in fire rated gypsum board assemblies.
 - .9 All locations required by the Ontario Building Code.
 - .10 Any other locations indicated.

3.8 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

End of Section

PART 1 GENERAL

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 04 22 00 Concrete Unit Masonry
- .3 Section 04 27 00 Multiple Wythe Unit Masonry
- .4 Section 06 10 00 Rough Carpentry
- .5 Section 06 20 00 Finish Carpentry
- .6 Section 06 40 00 Architectural Woodwork
- .7 Section 07 84 00 Firestopping
- .8 Section 08 11 00 Metal Doors and Fames

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM C510-16(2022) Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants
 - .2 ASTM C661-15(2022) Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
 - .3 ASTM C679-15(2022) Standard Test Method for Tack-Free Time of Elastomeric Sealants
 - .4 ASTM C719-22 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
 - .5 ASTM C793-05(2017) Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants
 - .6 ASTM C794-18(2022) Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - .7 ASTM C834-17 Standard Specification for Latex Sealants
 - .8 ASTM C919-22 Standard Practice for Use of Sealants in Acoustical Applications
 - .9 ASTM C920-18 Standard Specification for Elastomeric Joint Sealants
 - .10ASTM C1087-23 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
 - .11ASTM C1183/C1183M-13(2018) Standard Test Method for Extrusion Rate of Elastomeric Sealants
 - .12ASTM C1193-16 Standard Guide for Use of Joint Sealants
 - .13ASTM C1246-17(2022) Standard Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants After Cure

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- .14ASTM C1247-20 Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
- .15ASTM C1248-22 Standard Test Method for Staining of Porous Substrate by Joint Sealants
- .16ASTM C1311-22 Standard Specification for Solvent Release Sealants
- .17ASTM C1330-23 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
- .18ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- .19ASTM D2203-01(2023) Standard Test Method for Staining from Sealants
- .20 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
- .21 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 U. S. Environmental Protection Agency (EPA)
 - .1 EPA 40 CFR 59, Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings.
- .4 South Coast Air Quality Management District (SCAQMD) California State .1 SCAQMD Rule 1168-03: Adhesives and Sealants.
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Submit product data for all sealant materials and accessories including:
 - .1 Preparation instructions and recommendations.
 - .2 Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
 - .3 Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and colour, for each application. Utilize joint sealant designations included in this Section.
 - .4 Samples:
 - .1 Samples for Colour Selection: For each joint sealant type.
 - .2 Samples for Verification: For each joint sealant product, for each colour selected.
 - .5 Greenguard Certificates: For each sealant and accessory product specified to meet volatile organic emissions standards of the Greenguard Children and Schools Certification.

1.5 <u>Quality Assurance</u>

- .1 Installer Qualifications: Company with minimum of three years of experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer.
- .2 Single Source Responsibility: Provide joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- .3 Caulking work shall be carried out in strict accordance with manufacturer's printed directions.
- .4 Preconstruction Manufacturer Laboratory Compatibility, Staining, and Adhesion Testing: Submit samples of each substrate or adjacent material that will be in contact with or affect joint sealants. Current manufacturer test data of products on matching substrates will be acceptable.
- .5 Adhesion: Use ASTM C719 and ASTM C794 to determine requirements for joint preparation, including cleaning and priming.
- .6 Compatibility: Use ASTM C1087 to determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant colour.
- .7 Stain Testing: Use ASTM C510, ASTM C1248, or ASTM D2203 to verify non-staining characteristics of proposed sealants on specified substrates.
- .8 Pre-construction manufacturer laboratory testing is not required when sealant manufacturer can furnish data acceptable to Consultant based on previous testing for materials matching those of the Work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 <u>Project Conditions</u>

- .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 Ventilate area of work by use of approved portable supply and exhaust fans.

1.8 <u>Scheduling</u>

- .1 Ensure sealants are cured before covering with other materials.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

PART 2 PRODUCTS

- 2.1 <u>Manufacturer</u>
 - .1 Basis-of-Design Products: Provide joint sealant products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing, 220 Wicksteed Avenue, Toronto, www.tremcosealants.com, or comparable products of other manufacturer approved by Consultant.

2.2 <u>Materials, General</u>

- .1 VOC Content for Interior Applications: Provide sealants and sealant primers complying with the following VOC content limits per 40 CFR 59, Subpart D (EPA Method 24):
 - .1 Architectural Sealants: 250 g/L.
 - .2 Sealant Primers for Nonporous Substrates: 250 g/L.
 - .3 Sealant Primers for Porous Substrates: 775 g/L.
- .2 Low-Emitting Sealants for Interior Applications: Provide sealants and sealant primers complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- .3 Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with adjacent materials, as demonstrated by sealant manufacturer using ASTM C1087 testing and related experience.
- .4 Joint Sealant Standard: Comply with ASTM C920 and other specified

requirements for each joint sealant.

.5 Stain Test Characteristics: Where sealants are required to be non-staining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates specified.

2.3 <u>Silicone Joint Sealants</u>

- .1 SJS#1: Single-Component, Nonsag, Non-Staining, Moisture-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, Use NT; SWRI validated.
 - .1 Basis of Design Product: Tremco Spectrem 1.
 - .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .2 SJS#2: Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; SWRI validated.
 - .1 Basis of Design Product: Tremco Spectrem 2.
 - .2 Volatile Organic Compound (VOC) Content: 50 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .3 SJS#3: Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - .1 Basis of Design Product: Tremco Spectrem 3.
 - .2 Volatile Organic Compound (VOC) Content: 20 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .4 SJS#4: Multi-Component, Nonsag, Non-Staining, Field-Tintable Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - .1 Basis of Design Product: Tremco Spectrem 4-TS.
 - .2 Volatile Organic Compound (VOC) Content: 20 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.

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- .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
- .5 Colour: As selected by Consultant from manufacturer's standard line.
- .5 SJS#5: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - .1 Basis of Design Product: Tremco Tremsil 200 Sanitary.
 - .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: White and Clear.

2.4 <u>Urethane Joint Sealants</u>

- .1 UJS#1: Single-Component, Nonsag, Moisture-Cure, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; Greenguard certified.
 - .1 Basis of Design Product: Tremco Dymonic 100.
 - .2 Volatile Organic Compound (VOC) Content: 40 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Tensile Strength ASTM D412: 350 to 450 psi
 - .5 Percent Elongation ASTM D412: 800 to 900%
 - .6 Modulus at 100% ASTM D412: 75 to 85 psi
 - .7 Tear Strength ASTM D412: 65 to 75 psi
 - .8 Smoke Development ASTM E84: 5
 - .9 Colour: As selected by Consultant from manufacturer's standard line.
- .2 UJS#2: Single-Component, Nonsag, Moisture-Cure, Polyurethane Hybrid Joint Sealant: ASTM C920, Type S, Grade NS, Class 35, Use NT; Greenguard certified.
 - .1 Basis of Design Product: Tremco Dymonic FC.
 - .2 Extrusion Rate ASTM C1183: 93.1 mL/min
 - .3 Weight Loss ASTM C1246: Pass
 - .4 Tack Free Time ASTM C679: 3 to 4 hours.
 - .5 Volatile Organic Compound (VOC) Content: 10 g/L maximum.
 - .6 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .7 Colour: As selected by Consultant from manufacturer's standard line.
- .3 UJS#3: Single-Component, Nonsag, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - .1 Basis of Design Product: Tremco Vulkem 116.
 - .2 Volatile Organic Compound (VOC) Content: 60 g/L maximum.
 - .3 Colour: As selected by Consultant from manufacturer's standard line.

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- .4 UJS#4: Immersible, Single-Component, Pourable, Traffic Grade Polyurethane Joint Sealant: ASTM C920, Type S, Grade P, Class 50, Use T and I.
 - .1 Basis of Design Product: Tremco Vulkem 45 SSL.
 - .2 Volatile Organic Compound (VOC) Content: 110 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: As selected by Consultant from manufacturer's standard line.
- .5 UJS#5: Immersible, Multi-Component, Pourable, Traffic-Grade Polyurethane Joint Sealant: ASTM C920, Type M, Grade P, Class 35, Use T, O, and I.
 - .1 Basis of Design Product: Tremco Vulkem 445SSL.
 - .2 Tensile Strength, ASTM D412: 1.7 MPa, at 100 percent elongation.
 - .3 Tear Strength, ASTM D412: 6.1 kN/m.
 - .4 Adhesion to Concrete, After Water, ASTM C794: 4.4 kN/m
 - .5 Hardness, ASTM C661: 40 durometer Shore A, minimum.
 - .6 Accelerated Weathering, ASTM C793: Pass.
 - .7 Volatile Organic Compound (VOC) Content: 106 g/L maximum.
 - .8 Colour: As selected by Consultant from manufacturer's standard line.
- .6 UJS#6: Multi-Component, Non-sag, Polyurethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 50, Use I.
 - .1 Basis of Design Product: Tremco Dymeric 240 FC.
 - .2 Volatile Organic Compound (VOC) Content: 0 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: As selected by Consultant from manufacturer's standard line.

2.5 Latex Joint Sealants

- .1 LJS#1: Latex Joint Sealant: Siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - .1 Basis of Design Product: Tremco Tremflex 834.
 - .2 Volatile Organic Compound (VOC) Content: 35 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: White, paintable.

2.6 <u>Solvent-Release-Curing Joint Sealants</u>

- .1 BJS#1: Butyl-Rubber-Based Joint Sealant: ASTM C1311.
 - .1 Basis of Design Product: Tremco Tremco Butyl Sealant.
 - .2 Volatile Organic Compound (VOC) Content: 250 g/L maximum.
 - .3 Colour: As selected by Consultant from manufacturer's standard colours.

2.7 <u>Joint Sealant Accessories</u>

- .1 Cylindrical Sealant Backing: ASTM C1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
- .2 Bond Breaker Tape: Polymer tape compatible with joint sealant and adjacent materials and recommended by sealant manufacturer.
- .3 Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.
- .4 Cleaners: Chemical cleaners acceptable to joint sealant manufacturer.
- .5 Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 Examination

.1 Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Verify joint surfaces are clean, dry, and adequately cured. Proceed with joint sealant work once conditions meet sealant manufacturer's written recommendations.

3.2 Preparation

- .1 Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer. Comply with ASTM C1193.
 - .1 Remove curing compounds, laitance, form-release agents, dust, and other contaminants.
 - .2 Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.
 - .3 Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 Application

.1 Sealant and Primer Installation Standard: Comply with ASTM C1193 and manufacturer's written instructions.

- .2 Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
 - .1 Install joint backing to maintain the following joint ratios:
 - .1 Joints up to 13 mm wide: 1:1 width to depth ratio.
 - .2 Joints greater than 13 mm wide: 2:1 width to depth ratio; maximum 13 mm joint depth.
 - .2 Install bond breaker tape over substrates when sealant backings are not used.
- .3 Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- .4 Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
- .5 Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 - .1 Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 - .2 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
 - .3 Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.
- .6 Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 - .1 Remove masking tape immediately after tooling joint without disturbing seal.
 - .2 Remove excess sealant from surfaces while still uncured.
- .7 Installation of Acoustical Sealant: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations on both sides of assemblies with a continuous bead of acoustical sealant. Comply with ASTM C919 and with manufacturer's written recommendations.

3.4 Field Quality Control

- .1 Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.
 - .1 Perform 5 tests for the first 300 m of joint length for each kind of sealant and joint substrate, and one test for each 300 m of joint length thereafter or 1 test per each floor per building elevation, minimum.
 - .2 For sealant applied between dissimilar materials, test both sides of joint.
- .2 Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- .3 Submit report of field adhesion testing to Consultant indicating tests, locations, dates, results, and remedial actions taken.

3.5 Interior Joint Sealant Schedule

- .1 Interior vertical movement joints in interior concrete and unit masonry. .1 UJS#1, UJS#2: Single-component non-sag urethane sealant.
- .2 Interior movement joints in interior unit masonry. .1 UJS#1, UJS#2: Single-component non-sag urethane sealant.
- .3 Interior perimeter joints of exterior aluminum frames. .1 UJS#1: Single-component non-sag urethane sealant.
- .4 Interior perimeter joints of interior frames.
 - .1 UJS#2: Single-component non-sag urethane sealant.
 - .2 LJS#1: Siliconized acrylic latex
- .5 Interior sanitary joints between plumbing fixtures, food preparation fixtures, and casework and adjacent walls, floors, and counters.
 - .1 SJS#5: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant.
- .6 Interior traffic joints in floor and between floor and wall construction.
 - .1 UJS# 4, UJS#5: Single-component pourable urethane sealant.
- .7 Interior non-moving joints between interior painted surfaces and adjacent materials.
 - .1 LJS#1: Siliconized acrylic latex
 - .2 Joint-Sealant Colour: Paintable.

- .8 Interior concealed sealants at thresholds and sills.
 - .1 BJS#1: Butyl-rubber-based joint sealant.
- .9 Interior exposed and non-exposed acoustical applications.
 - .1 AJS#1: Acoustical joint sealant.
- 3.6 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 <u>GENERAL</u>

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 07 92 00 Joint Sealants
- .4 Section 08 71 10 Door Hardware
- .5 Section 08 71 13 Automatic Door Operators
- .6 Section 09 21 16 Gypsum Board
- .7 Section 09 22 16 Non-Structural Metal Framing
- .8 Section 09 91 23 Interior Painting

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C177-19e1 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
 - .3 ASTM C518-21 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .4 ASTM C553-13(2019) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
 - .5 ASTM C591-22 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
 - .6 ASTM C1289-22a Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - .7 ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
 - .8 ASTM D7396-14(2020) Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting
 - .9 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.10 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19M-84 Rigid Vinyl Extrusions for Windows and Doors.
- .3 CSA Group (CSA)
 - .1 CSA-G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000
 - .2 CSDMA Recommended Specifications for Commercial Steel Doors and Frames, 2006.
 - .3 CSDMA Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.
- .5 Underwriters Laboratories Canada (ULC)
 - .1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
 - .2 ULC 105- 2016 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
 - .3 ULC 106-2015 Standard Method for Fire Tests of Window and Glass Block Assemblies
 - .4 ULC 701-2011 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .5 ULC 702.1- 2014 Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .6 ULC 704-11 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .6 Underwriters Laboratories (UL)
 - .1 UL10B Fire Tests of Door Assemblies.
 - .2 UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
- .7 National Fire Protection Association (NFPA)
 - .1 NFPA 80-22 Standard for Fire Doors and Other Opening Protectives.
 - .2 NFPA 252-2017 Fire Tests of Door Assemblies.
- .8 American National Standards Institute (ANSI)
 - .1 ANSI 250.4-2018 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors
 - .2 ANSI 250.10-2011 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Provide shop drawings
 - .1 Indicate each type of door, frame, steel, construction and core.
 - .2 Indicate fire ratings.
 - .3 Indicate material thicknesses, mortises, reinforcements, anchorages, location of exposed fasteners, openings, arrangement of hardware, and finishes.
 - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 System Description

.1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35° C to 35° C.

1.6 Defining Opening Sizes

- .1 Width Widths of openings shall be measured from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width")
- .2 Height Heights of openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")
- .3 Door Sizes Doors shall be sized so as to fit the above openings and allow a 3 mm nominal clearance at jambs and head of frame. A clearance of 13 mm maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings).
- .4 Tolerances Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 <u>Requirements of Regulatory Agencies</u>

- .1 Steel fire rated doors and frames: labeled and installed by an organization accredited by Standards Council of Canada in conformance with ULC 104 or NFPA 252 for ratings specified or indicated.
- .2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with ULC 104 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.9 Testing and Performance

- .1 Fire labeled products shall be provided for those openings requiring fire protection ratings as scheduled on the drawings. Products shall be tested in strict conformance with ULC 104 and listed by Underwriters Laboratory of Canada Ltd. or Warnock Hersey under an active Factory Inspection Program.
- .2 Product quality shall meet the standards established by the Canadian Steel Door Manufacturer's Association.
- .3 Door construction shall meet acceptance criteria of ANSI A250.10 and shall be certified as meeting Level A (1,000,000 cycles) and Twist Test Acceptance Criteria deflection not to exceed 6.4 mm/13.6 kg force, total deflection at 136.1 kg force not to exceed 64 mm and permanent deflection not to exceed 3.0 mm when tested in strict conformance with ANSI A250.4. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .4 Core materials for insulated doors shall attain a thermal resistance rating of RSI 2.17 when tested in accordance with ASTM C177 or ASTM C518.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Acceptable Materials
 - .1 Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.

- .2 Steel: Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, Recommended Specifications for Commercial Steel Door and Frame Products unless noted otherwise.
- .3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653, ZF75.
- .4 Door Core Materials
 - .1 Interior Doors: Structural small cell, 24.5mm maximum kraft paper 'honeycomb'. Weight 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness. ULC approved.
 - .2 Temperature Rise Rated (TRR): Core composition to provide the fire-protection rating and limit the temperature rise on the unexposed side of door to 250°C at 30 or 60 minutes, as determined by governing building code requirements. Core to be tested as part of a complete door assembly, in accordance with ULC 104 and shall be listed by a nationally recognized testing agency having a factory inspection service.
- .5 Primers:
 - .1 Touch-up prime CAN/CGSB-1.181, organic zinc rich, rust inhibitive. .1 Maximum VOC limit 50 g/L to GC-03.

2.2 Adhesives

- .1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.
- .2 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .3 Polyisocyanurate: heat resistant, epoxy resin based, low viscosity, contact cement.
- .4 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, low VOC sealant/adhesive or U.L.C. approved equivalent.

2.3 <u>Accessories</u>

.1 Door silencers: single stud rubber/neoprene type.

- .2 Fiberglass: to ULC 702, loose batt type, minimum density of 24 kg/m³.
- .3 Metallic paste filler: to manufacturer's standard.
- .4 Sealant: As specified in Section 07 92 00.

2.4 Fabrication - Frame Products

.1 General

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Interior frame product shall be 1.60 mm. Interior frames shall be welded type construction.
- .4 Blank, reinforce, drill and tap frames for templated hardware and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .5 Prepare frames to receive electrical conduit for door operators where indicated and required.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.
- .8 Minimum reinforcing, anchor and other component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .9 Each interior door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two for double door openings, except on gasketed frame product.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Fire-rated frame products shall be provided for those openings requiring fire protection as determined and scheduled by the Consultant. Frames, transom and sidelight assemblies shall be listed for conformance with ULC 104. Window assemblies shall be listed for conformance with ULC 106. All fire-rated frame products shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance

with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

- .2 Welded Type
 - .1 Welding in accordance with CSA W59.
 - .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
 - .3 Cope accurately and securely weld butt joints of mullions, centre rails and sills.
 - .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
 - .5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm of the base of the jamb, shall be substituted.
 - .6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.
 - .7 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
 - .8 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.
 - .9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
 - .10 Manufacturer's nameplates on frames and screens are not permitted

2.5 <u>Fabrication - Doors</u>

- .1 General
 - .1 Interior doors: steel construction with honeycomb core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
 - .2 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.
 - .3 Doors: swing type, flush.
 - .4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.

- .2 Longitudinal edges shall be mechanically inter-locked, adhesive assisted. Seams: visible grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware and electronic hardware, in accordance with the approved hardware schedule and templates provided by the hardware supplier.
- .4 Holes 12.7 mm diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.
- .5 Doors shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.
- .6 Provide top and bottom of doors with inverted, recessed, welded steel channels. Exterior doors shall be provided with rigid PVC top caps.
- .7 Minimum reinforcing and component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Fire-rated doors shall be provided for those openings requiring fire protection and temperature rise ratings, as indicated. Such products shall be listed for conformance with ULC 104. All fire-rated doors shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated doors shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.
- .10 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.
- .11 Manufacturer's nameplates on doors are not permitted.

2.6 <u>Finishes</u>

.1 Doors and frames shall wipe coat zinc, ready for painting.

PART 3 EXECUTION

3.1 <u>Manufacturer's Instructions</u>

.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 Installation

- .1 Install doors and frames to CSDMA Installation Guide, NAAMM-HMMA 840, Installation Guide for Commercial Steel Doors and Frames.
- .2 Fire-rated door and frame product shall be installed in accordance with NFPA-80.
- .3 Prior to installation, remove temporary shipping spreaders.
- .4 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.
- .5 Check door and frame product for correct size, swing, rating and opening number.
- .6 The supplier shall be advised of any discrepancies prior to installation.
- .7 Set frames plumb, square, level and at correct elevation.
- .8 Secure anchorages and connections to adjacent construction.
- .9 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
- .10 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- .11 Remove wood spreaders after frames have been built-in.

- .12 Make allowance for deflection to ensure structural loads are not transmitted to frame product.
- .13 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware. Coordinate with Section 08 71 10 for preparation and installation of automatic door operators.
- .14 Adjust operable parts for correct clearances and function.
- .15 Install louvers, glazing and door silencers.
- .16 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
 - .1 Hinge side: 1.0 mm.
 - .2 Latch side and head: 1.5 mm.
 - .3 Finished floor and thresholds: 13 mm.
- .17 Caulk perimeter of frames. Refer to Section 07 92 00 Joint Sealants.
- 3.3 <u>Finish Repairs</u>
 - .1 Touch up with primer finishes damaged during installation.
 - .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.
- 3.4 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

Door Listing

OSHAWA FIRE HALL #3 - BEATRICE ST. EAST - OSHAWA, ON

Schedule 91077

Date Oct 11-24

Door Number	Set Number
104	1
106	3
109	4
127	5
128A	6
128B	6
130	6
132A	7
132B	7
132C	7
132D	7
134A	8
134B	8
134C	8
134D	8

Hardware Schedule

OSHAWA FIRE HALL #3 - BEATRICE ST. EAST - OSHAWA, ON

		Schedule	910//
		Date	Oct 11-24
Set # 1			
15	SINGLE DR # 104 LOCKERS 1	103 TO WASHROOM 104	RH
1 - 914 x 2	150 x 45 x HMD x PSF		
Qty			
3 EA	HINGE	BB1279-114 X 101- 626	
1 EA	PRIVACY SET	ALX40S X SAT X ASA X 626	6
1 EA	KICKPLATE	190S X 203 X 863 X 630	
1 EA	FLOOR STOP	243F X 626	
1 EA	ROBE HOOK	1139-S	
Set # 2 1 S 1 - 914 x 2 frame, c	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a	103 FROM CAPTAIN'S DORM 105 ST/PSF s is	RHR
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a	103 FROM CAPTAIN'S DORM 105 ST/PSF s is	RHR
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3 1 S	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a SINGLE DR # 106 LOCKERS 1	103 FROM CAPTAIN'S DORM 105 ST/PSF s is 103 TO SHOWER 106	RHR
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3 1 S 1 - 914 x 2	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF	103 FROM CAPTAIN'S DORM 105 ST/PSF s is	RHR
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3 1 S 1 - 914 x 2 Qty	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain as SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF	103 FROM CAPTAIN'S DORM 105 ST/PSF s is	RHR
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3 1 S 1 - 914 x 2 Qty 3 EA	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF HINGE	103 FROM CAPTAIN'S DORM 105 ST/PSF s is 103 TO SHOWER 106 BB1191-114 X 101-630	RHR
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3 1 S 1 - 914 x 2 Qty 3 EA 1 EA	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain as SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF HINGE PRIVACY SET	103 FROM CAPTAIN'S DORM 105 ST/PSF s is 103 TO SHOWER 106 BB1191-114 X 101-630 ALX40S X SAT X ASA X 626	RHR LH
Set # 2 1 S 1 - 914 x 2 frame, c Set # 3 1 S 1 - 914 x 2 Qty 3 EA 1 EA 1 EA 1 EA	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF HINGE PRIVACY SET CLOSER	103 FROM CAPTAIN'S DORM 105 ST/PSF s is 103 TO SHOWER 106 BB1191-114 X 101-630 ALX40S X SAT X ASA X 626 1461 X 689	RHR LH
Set # 2 1 · 914 x 2 frame, c Set # 3 1 · 914 x 2 1 · 914 x 2 Qty 3 EA 1 EA 1 EA 1 EA 1 EA	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain as SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF HINGE PRIVACY SET CLOSER KICKPLATE	103 FROM CAPTAIN'S DORM 105 ST/PSF s is 103 TO SHOWER 106 BB1191-114 X 101-630 ALX40S X SAT X ASA X 626 1461 X 689 190S X 203 X 863 X 630	RHR LH
Set # 2 1 · 914 x 2 frame, c Set # 3 1 · 914 x 2 Set # 3 1 · 914 x 2 Qty 3 EA 1 EA 1 EA 1 EA 1 EA 1 EA	SINGLE DR # 105 LOCKERS 1 134 x 45 x EXIST/HMD x EXIS door and hardware to remain a SINGLE DR # 106 LOCKERS 1 150 x 45 x HMD x PSF HINGE PRIVACY SET CLOSER KICKPLATE FLOOR STOP	103 FROM CAPTAIN'S DORM 105 5T/PSF s is 103 TO SHOWER 106 BB1191-114 X 101-630 ALX40S X SAT X ASA X 626 1461 X 689 190S X 203 X 863 X 630 243F X 626	RHR LH

Hardware Schedule

OSHAWA FIRE HALL #3 - BEATRICE ST. EAST - OSHAWA, ON

						Schedule Date	91077 Oct 11-24
	S	Set #	4				
			1 \$	SINGLE DR # 109 CORRIDOR 107 TO UNIVE	RSAL W/RM 10	9	RH
		1 - 96	5 x 2	150 x 45 x HMD x PSF			
	-	• • • • •					
_		Qty	, 			404 000	
:	:	3	EA	HINGE	BB1168-114 X	101-626	
:	:	1	ΕA	STOREROOM LOCKSET	ALX80PD X SA	AT X ASA X 6	526
:	:	1	ΕA	ELECTRIC STRIKE	1600CLB X 630)	
				EC to run low voltage wiring from strike to hea	ad of frame		
:	:	1	ΕA	DOOR OPERATOR	SW200i X SINC	GLE HSG X	628
				110v to head of frame by EC			
:	:	1	EA	DOOR OPERATOR ADD ON	SW200i ADD F	OR INSWIN	G ARM
:	:	1	EA	OCCUPIED & EMERGENCY KIT RECES	#OCC-1-EMR-F	R KIT	
	low voltage wiring & ALL single gang junction boxes by EC						
		1	FΔ	LABOUR CHARGE (STD BUTTON)	LABOUR - INS		C1-ES-EMR
:		1					
•	•	1			1903 × 203 × 8	914 \ 030	
:		1	ΕA	FLOOK STOP	243F X 626		
:	:	1	ΕA	ROBE HOOK	1139-S		

Set # 5

install on wall @ LH door

:

:

:

:

	1 PAIR OF DRS # 127 CORRIDOR 128 TO STORAGE 127 1 - PAIR OF 770 x 2150 x 45 x HMD x PSF site measure for new frame/doors			
	Qty			
:	6 EA	HINGE	BB1279-114 X 101- 626	
:	1 EA	STOREROOM LOCKSET	ALX80PD X SAT X ASA X 626	
		install on RH door		
:	1 EA	CLOSER	1461 X 689	
		install on RH door		
:	2 EA	FLUSH BOLT	282D X 626	
		install in edge of LH door		
:	1 EA	ASTRAGAL	835SPS X 7'0" X 600	
:	2 EA	KICKPLATES	190S X 203 X 730 X 630	
:	1 EA	WALL STOP	232W X 626	

Hardware Schedule

OSHAWA FIRE HALL #3 - BEATRICE ST. EAST - OSHAWA, ON

				,	-
				Schedule Date	91077 Oct 11-24
		Set #	6		
			1 SINGLE DR # 128A CORRIDOR	128 FROM DORMS 126	RHR
			1 SINGLE DR # 128B CORRIDOR	111 FROM CORRIDOR 129	RHR
			1 SINGLE DR # 130 VANITY 130	FROM DORMS 126	LHR
		3-914 x	2150 x 45 x HMD x PSF		
		Qty			
:	:	9 EA	A HINGE	BB1168-114 X 101- 626	
:	:	2 EA	A PANIC DEVICE	98L X 996L X RHR X 628	
:	:	3 EA	A RIM CYL.	20-021 X 626	
:	:	3 EA	A ELECTRIC STRIKE	9600 X 630	
			EC to run low voltage wiring fro	m strike to head of frame	
:	:	3 EA	A DOOR OPERATOR	SW200i X SINGLE HSG X 6	528
		o =	110v to head of frame by EC		
:	:	6 E <i>F</i>	WALL MOUNT SWITCH	#6R-3 X H/C PUSH X 630	
		с г /	single gang junction boxes and	low voltage wiring to boxes by EC	
•	•	0 E <i>F</i>	A RICKPLATE	1905 X 203 X 863 X 630	
		2 E/		243E X 626	
:	:	2 L/ 1 F/		981 X 9961 X I HR X 628	
•	•		install on 130		
:	:	3 EA	A LABOUR CHARGE	LABOUR - INSTALL OPER.	& E/ST
		Sot #	7		
		Jel #	' 1 SINGLE DR # 132A CORRIDOR	2 128 TO WASHROOM 132A	LH
			1 SINGLE DR # 132B CORRIDOR	128 TO WASHROOM 132B	RH
			1 SINGLE DR # 132C VANITY 130	TO WASHROOM 132C	RH
			1 SINGLE DR # 132D VANITY 130	TO WASHROOM 132D	LH
	4 - 900 x 2150 x 45 x HMD x PSF				
		Qty			
:	:	12 EA	A HINGE	BB1279-114 X 101- 626	
:	:	4 EA	A PRIVACY SET	ALX40S X SAT X ASA X 620	6
:	:	4 EA	A CLOSER	1461 X 689	
:	:	4 EA	A KICKPLATE	190S X 203 X 863 X 630	
:	:	4 EA	A FLOOR STOP	243F X 626	
:	:	4 EA	A ROBE HOOK	1139-S	

1139-S
Rivett Architectural Hardware Ltd.

Hardware Schedule

OSHAWA FIRE HALL #3 - BEATRICE ST. EAST - OSHAWA, ON

				Schedule	91077
				Date	Oct 11-24
	Set #	8			
		1 SINGLE DR # 134A C	CORRIDOR 129 TO SHOWI	ER 134A	LH
		1 SINGLE DR # 134B C	CORRIDOR 129 TO SHOWI	ER 134B	RH
		1 SINGLE DR # 134C 0	CORRIDOR 129 TO SHOW	ER 134C	LH
		1 SINGLE DR # 134D 0	CORRIDOR 129 TO SHOW	ER 134D	RH
	4 - 914	x 2150 x 45 x HMD x PS	SF		
	Qty				
:	12 E	EA HINGE	В	B1279-114 X 101- 626	
:	4 E	EA PRIVACY SET	A	LX40S X SAT X ASA X 6	626
:	4 E	EA CLOSER	1	461 X 689	
:	4 E	EA KICKPLATE	1	90S X 203 X 863 X 630	
:	4 E	EA FLOOR STOP	2	43F X 626	
:	4 E	EA ROBE HOOK	1	139-S	

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 06 20 00 Finish Carpentry
- .2 Section 08 11 00 Metal Doors and Frames

1.3 <u>References</u>

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/DHI A115.1G-1994 Installation Guide for Doors and Hardware
 - .2 ANSI/ICC A117.1-2017 Accessible and Usable Buildings and Facilities
 - .3 ANSI/BHMA A156.1-2013 American National Standard for Butts and Hinges.
 - .4 ANSI/BHMA A156.2-2011 Bored and Preassembled Locks and Latches.
 - .5 ANSI/BHMA A156.3-2014 Exit Devices.
 - .6 ANSI/BHMA A156.4-2013 Door Controls Closers.
 - .7 ANSI/BHMA A156.5-2014 Auxiliary Locks and Associated Products.
 - .8 ANSI/BHMA A156.6-2010 Architectural Door Trim.
 - .9 ANSI/BHMA A156.8-2010 Door Controls Overhead Stops and Holders.
 - .10 ANSI/BHMA A156.10-2011 Power Operated Pedestrian Doors.
 - .11ANSI/BHMA A156.12-2013 Interconnected Locks and Latches.
 - .12ANSI/BHMA A156.13-2012 Mortise Locks and Latches Series 1000.
 - .13 ANSI/BHMA A156.16-2013 Auxiliary Hardware.
 - .14 ANSI/BHMA A156.18-2012 Materials and Finishes.
 - .15ANSI/BHMA A156.19-2013 Power Assist and Low Energy Power Operated Doors.
 - .16 ANSI/BHMA A156.21-2014 Thresholds.
 - .17 ANSI/BMHA A156.22-2012 Door Gasketing and Edge Seal Systems
- .2 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): Standard Hardware Location Dimensions.
- .3 National Wood Window and Door Association (NWWDA)
- .4 Door Hardware Institute (DHI)
- .5 Accessibility for Ontarians with Disabilities Act (AODA)
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.

- .2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .3 Samples:
 - .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
 - .2 After approval samples will be returned for incorporation in the Work.
- .4 Hardware List:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .5 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .6 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into Operations and Maintenance Manuals specified in Section 01 78 00 Closeout Submittals.

1.5 <u>Quality Assurance</u>

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
 - .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Package each item of hardware including fastenings, separately or in like groups

of hardware, label each package as to item definition and location.

- .4 Receive the delivery of the Finishing Hardware and identify all items against the Finishing Hardware Schedule. Ensure each hardware item is accompanied by the correct template, installation instructions, special tools, fastening devices and other loose items. Advise the finish hardware supplier and Consultant in writing of errors or omissions.
- .5 Storage and Protection: Store finishing hardware in locked, clean and dry area.
- .6 Remove all hardware from doors and frames prior to painting. After painting is complete and dry, reinstall all hardware to manufacturer's recommendations.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 <u>Warranty</u>

.1 Warrant all hardware against defects of workmanship and material, for a period of one year, except for door closers which shall be warranted for ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 All hardware shall be supplied as specified in the Finishing Hardware Schedule.
- .2 All finishes shall be as indicated in the Finishing Hardware Schedule by international codes.
- .3 All door handles shall be lever type meeting requirements of the referenced accessibility standards and the Ontario Building Code.
- .4 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).

2.2 <u>Fastenings</u>

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

2.3 <u>Electrified Devices</u>

- .1 Electrified exit devices shall conform to all traditional exit device standards as specified above. All power requirements for exit devices used must utilize a continuous circuit electric hinge for clean design and no visible means of interrupting power to device.
- .2 All exit devices with electric latch retraction shall provide for a remote means of unlocking for momentary or maintained periods of time.
- .3 Exit devices with electrified trim shall be fail-secure unless otherwise specified.

2.4 <u>Keying</u>

- .1 Keying: All permanent cylinders to be grandmaster-keyed as directed by the Owner. The factory shall key all locks and cylinders and maintain keying records. The factory shall establish a System Information Document (SID) to designate primary system administrators and require a separate letter of authorization for all future shipments of keyed products.
- .2 Remove all construction cores and install all permanent cores. Unless otherwise directed by the Owner.
- .3 Construction master/change keys are to be delivered by the contractor directly to The Owner.

.4 Ship all permanent cylinders and keys separately. Identify door number and keyset symbol on each envelope for direct factory delivery to the owner.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 Examination

- .1 Before installing any hardware, carefully check all architectural drawings of the work requiring hardware, verify door swings, door and frame materials and operating conditions, and assure that all hardware will fit the work to which it is to be attached.
- .2 Check all shop drawings and frame and door lists affecting hardware type and installation, and certify to the correctness thereof, or advise the hardware supplier and Consultant in writing of required revisions.

3.3 <u>Templates</u>

.1 Check the hardware schedule, drawings and specifications, and furnish promptly to the applicable trades any patterns, templates, template information and manufacturer's literature required for the proper preparation for and application of hardware, in ample time to facilitate the progress of the work.

3.4 Installation

- .1 Installation of hardware shall be in accordance with ANSI A115.1G, manufacturer's templates and instructions.
- .2 Install each item of mechanical and electromechanical hardware and access control equipment to comply with the manufacturer's written instructions and

according to specifications. All items to be installed with fasteners identified by manufacturer's installation instructions unless otherwise noted.

- .3 Mounting Heights: Install door hardware at heights indicated in the following applicable publications unless; specifically indicated or required by local governing regulations, requirements to match for special templates, necessary coordination with door elevations, and or to ensure consistency with pairs of doors.
 - .1 DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames"
 - .2 DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors"
 - .3 ANSI/ICC A117.1 Accessibility Guidelines for Buildings and Facilities
 - .4 NWWDA
 - .5 AODA
- .4 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system.
- .5 Coordinate installation of electric door strikes, keypad locks, card readers, washroom duress systems, and other electronic door control and security devices with Electrical contractor including supply and installation of wiring and all terminations.
- .6 All hardware shall be installed by carpenters, skilled in the application of architectural hardware and satisfactory to the hardware supplier. Refer to Section 06 20 00 Finish Carpentry. Instruction sheets, details and templates shall be read and understood before installation.
- .7 Install all materials as listed in the Finishing Hardware Schedule on the doors and frames listed. Interchanging of hardware will not be allowed.
- .8 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .9 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .10 Remove construction cores when directed by Owner's Representative.
- .11 After installation, templates, installation instructions and details shall be put in a file and turned over to the Owner, when building is Substantially Performed.

3.5 Field Quality Control

- .1 Conduct periodic inspections to ensure that door frames are installed plumb, level and square with verification by installer prior to installation of doors and door hardware.
- .2 Hardware supplier to attend site meetings as required to ensure proper execution of the guidelines set forth herein.
- .3 Hardware supplier will perform final field inspection of installed door hardware after final adjustment of all products and will document and report any deficiencies or omissions for correction and written acceptance by the Contractor.
- 3.6 <u>Adjusting</u>
 - .1 Adjust door hardware, operators, closers and controls for optimum, smooth operating condition, safety and for weather tight closure.
 - .2 Lubricate hardware, operating equipment and other moving parts.
 - .3 Adjust door hardware to provide tight fit at contact points with frames.
- 3.7 <u>Demonstration</u>
 - .1 Instruct Owner's maintenance personnel in the proper adjustment, operation and maintenance of mechanical and electromechanical door hardware, electronic devices and maintenance of finishes.

3.8 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .3 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
- .4 Remove protective material from hardware items where present.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 08 11 00 Metal Doors and Frames
- .2 Section 08 71 10 Door Hardware

1.3 <u>References</u>

- .1 American National Standards Institute/Builders Hardware and Manufacturers Association (ANSI/BHMA):
 - .1 BHMA A156.10- 2017 Power Operated Pedestrian Doors
- .2 CSA Group (CSA)
 - .1 CSA C22.1:21 Canadian Electrical Code
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.108-M89 Bituminous Solvent Type Paint
- .4 Ontario Building Code.
- .5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop Drawings: Submit shop drawings for review indicating all components, required clearances, electrical hook-up and coordination required with the work of related trades.
 - .1 Indicate materials, thickness, anchorage, finishes and operation. Indicate minimum acceptable clearances required.
 - .2 Provide layout for installation of door controller paddles and devices including mounting heights and conduit requirements.
 - .3 Submit wiring diagrams and schematics.
- .3 Provide maintenance data for automatic door operators complete with operation and maintenence instructions, pertinent details and spare parts list for incorporation into Maintenance Manuals specified in Section 01 78 00 – Closeout Submittals.

1.5 <u>Maintenance</u>

.1 Instruct Owner in operation and maintenance of door operators.

1.6 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.
- 1.8 <u>Warranty</u>
 - .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 <u>General</u>
 - .1 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).
 - .2 Manufacturer: This specification is based on Stanley Access technologies Magic Swing Door Operators. Equivalent products by the following manufacturers are acceptable, subject to approval of the Consultant:
 - .1 Besam/Assa -Abloy
 - .2 Dormakaba
 - .3 Dor-O-Matic.
 - .4 Horton Automatics.
 - .5 Rhinotek

2.2 <u>Material/Design/Operation</u>

- .1 Operator
 - .1 Shall be Stanley Magic-Swing, electro-mechanical system sealed against dirt, dust and corrosion in a cast aluminum case and fully lubricated to minimize wear and friction of the moving parts between temperature extremes of -20 ° C and +60 ° C. The entire operator shall be removable from the header as a unit.
 - .2 Size operators to suit weight of doors as indicated on the Door and Frame Schedule.
 - .3 Aluminum header extrusions to be minimum 3.0 mm wall thickness and have a clear anodized finish to match adjacent frames.
 - .4 Back paint all aluminum in contact with steel with bituminous paint to CGSB 1.108 and install PVC isolating strips.
 - .5 All automatic entrance equipment is to comply with all sectors of ANSI A-156.10 and be C.S.A. approved.
- .2 Power Opening: The operator shall open the door with a 1/8 hp DC motor through reduction gears, ball screw actuator and a forged steel rack and pinion. Opening time to back-check (approximately 75°) shall be 1.25-1.6 seconds. The drive train shall have positive, constant engagement. A force no greater than 25 IbF at the lock stile shall stop the door from opening. The operator shall stop the door in the open position by electrically reducing the motor voltage and holding against an adjustable 90° stop.
- .3 Spring Closing: The operator shall close the door by spring energy. Closing speed shall be controlled by employing the motor as a dynamic brake and closing to latch check (approximately 10°) shall be in 3 seconds. Closing through last 10° shall be in 1.5 seconds minimum. The closing spring shall be a helical compression spring, pre-loaded for positive closing action at a low material stress level for long spring life.
- .4 Emergency Release: The operator shall have built in emergency release with controlled spring return to the closed position without manual resetting. While the door is in the emergency release mode, a disconnect switch shall prevent powered operation. No header or jamb mounted stops or cams shall be required for emergency function. Not more than 50 IbF at the lock stile shall be required for emergency use per ANSI A-156.10.

- .5 Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power.
 - .1 Entrapment Protection: the forces and speeds of power opening, manual opening in both directions of swing, and spring closing in both directions of swing shall conform to the requirements of ANSI-A-156.10.
- .6 Electrical Control: A solid state, completely enclosed electronic control with quick connect plugs shall incorporate the following features:
 - .1 A "safety plus" 1 ½ second extension of both operate and safety signals after pressure has been removed from the control mats.
 - .2 A 2 ½ ampere current limiting circuit which limits the opening force of the operator to a maximum of 24 lbF at the lock stile.
 - .3 A "soft-start" motor driving circuit that reduces power to the motor after seven seconds of maintained opening speed.
 - .4 A cam actuated emergency breakout switch to disconnect power to the motor when the door is manually pushed in the emergency direction. The operator shall then automatically reset and power will be resumed.
- .7 Door Arm
 - .1 Linkage assembly shall provide positive control of door through entire swing; shall permit use on butt hung doors.
 - .2 Header shall be 140 mm wide by 152 mm high extruded aluminum of 3.0 mm thickness. Access to the operator and electronic control box shall be by a full length removable cover, edge rabbited to the header to insure flush fit. Finish to be anodized.
- .8 Controls
 - .1 Shall be manufacturer's standard Touchless, stainless steel push plate embossed with Handicap Symbol and "WAVE TO OPEN". Size of plate to meet Code requirements.
 - .1 BEA 10MS31U Universal Wave to Open Touchless Actuator or Camden 325. Black.
 - .2 Provide CSA approved 50 x 100 mm minimum galvanized steel junction box or size to match frames.
 - .3 Control devices shall be weatherproof.
 - .4 Where indicated, install junction box/control on door control pedestal. Pedestal shall be stainless steel, brushed finish purpose made for door operator controls.
 - .1 152 x 152 mm stainless steel pedestal.

- .2 1220 mm high with sloped top.
- .3 1 single gang and 2 double gang openings. (Intercom/Card Reader/Door operator). Centrelines between 900mm and 1100mm to meet OBC Barrier Free requirements.

PART 3 EXECUTION

- 3.1 <u>Examination</u>
 - .1 Inspect the site to ensure that no defects are present in the completed phases of the work which would result in poor application or installation or cause latent defects of the automatic door equipment.

3.2 Installation

- .1 Install components and wire operators in accordance with Manufacturer's instructions.
- .2 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system
- .3 Coordinate installation of operators with other Sections. Supply material to be built into the work when required.
- .4 Install control switches at heights in accordance with referenced standards and reviewed shop drawings.
- .5 Pedestals for automatic door operators shall be mounted on concrete foundations in accordance with manufacturer's recommendations and installation instructions. Exterior air entrained concrete as specified in Section 03 30 00.
- .6 Maintain minimum headroom requirements at doors as indicated on the reviewed shop drawings.
- .7 Adjust door operating components to ensure smooth opening and closing of doors.

- .8 Instruct the Owner in the correct operation, care and maintenance of the door operators.
- 3.3 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 GENERAL

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 84 00 Firestopping
- .3 Section 07 92 00 Joint Sealants
- .4 Section 09 22 16 Non-Structural Metal Framing
- .5 Section 09 91 23 Interior Painting

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM C514-04(2020) Standard Specification for Nails for the Application of Gypsum Board
 - .2 ASTM C840-20 Standard Specification for Application and Finishing of Gypsum Board
 - .3 ASTM C954-22 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
 - .4 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .5 ASTM C1047-19 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
 - .6 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
 - .7 ASTM C1178/C1178M-18 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
 - .8 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel
 - .9 ASTM C1280 18 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
 - .10 ASTM C1288-17 Standard Specification for Fiber-Cement Interior Substrate Sheets
 - .11ASTM C1325-22 Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
 - .12ASTM C1396/C1396M 17 Standard Specification for Gypsum Board

- .13ASTM C1629/C1629M-19 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
- .14 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .15ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
- .16ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems .2 American National Standards Institute (ANSI)
 - .1 ANSI A118.9-1992 Test Methods and Specifications for Cementitious Backer Units.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB 19-GP-21M Sealing and Bedding Compound for Acoustical Purposes
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 ULC 114-2018 Standard Method of Test for Determination of Non-Combustibility in Building Materials
 - .3 ULC 129- 2015 Standard Method of Test for Smoulder Resistance of Insulation (Basket Method)
 - .4 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
- .5 Gypsum Association (GA)
 - .1 GA-214-2022 Recommended Levels of Gypsum Board Finish.
 - .2 GA-216-2021 Application and Finishing of Gypsum Board.
 - .3 GA-253-2021 Application of Gypsum Sheathing
- .6 Wall and Ceiling Bureau (WCB)
 - .1 Technical Bulletin Control Joint Placement in Gypsum Board Assemblies
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.

1.5 <u>Quality Assurance</u>

- .1 Dry wall installers: minimum 5 years proven experience.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .5 Mock-Ups
 - .1 Construct mock-ups in accordance with Section 01 45 00 Quality Control.
 - .2 Construct mock-up gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.
 - .3 Allow two working days for inspection of mock-up by Consultant before proceeding with rest of the work.
 - .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.6 <u>Design Requirements</u>

- .1 Where indicated provide minimum sound transmission rating of installed partitions of STC 50 tested to ASTM E90.
- .2 Provide fire resistance rating of installed partitions as indicated and according to referenced ULC design.
- 1.7 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
 - .3 Protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.

1.8 <u>Project Conditions</u>

- .1 Maintain temperature minimum 10 ° C, maximum 21 ° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 <u>Gypsum Board</u>

- .1 To ASTM C1396/C1396M. Standard for non-rated applications, Type X for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings. All fire rated board shall be minimum 16 mm thickness.
- .2 Abuse Resistant Gypsum Board: CGC Fibrerock abuse resistant fibre/gypsum panels, 16 mm thickness.
- .3 Water and Moisture Resistant Board: to ASTM C1396, 12.7 mm thick, 1220 mm wide with tapered edges.
- .4 Glass Mat Water-Resistant Gypsum Board: to ASTM C1178 with glass mat facings, both sides, regular and Type X, thicknesses as indicated on drawings, 1200 mm wide x maximum practical length, ends square cut, long edges tapered.
- .5 Glass Mat Exterior Gypsum Sheathing: to ASTM C1177, 12.7 mm thick, 1219 mm wide x 2440 mm long, square edge.
 - .1 Weight: 9.27 kg/m²
 - .2 Surfacing: Fiberglass mat on face, back, and long edges.
 - .3 Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
 - .4 Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
 - .5 Humidified Deflection (ASTM C1177): Not more than 6.0 mm.
 - .6 Permeance (ASTM E96): Not less than 23 perms.

- .7 R-Value (ASTM C518): 0.56.
- .8 Mold Resistance (ASTM D3273): 10, in a test as manufactured.
- .9 Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
 - .1 CGC Securock
 - .2 Georgia Pacific DENS-Glass Gold
 - .3 Certainteed GlasRoc

2.2 <u>Cementitious Backer Board</u>

- .1 Cementitious backer board: cementitious, water durable, board; surfaced with fiberglass reinforcing mesh on front and back; long edges wrapped; to ANSI A118.9, ASTM C1288 and ASTM C1325, 13 mm thick, edges tapered, 1200 mm wide x maximum practical length. Compressive strength: Not less than 15.51 MPa when tested in accordance with ASTM D2394. Water absorption: Not greater than 8 percent when tested for 24 hours in accordance with ASTM C473.
 - .1 CGC Durock Brand
 - .2 Certainteed Diamondback

2.3 <u>Fastening and Adhesives</u>

- .1 Drywall Screws: To ASTM C954 or ASTM C1002 self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.
- .2 Sheathing Screws: To ASTM C1002, corrosion resistant, heat treated self-tapping sheet metal screws minimum 32 mm long.
- .3 Joint Tape: To ASTM C475, 50 mm perforated with preformed seam, mould and mildew resistant.
 - .1 Joint tape for abuse resistant gypsum board: CGC Mould Resistant Fiberglass Drywall Tape.
- .4 Joint Filler and Topping: To ASTM C475 vinyl or latex base, slow setting.
- .5 Joint Treatment for Gypsum Sheathing: 50 mm wide, 10 x 10 woven threads per 25 mm, self-adhering fibreglass joint tape and Borden HPPG Elmer's Siliconized Acrylic Latex Caulk.
- .6 Laminating Compound: as recommended by manufacturer, asbestos-free.
- 2.4 Acoustic Insulation

- .1 Acoustic Attenuation: Min 50 STC in accordance with ASTM E90.
- .2 Acoustic Insulation: Mineral or Glass Fibre Acoustic Insulation:
 - .1 Mineral Fibre Acoustic Insulation: To ASTM C665, Mineral fibre blanket insulation, minimum density of 40 kg/m³:
 - .1 AFB Acoustical Fire Batts manufactured by Roxul Inc.
 - .2 Creased SAFB manufactured by Owens Corning Canada.
 - .2 Glass Fibre Acoustic Blanket Insulation: To CAN/ULC-S702, type 1, pre-formed unfaced glass fibre batt acoustic insulation.
 - .1 QUIETZONE Acoustic Blanket insulation manufactured by Owens Corning Canada.
- .3 Surface burning characteristics to ULC 102:
 - .1 Flame spread: 15
 - .2 Smoke developed: 5
 - .3 Smoulder resistance: to ULC 129.
 - .4 Non-combustible: to ULC 114
- .4 Thickness to suit depth of wall framing and as indicated.
- .5 Acoustic sealant: as specified in Section 07 92 00 Joint Sealants.
- 2.5 <u>Accessories</u>
 - .1 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.
 - .2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene strip, with self-sticking permanent adhesive on one face; lengths as required.
 - .3 Control Joints: Bailey D-ZNCJ 7/16 x 10' Drywall or Veneer Plaster Control Joint.
 - .4 Sealants: as specified in Section 07 92 00 Joint Sealants.

PART 3 EXECUTION

- 3.1 <u>General</u>
 - .1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal authorities and the Consultant. Failure to do

so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.

.2 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

3.2 <u>Gypsum Board Application</u>

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 and/or GA-216 except where specified otherwise.
- .2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.
- .3 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.
- .4 Install fibre gypsum abuse resistant panels at all ceilings and bulkheads except as noted below. Treat joints with fibreglass reinforced joint tape in accordance with manufacturer's instructions.
- .5 Apply water or moisture resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.
- .6 Install Hi-Density Water Resistant Gypsum Sheathing in showers and other wet areas.
- .7 Carry gypsum board from floor to underside of floor or roof structure above. Furr out and carry gypsum board around any structural members as may be required. Neatly cope gypsum board to fill deck flutes where gypsum board abuts floor or roof deck.

3.3 <u>Cementitious Backer Board</u>

- .1 Install cementitious backer board where indicated in shower and tub enclosures and other wet areas indicated.
- .2 Install in accordance with manufacturer's instructions.

3.4 <u>Accessories</u>

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.

- .2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.
- .4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.
- .5 Provide control joints in gypsum board facing. Construct control joints in accordance with ASTM C840 and as described in Wall and Ceiling Bureau Technical Bulletin "Control Joint Placement in Gypsum Board Assemblies". Place control joints consistent with lines of building spaces as indicated. Where not indicated install as directed at maximum 6.0 m spacing. Control joints shall be supported with metal studs or furring channels on both sides of the joint Construct joints using back-to-back casing beads filled with a low modulus sealant capable of flexible joint movement. Maintain fire-resistance rating of wall assemblies. Control joints shall be provided:
 - .1 At abutting structural elements, steel columns.
 - .2 At expansion or control joints in the substrate.
 - .3 At each door jamb.

3.5 <u>Access Doors</u>

- .1 Install access doors to electrical and mechanical fixtures specified in respective Sections.
- .2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.6 <u>Taping and Filling</u>

- .1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces. Finish to GA-214 Level 5.
- .2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

- .4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.
- 3.7 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.
- 1.2 <u>Related Sections</u>
 - .1 Section 09 21 16 Gypsum Board

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C645-18 Standard Specification for Nonstructural Steel Framing Members
 - .3 ASTM C754-20 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
 - .4 ASTM C841-03(2018) Standard Specification for Installation of Interior Lathing and Furring.
 - .5 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .6 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .7 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .8 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
- .2 Canadian General Services Board (CGSB)
 - .1 CAN/CGSB-1.40-97 Primer, Structural Steel, Oil Alkyd Type.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
- .4 CSSBI Lightweight Steel Framing Manual
- 1.4 <u>Submittals</u>
 - .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
 - .2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 <u>Quality Assurance</u>

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 <u>Waste Management and Disposal</u>

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Metal Stud Framing Systems

- .1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
 - .1 Thickness of materials to conform to referenced standards unless noted otherwise.
 - .2 Thickness of materials shall be selected from manufacturer's standard span tables to suit total height requirements.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

- .3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .4 Tie Wire: 0.90 mm, galvanized, soft annealed, steel wire or clip as recommended by the manufacturer of furring channels.
- .5 Wind bearing light weight steel stud framing for exterior wall applications is specified in Section 05 41 00.

2.2 <u>Metal Furring and Suspension Systems</u>

- .1 Channel framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board.
 - .1 Thickness of materials to conform to referenced standards unless noted otherwise.
- .1 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: to ASTM C645, electro-zinc coated steel.
- .2 Runner Channels: 38 x 19 x 0.59 mm and 38 x 9.5 x 0.45 mm, hot dip or electrogalvanized sheet steel. Use of various sizes governed by applied loads and applicable spans.
- .3 Drywall Furring Channel: Channel shaped furring member for screw attachment of drywall with knurled face. For interior use. Furring masonry or concrete surfaces. Cross furring under steel joist or suspended metal channels in suspended ceiling systems: 70 x 22 x 0.9 mm with knurled face, hot dip or electro-galvanized sheet steel. Bailey D-1001.
- .4 Deflection Track: Bailey Multi-Slot Track MST 250, size to suit studs, and top deflection clips TDC 350 and TDC 587.
- .5 Horizontal Flange attachment: Bailey Horizontal Flange Attachment Clip (HFA Clip)
- .6 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.2 <u>Fasteners</u>

- .1 Powder activated fasteners: to suit structural conditions and fastening requirements and in accordance with manufacturer's recommendations: Ramset; Hilti; or approved equivalent.
- .2 Sheet Metal Screws: To ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.3 <u>Accessories</u>

- .1 Acoustic sealant: As specified in Section 07 92 00.
- .2 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-sticking adhesive on one face, lengths as required.
- .3 Zinc Rich Paint: to CGSB 1-GP-181M. Low VOC type.

PART 3 EXECUTION

3.1 <u>Examination</u>

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Consultant.

3.2 <u>Erection</u>

- .1 Comply with ASTM C754.
- .2 All gypsum board shall be supported with steel framing whether indicated or not.
- .3 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.
- .4 Align partition tracks at floor and ceiling and secure at 600 mm on centre

maximum. Provide top deflection tracks where indicated or as required to permit structural deflection. Install top deflection clips as necessary to increase load capacity.

- .5 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .6 Place studs vertically at 400 mm on centre unless noted otherwise and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .7 Erect metal studding to tolerance of 1:1000.
- .8 Attach studs to bottom and ceiling track using screws.
- .9 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .10 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .11 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .12 Install heavy thickness single jamb studs at openings.
- .13 Erect track at head of door/window openings and sills of window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .14 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .15 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .16 Install steel studs or furring channel between studs for attaching electrical and other boxes.

- .17 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.
- .18 Install continuous insulating strips to isolate studs from un-insulated surfaces.
- .19 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 Wall Furring

- .1 Install wall furring for gypsum board wall finishes in accordance ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.
- .2 Frame openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.4 <u>Suspended and Furred Ceilings and Bulkheads</u>

- .1 Erect hanger and runner channels for suspended gypsum board ceilings and bulkheads in accordance with ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.
- .2 Securely anchor hanger to structural supports 1220 mm o.c. maximum along runner channels and not more than 150 mm from ends. Under no circumstances shall hanger wires be secured to or supported from mechanical or electrical materials or equipment or penetrate mechanical ductwork.
- .3 Space runner or furring channels as shown on drawings and not more than 610 mm o.c. maximum nor 150 mm from walls. Run channels in long direction of board. Bend hanger sharply under bottom flange of runner and securely wire in place with a saddle tie. Provide channels below mechanical or electrical equipment and mechanical ductwork to maintain maximum spacing.
- .4 Install furring channels transversely across runner channels in short direction of wallboard at 610 mm o.c. maximum or 150 mm from walls and interruptions in ceiling continuity. Secure channels to support with furring clips or wire. Where splicing is necessary lap minimum 200 mm and wire tie each end with double loops of 0.90 mm galvanized tie wire, 25 mm from each end of overlap.
- .5 Support light fixtures by providing additional ceiling suspension hangers within

150 mm of each corner and at maximum 610 mm around perimeter of fixture. Coordinate with Electrical.

- .6 Install work level to tolerance of 1:1200.
- .7 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, etc.
- .8 Install furring channels parallel to, and at exact locations of steel stud partition header track.
- .9 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.
- 3.5 <u>Gypsum Board</u>
 - .1 Installation of gypsum board is specified in Section 09 21 16
- 3.6 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.
 - .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

End of Section

PART 1 GENERAL

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 04 20 00 Concrete Unit Masonry
- .3 Section 07 92 00 Joint Sealants
- .4 Section 09 21 16 Gypsum Board
- .5 Section 09 65 19 Resilient Tile Flooring
- .6 Section 09 91 23 Interior Painting

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ACTM C144-18 Standard Specification for Aggregate for Masonry Mortar
 - .2 ASTM C150/C150M-22 Standard Specification for Portland Cement
 - .3 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes
 - .4 ASTM C627-18e1 Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems using the Robinson-Type Floor Tester
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A108/A118/A136.1:2017 American National Specifications for the Installation of Ceramic Tile.
 - .2 ANSI A118.10 Waterproof Membrane
 - .3 ANSI A137.1: 2017 American National Standard Specifications for Ceramic Tile
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP 22M 1978 Adhesive, Organic, for Installation of Ceramic Wall Tile
- .4 International Standards Organization (ISO)
 - .1 ISO 10545 Series Ceramic Tiles, Standards for Testing
 - .2 ISO 13006-2012 Ceramic Tiles, Definitions, Classifications, Characteristics and Marking.
 - .3 ISO 13007-2010 Ceramic Tiles, Grouts and Adhesives.
- .5 Terrazzo, Tile and Marble Association of Canada (TTMAC)
 - .1 TTMAC 2019-2021 Specifications Guide 09 30 00, Tile Installation Manual.
 - .2 TTMAC Hard Surface Maintenance Guide.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Provide product data. Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Mortar and grout.
 - .3 Divider strip.
 - .4 Levelling compound.
 - .5 Waterproofing isolation membrane.
- .3 Submit duplicate samples of tile. Samples to be submitted on 300 x 600 mm sample board for each colour, texture, size and pattern of tile. Grout sample joints for representative sample of final installation.
- .4 Trim and Accessories: submit duplicate samples of each trim.
- .5 Shop drawings: submit tiling plans giving all details of special fittings, expansion joints, joint layout, etc.
- .6 Maintenance Data: Provide maintenance data for tile work, for incorporation into Maintenance Manuals specified under Section 01 78 00.

1.5 Quality Assurance

- .1 Do tile work in accordance with Installation Manual 200, Ceramic Tile, by Terrazzo, Tile and Marble Association of Canada (TTMAC), except where this specification is more stringent.
- .2 For the installation of ceramic tile, use only skilled tradesmen who are familiar with the referenced standards and with the requirements for this Work.
- .3 The setting material manufacturer's representative shall review the details with the Contractor prior to the start of work. Instruct the Contractor on the proper installation procedures to ensure compliance with the guarantee requirements.

1.6 <u>Performance Requirements</u>

- .1 Floor Traffic Load Bearing performance: Provide installations rated for the following load bearing performance in accordance with ASTM C627 for ceramic tile installed on walkway surfaces:
 - .1 Extra Heavy: passes cycles 1 through 14.
 - .2 Heavy: passes cycles 1 through 12.
 - .3 Moderate: passes cycles 1 through 10.

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- .4 Light: passes cycles 1 through 6
- .5 Residential: passes cycles 1 through 3.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver packaged materials in original unopened containers.
- .3 Keep delivered material dry and free from stains. Store cementitious material off damp surfaces.
- .4 Use all means necessary to protect materials, before, during and after installation and to protect the installed work and materials of all other trades.
- .5 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.
- .6 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 <u>Project Conditions</u>

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 hours before, during and after installation.
- .2 Do not install tiles at temperatures less than 12 °C or above 38 °C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.
- .4 Provide and maintain temporary lighting. Lighting levels shall be sufficient to complete work including inspections. Provide minimum lighting levels of 400 lux at work areas.

1.9 Qualifications

- .1 Installer of ceramic tiles shall have a minimum of 10 years of experience including at least five projects of similar scope and scale. Submit documented proof of experience prior to commencing work of this Section.
- 1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 <u>Maintenance</u>

.1 Upon completion of the installation and as a condition of acceptance, deliver to the Owner 2% of tile and accessory tiles in each colour and pattern of ceramic tiles installed under this Section for the Owners maintenance program. Identify each carton for location and installation date. Submission must be made all at one time and prior to Substantial Performance.

1.12 <u>Warranty</u>

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 <u>Materials</u>
 - .1 Materials shall be graded and containers grade sealed, delivered to the job site in their original packages or containers with the manufacturer's labels and seals intact.
 - .2 Tile and grout colours shall be selected by the Consultant from the manufacturer's standard range of colours.
 - .3 Tile shall conform to ANSI A137.1.
 - .4 Floor tile shall have coefficient of slip resistance conforming to ANSI A137.1.
 - .5 Provide coves, corners, reveals, surf caps, inners and outers as required to complete the work.

2.2 <u>Ceramic Tile</u>

.1 PCT1: Porcelain Ceramic Tile (Washroom Flooring): Daltile, Portfolio Series, 152mm x 610mm (6"X24"), matt finish, slip resistant. Up to 2 colours will be selected by consultant.

- .2 PCT2: Porcelain Ceramic tile (Shower Flooring): Daltile, Portfolio Series, 51mm x 51mm (2" x2"), matt finish, slip resistant. Shower cove base shape shall be 152mm x 305mm (6"X12") cove base type #P36C9.
- .3 CT1: Ceramic Wall Tile: (Field Tile) Daltile, Retrospec Remix Series, 76mm x 152mm (3"X6"), glazed ceramic tile. Up to two (2) colours will be selected by consultant.
- .4 CT2: Ceramic Wall Tile: (Accent Tile) Daltile, Artcrafted Series, (25mm x 152mm (1"X6"), glazed ceramic tile. Up to two (2) colours will be selected by consultant.

2.3 Mortar, Adhesives and Grout Material

- .1 Primer: Low VOC, low viscosity primer as recommended by manufacturer to suit substrate and site conditions; provide proof of bonding ability of setting systems where manufacturer recommends that a primer is not necessary to installation.
- .2 Surface Preparation Materials:
 - .1 Portland Cement Mortar: Scratch and bond coat, levelling bed containing the following:
 - .1 Portland Cement: Meeting or exceeding requirements of CSA A3000, Type GU.
 - .2 Hydrated Lime: Meeting or exceeding requirements of ASTM C207, Type N.
 - .3 Sand: Meeting or exceeding requirements of ASTM C144, passing 16 mesh.
 - .4 Water: Potable.
 - .2 Self Levelling and Smoothing Underlayment: Cementitious and self levelling smoothing underlayment meeting or exceeding requirements of ANSI A108.1, Type 2.
- .3 Wall Tile Systems:
 - .1 Thin Set Interior Installation: Dry set mortar meeting or exceeding requirements of ANSI A118.1 formulated for thin set applications, factory sanded mortar consisting of Portland cement, sand and additives requiring only addition of potable water for installation complete with bond enhancing latex additive.
- .4 Floor Tile Systems:
 - .1 Thin Set Interior Installation: Latex-Portland cement mortar meeting or exceeding requirements of ANSI A118.1, rated for floor traffic load bearing performance indicated above.

- .5 Adhesive Systems:
 - .1 Epoxy Adhesive: Thin set adhesive system using 100% solids epoxy resin and epoxy hardener meeting or exceeding requirements of ANSI A108.1; stain proof, chemical resistant and having high temperature resistance and water cleanable.
 - .2 Organic Adhesive: Thin set wall tile adhesive system using non-flammable, water resistant, latex adhesives for interior use meeting or exceeding requirements of ANSI A108.1, Type 1.
- .6 Tile Grout Systems:
 - .1 Colours:
 - .1 T1:
 - .2 T2:
 - .2 Unsanded Portland Cement Grout: factory blended dry-set stain resistant, latex modified Portland cement meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints less than or equal to 3 mm in width.
 - .3 Sanded Portland Cement Grout: Factory blended dry-set stain resistant, latex modified Portland cement and graded silica sand meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints greater than 3 mm in width.
 - .4 Polymer Modified Grout: factory blended stain resistant polymer modified Portland cement meeting or exceeding requirements of ANSI A118.7, specifically formulated for joints greater than 3 mm in width.
 - .5 Epoxy Grout: Water cleanable, chemical resistant, factory blended modified Portland cement compound with 100% epoxy adhesives and hardeners meeting or exceeding requirements of ANSI A118.3.

2.4 Patching and Levelling Compound

- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors, capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish and having not less than the following physical properties:
 - .1 Compressive strength: 25 MPa.
 - .2 Tensile strength: 7 MPa.
 - .3 Flexural strength: 7 MPa.
 - .4 Density: 1.9
 - .5 Products containing gypsum are not acceptable.
- .2 Levelling Compound: Laticrete 3701 latex or 226 Mapecem mortar mixed with Planicrete 50.
2.5 Floor Sealer and Protective Coating

.1 To tile and grout manufacturer's recommendations.

2.6 <u>Waterproofing Membrane</u>

- .1 Schluter-KERDI 8 mil thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides, which meets or exceeds the requirements of ANSI A118.10
- .2 Waterproofing seaming membrane: Schluter-KERDI-BAND Seams and Corners material 4 mil thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides.
- .3 Waterproofing Accessories:
 - .1 Schluter KERD-SEAL Mixing Valve seals
 - .2 Schluter KED-SEAL pipe seals
 - .3 Setting materials for waterproofing membranes as recommended by manufacturer.

2.7 <u>Accessories</u>

- .1 Cleavage Membrane: 0.10 mm thick polyethylene film meeting or exceeding requirements of CAN/CGSB-51.34
- .2 Crack Isolation] [Uncoupling Membrane] [Waterproofing] Membranes: Load bearing, [premanufactured self-adhering] [liquid applied, lightweight fabric reinforced] membrane meeting requirements of ANSI [A 118.12] [A 118.10]; thickness as recommended by manufacturer to accommodate in-plane substrate movement of 2 mm in thin set applications meeting or exceeding requirements of ANSI A108.1:
 - .1 Basis-of-Design Materials: [List Manufacturer, Material Name and other distinguishing characteristics]
- .3 Reducers, edge trim, and transition strips: Schluter Systems purpose made aluminum.
- .4 Shower thresholds: .
- .5 CT Edge Protection: Schluter RONDEC, size to suit tile thickness. Satin anodized aluminum. Trim to come with all connectors or end caps required for a complete and finished installation. As a minimum, provide edge protection at the following locations:

- .1 Top of PC Base;
- .2 Top of CT wall tile;
- .3 All outside corners of wall tile or porcelain ceramic tile base.
- .6 Transition Strip: (Porcelain ceramic tile to resilient flooring): Schluter RENO.V, satin anodized aluminum transition strips.
- .7 Transition Strips
 - .1 TS1: Schluter Reno-Ramp-K, Type 304 Stainless Steel.
 - .2 TS2: CRL 4" Aluminum Commercial Saddle Threshold, Colour Aluminum (38)
 - .3 TS3: To match existing.
 - .4 TS4: Schluter Schiene E100 Satin Anodized Aluminum.
- .8 Sealant: as specified in Section 07 92 00.

2.8 <u>Mixes</u>

- .1 Mix premanufactured mortars and grouts in accordance with referenced standards, and mortar and grout manufacturer's written instructions; mix site mixed materials as follows:
 - .1 Scratch Coat (by volume): Mix 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC detail.

PART 3 EXECUTION

3.1 <u>Surface Conditions</u>

- .1 Surfaces on which tile is to be applied, shall be thoroughly cleaned down.
- .2 Verify that concrete substrates have been allowed to cure for a minimum of 28 days in accordance with TTMAC requirements.
- .3 Verify that substrates for bonding tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and are within starting flatness tolerances as specified in Section 03 30 00 and are ready for application of levelling materials specified in this Section.
- .4 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work, and similar items located in or behind tile have been completed before installing tile.
- .5 Drywall surfaces on which wall and floor tile is to be applied, shall be free from dust, excess plaster and shall be plain and true without any irregularities.

Prepare existing gypsum board surfaces as recommended by TTMAC and product manufacturer to support tile installation.

- .6 Existing painted masonry or concrete wall surfaces to receive ceramic tile shall be thoroughly cleaned of all paint down to concrete or concrete block surfaces using paint stripper. Prepare painted surfaces in accordance with manufacturer's instructions and TTMAC recommendations.
- .7 In the event of discrepancies, immediately notify the Consultant and do not proceed with installation in such areas until all such discrepancies have been fully resolved.
- .8 Check that conditions of temperature, humidity, traffic and usage are suitable as required by Installation Manual specifications. Minimum temperature to be not less than 10°C.
- .9 Check that surfaces ready to receive tiling are cured, level and/or graded, plumb, smooth, firm, free from loose particles, droppings, projection, grease, solvent, paint and other foreign matter and from other unsuitable conditions.
- .10 Install transition strips, reducers and edge trim at exposed edges of all tiled walls and floors in accordance with manufacturer's instructions.

3.2 Installation

- .1 Install tiling in accordance with requirements of TTMAC Tile Installation Manual and parts of ANSI A108 Series of tile installation standards that apply to types of bonding and grouting materials, and to methods required for complete tile installation.
- .2 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions:
 - .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - .2 Make cut edges smooth, even and free from chipping.
 - .3 Do not split tile.
- .3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
 - .1 Cut, drill, and fit tile to accommodate work of other subcontractors penetrating or abutting work of this Section.
 - .2 Carefully grind cut edges of tile abutting trim, finish, or built in items for straight aligned joints.
 - .3 Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so

that plates, collars, or covers overlap tile and to provide a uniform joint appearance.

- .4 Lay tile in pattern indicated on Drawings and as follows:
 - .1 Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
 - .2 Centre tile patterns between control and movement joints; notify Consultant for further instructions where tile patterns do not align with control or movement joints.
 - .3 Cut tile accurately and without damage.
 - .4 Smooth exposed cut edges with abrasive stone, where exposed.
 - .5 Chipped or split edges are not acceptable.
- .5 Bonding Bed: Set tile in place while bond coat is wet and tacky and as follows:
 - .1 Adjust amount of bonding materials placed on substrates based on temperature and humidity to prevent skinning over of bonding materials.
 - .2 Use sufficient bond coat to provide a minimum 80% contact for tiles smaller than 300 mm x 300 mm with bonding material evenly dispersed and pressed into back of tile; refer to back buttering requirements for larger materials and installations having Moderate or higher Load Bearing Performance requirements.
 - .3 Notch bond coat in horizontal straight lines and set on freshly placed bonding material while moving (sliding) tile back and forth at 90° to notches.
 - .4 Verify that corner and edges are fully supported by bonding material.
 - .5 Set tiles to prevent lippage greater than 1 mm over a 3 mm grout joint.
 - .6 Keep two-thirds of grout joint depth free of bonding materials.
 - .7 Clean excess bonding materials from tile surface prior to final set.
 - .8 Sound tiles after bonding materials have cured and replace hollow sounding tile before grouting.
- .6 Back Buttering: Obtain 100% mortar coverage in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards for the following applications:
 - .1 Glass tile
 - .2 Exterior tile
 - .3 Tile in wet areas:
 - .1 Showers
 - .2 Saunas
 - .3 Tub Enclosures
 - .4 Laundries
 - .5 Swimming pools
 - .4 Tile installed with chemical resistant mortars and grouts
 - .5 Tile 300 mm or larger in any direction

- .6 Tile with raised or textured backs
- .7 Tile installation rated for Heavy or Extra Heavy Duty.
- .8 All porcelain tiles with more than 20% of the tile backs covered with firing release dust back buttered so that 100% of the back is covered with adhesive mortar rated for C627, Extra Heavy Duty rating.
- .7 Install prefabricated edge strips and control at locations indicated or where exposed edge of floor tile meets different flooring materials and exposed substrates.
- .8 Protect exposed edges of floor tile with properly sized transition strips, use sloped reducer strips where uneven transitions between 6 mm and 13 mm occur.
- .9 Control and Movement Joints: Install control joints and expansion joints in tile work in accordance with TTMAC Detail 301MJ; keep control and expansion joints free of bonding materials and as follows:
 - .1 Cut tiles to establish line of joints; sawn joints after installation of tiles will not be acceptable.
 - .2 Locate joints in tile surfaces directly above joints in concrete substrates.
 - .3 Provide floor control joints over structural control joints.
 - .4 Install prefabricated joint profiles in accordance with manufacturer's written instructions, set with top surface of joint profile slightly below top surface of tile.
 - .5 Prepare joints and apply sealants in accordance with requirements of Section 07 92 00.
 - .6 Keep control and movement joints free from setting materials.
 - .7 Form an open joint for sealant in tile wherever a change in backing material occurs, at all vertical interior corners, around penetrating pipes and fixtures, and where tile abuts other materials or fixtures.

5	Install control joints where indicated or at not less than the flowing spacings			
	Environment	Minimum	Maximum	Joint Width
				(minimum)
	Interior/Shaded	4800 mm	6100 mm	6 mm
	Interior/Sunlight	2400 mm	3700 mm	6 mm

3700 mm

3000 mm

8 Install control joints where indicated or at not lo

.10 Waterproof membrane and setting materials shall be installed in strict accordance with manufacturer's instructions.

2400 mm

2400 mm

.2 Provide pool markings where required and in conformance with Ontario Regulation 565/90 – Public Pools.

Exterior/Normal

Exterior/Excessive

10 mm

13 mm

3.3 <u>Grouting</u>

- .1 Grouting: Install grout in accordance with manufacturer's written instructions, the requirements of TTMAC, and as follows:
 - .1 Allow proper setting time before application of grout.
 - .2 Pre-seal or wax tiles requiring protection from grout staining.
 - .3 Force grout into joints to a smooth, dense finish.
 - .4 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.
- .2 Grout all tile using specified grout in strict accordance with manufacturers written instructions all to give a flush, hard joint.
- .3 Joints in tile shall be filled solid and flush with grout.
- .4 Prepare joints and mix grout in accordance with manufacturer's printed instructions. Force maximum amount of grout into joints, avoiding air traps or voids.
- .5 Remove all excess grout by washing diagonally across the joints. Check for voids, air pockets and gaps and fill same. Remove all discoloured grout and replace with new.
- .6 Cure all joints.
- 3.4 Floor Sealer and Protective Coatings
 - .1 Apply in accordance with manufacturer's instructions.
- 3.5 <u>Cleaning and Protection</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.
 - .2 Cleaning: Clean tile surfaces so they are free of foreign matter using manufacturer recommended cleaning products and methods after completion of placement and grouting and as follows:
 - .1 Remove grout residue from tile as soon as possible.
 - .2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation; protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
 - .3 Flush surface with clean water before and after cleaning.

- .3 Protection: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies as follows:
 - .1 Protect finished areas from traffic until setting materials have sufficiently cured in accordance with TTMAC requirements.
 - .2 Protect floor areas from traffic after grouting is completed in accordance with manufacturer's written instructions.
 - .3 Prevent foot and wheel traffic from floors for a minimum of 24 hours after completion of grouting.
 - .4 Provide protective covering until Substantial Performance of the Work.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.
- 1.2 <u>Related Sections</u>
 - .1 Section 09 21 16 Gypsum Board
 - .2 Section 09 53 00 Acoustical Suspension

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
 - .3 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products
 - .4 ASTM E1414/E1414M-21a Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
 - .5 ASTM E1477-98a(2022) Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
 - .1 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- .3 Submit duplicate 300 x 300 mm samples of each type of acoustical units.

.4 Provide maintenance data for acoustic panel ceilings for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 <u>Quality Assurance</u>

- .1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- .2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
- .3 Mock-up:
 - .1 Construct mock-ups in accordance with Section 01 45 00 Quality Control.
 - .2 Construct mock-up 10 m² minimum of acoustical panel tile ceiling including one inside corner and one outside corner.
 - .3 Construct mock-up where directed.
 - .4 Allow 48 hours for inspection of mock-up by Consultant before proceeding with ceiling work.
 - .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.
- 1.6 <u>Project Conditions</u>
 - .1 Permit wet work to dry before beginning to install.
 - .2 Maintain uniform minimum temperature of 15° C and humidity of 20-40% before and during installation.
 - .3 Store materials in work area 48 hours prior to installation.
 - .4 Building areas to receive ceilings shall be free of construction dust and debris.

1.7 <u>Performance Requirements</u>

- .1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - .1 Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 Classification.
 - .2 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire

Resistance Directory

.2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.8

Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect on site stored or installed absorptive material from moisture damage.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

1.10 Extra Materials

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 Closeout Submittals.
- .2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Acoustic units for suspended ceiling system: to ASTM E1264
- .2 Panel Type 1: CGC Fissured.
 - .1 Class A.
 - .2 Composition: Water Felted Mineral Fiber
 - .3 Pattern regular fissured.
 - .4 Texture: medium.
 - .5 Flame spread: ASTM E1264, Class A (U.L.C.), 25 or less.
 - .6 Smoke developed 50 or less in accordance with ULC 102.
 - .7 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.55

- .8 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 35
- .9 Light Reflectance (LR) range of 0.81 to ASTM E1477.
- .10 Dimensional Stability: Standard
- .11 Edge Profile: Square Lay-In
- .12 Colour: White.
- .13 Size 610 x 1219 x 16 mm thick.
- .14 Shape flat.
- .15 Surface coverings: Ecolabel certified paint.
- .3 Panel Type 1: CGC Eclipse ClimaPlus #78575.
 - .1 Class A.
 - .2 Ecolabel certified.
 - .3 Composition: Wet Formed Mineral Fiber with Vinyl Latex Paint Finish
 - .4 Pattern regular fissured.
 - .5 Texture: medium.
 - .6 Flame spread: ASTM E1264-98, Class A (U.L.C.), 25 or less.
 - .7 Smoke developed 50 or less in accordance with ULC 102.
 - .8 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.70
 - .9 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 40
 - .10 Light Reflectance (LR) range of 0.85 to ASTM E1477.
 - .11 Dimensional Stability: Standard
 - .12 Edge Profile: Square Lay-In
 - .13 Colour: White.
 - .14 Size 610 x 1219 x 19 mm thick.
 - .15 Shape flat.
 - .16 Surface coverings: Ecolabel certified paint.
- .4 Alternate manufacturer: Products as manufactured by the following are acceptable, subject to Consultants approval of style, finish, performance characteristics and texture:
 - .1 Armstrong Industries
 - .2 Certainteed
- .5 Ceiling Suspension System: as specified in Section 09 53 00.

PART 3 EXECUTION

- 3.1 Examination
 - .1 Do not install acoustical panels until work above ceiling has been inspected by Consultant.

3.2 <u>Installation</u>

- .1 Co-ordinate with Section 09 53 00 Acoustical Suspension.
- .2 Coordinate layout and installation of ceilings with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and fire-suppression system.
- .3 Install acoustical panels and tiles in ceiling suspension system.
- .4 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width, with directional pattern running in same direction. Refer to reflected ceiling plan.
- .5 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.3 <u>Cleaning</u>

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.
- 1.2 Related Sections
 - .1 Section 05 12 23 Structural Steel
 - .2 Section 09 21 16 Gypsum Board
 - .3 Section 09 51 13 Acoustic Panel Ceilings
 - .4 Division 23 Mechanical
 - .5 Division 26 Electrical

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
 - .2 ASTM A641/A641M-19 Standard Specification for Zinc–Coated (Galvanized) Carbon Steel Wire.
 - .3 ASTM A653 / A653M 23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .4 ASTM A1011/A1011M-23 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
 - .5 ASTM C635/C635M-22 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay in Panel Ceilings.
 - .6 ASTM C636/C636M-19 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .7 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
 - .8 ASTM E119-22 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .9 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products

1.4 <u>Submittals</u>

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

- .2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- .3 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- .4 Submit one representative model of each type of ceiling suspension system.
 - .1 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 <u>Design Requirements</u>

- .1 Determine the superimposed loads that will be applied to suspension systems by components of the building other than the ceiling and ensure that adequate hangers are installed to support the additional loads in conjunction with the normal loads of the system.
- .2 Design supplemental suspension members and hangers where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at required spacing to support standard suspension system members:
 - .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- .3 Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of L/360 to ASTM C635 deflection test.

1.6 <u>Performance Requirements</u>

- .1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - .1 Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.
 - .2 Fire Resistance: Tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory
- .2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.
- 1.7 <u>Quality Assurance</u>

- .1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- .2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.
- .3 Where required, provide fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .4 Construct mock-ups in accordance with Section 01 45 00 Quality Control and as described in Section 09 51 13.
- 1.8 Shipping, Handling and Storage
 - .1 Refer to Section 01 61 00 Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.9 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

PART 2 PRODUCTS

- 2.1 <u>Materials</u>
 - .1 Components: All main beams and cross tees, base metal and end detail shall be commercial quality hot-dipped galvanized steel as per ASTM C635. Main beams and cross tees shall be double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
 - .2 Face width: 22 mm
 - .3 Edge Moldings and Trim: Hemmed angle moulding to match main beams and cross tees.
 - .4 Structural Classification: Intermediate Duty System, ASTM C635.

- .5 Colour: White and match the actual colour of the specified ceiling tile.
- .6 Standard of Acceptance:
 - .1 Armstrong Prelude XL
 - .2 Donn DXT
 - .3 Certainteed Classic Environmental Stab.
- .7 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated or required.
- .8 Threaded Rod: to ASTM A397. Galvanized or zinc plated.
- .9 Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 2.06 mm thick.
- .10 Channel Framing and Fittings: Strut type metal framing and components to ASTM A1011 or ASTM A653. Unistrut P1000SL or equivalent. Galvanized.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 Examination

.1 Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.3 Preparation

- .1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- .2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors

whose installation is specified in other sections.

- .1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.
- 3.4 Installation
 - .1 Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines and in accordance with the manufacturer's installation instructions.
 - .2 Install wall moldings at intersection of suspended ceiling and vertical surfaces.
 - .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.
 - .4 Secure hangers to overhead structure using attachment methods as indicated by manufacturer. Do not suspend ceiling systems from building services including plumbing lines, conduit, cable trays or duct work.
 - .5 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment. Provide trapeze or other supplementary support members at obstructions to allow typical hanger spacing. Brace assemblies must be configured and/or located in order to avoid obstructions in addition to maintaining the required brace assembly spacing.
 - .6 Install hangers spaced at maximum 1219 mm centres and within 152 mm from ends of main tees. Install hanger wires plumb and straight.
 - .7 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width.
 - .8 Ensure suspension system is coordinated with location of related components.
 - .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.
 - .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture.
 - .11 Interlock cross member to main runner to provide rigid assembly.

- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide ceiling access.
- .14 Finished ceiling system to be square with adjoining walls and level within 1:1000

3.5 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 33 00 Architectural Concrete
- .2 Section 07 92 00 Joint Sealants
- .3 Section 09 21 16 Gypsum Board

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM E648-17 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - .2 ASTM E662-17a Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - .3 ASTM F1869-16a Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - .4 ASTM F1913-04(2014) Standard Specification for Vinyl Sheet Floor Covering Without Backing

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions for flooring and accessories.
- .3 Submit manufacturer's installation instructions.
- .4 Submit the manufacturer's standard samples showing the required colours for flooring, welding rods, and applicable accessories.

1.5 <u>Quality Assurance</u>

.1 Select an installer who is competent in the installation of resilient sheet flooring using heat-welded seams.

- .2 Provide types of flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.
- .3 Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:
 - .1 ASTM E648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
 - .2 ASTM E662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

1.6 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 16 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- .4 Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 10 – Cleaning.

1.8 <u>Environmental Conditions</u>

- .1 Maintain a minimum temperature in the spaces to receive the flooring and accessories of 18°C and a maximum temperature of 38°C for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 13°C in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.
- .2 Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

1.9 <u>Warranty</u>

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten (10) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Resilient Sheet Flooring Materials

- .1 Vinyl sheet flooring shall meet ASTM F1913.
- .2 Provide homogeneous vinyl sheet flooring, nonlayered and nonbacked, in colour selected from manufacturer's standard range, 1.83 m wide, having a nominal total thickness of 2.0 mm. The polyurethane-coated wear surface shall be composed of polyvinyl chloride resin, plasticizers, stabilizers, fillers, and pigments comprising a through-grain vinyl chip visual with pattern and colour uniformly dispersed throughout the entire thickness.
- .3 Acceptable Products:
 - .1 Armstrong Medintech Series
 - .2 Amtico Biospec MD
 - .3 Tarkett iQ Series
- .4 Provide solid colour vinyl weld rod as produced by sheet vinyl flooring manufacturer, and intended for heat welding of seams. Colour shall be compatible with field colour of flooring or as selected by Consultant to contrast with field colour of flooring. Colour selected from the manufacturer's standard range.

2.2 Integral Wall Base Materials

- .1 For integral flash cove base: Provide integral flash cove wall base by extending sheet 100 mm up the wall using adhesive, welding rod, and accessories recommended and approved by the flooring manufacturer.
- .2 Resilient Base: To ASTM F1861, 100 mm high thermoplastic rubber, not less than 3.0 mm thickness with preformed internal and external corners. Base at resilient tile shall have standard toe.
 - .1 Johnsonite DuraCove DC Rubber Wall Base.

- .2 Roppe Pinnacle Rubber Base.
- .3 Amtico Marathon.
- .4 Burke Mercer BurkeBase.

2.3 <u>Adhesives</u>

- .1 Provide high-performance epoxy flooring adhesive for field areas and flash cove adhesive at flash coving as recommended by the flooring manufacturer.
- .2 Provide seam adhesive at seams as recommended by the resilient flooring manufacturer.

2.4 <u>Accessories</u>

- .1 For patching, smoothing, and leveling monolithic subfloors, provide fast-setting cement-based patch and underlayment as recommended by the resilient flooring manufacturer.
- .2 For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
- .3 Provide top edge trim caps of anodized aluminum for integral flash cove as approved by the Consultant.
- .4 Provide a fillet support strip for integral cove base with a minimum radius of 25 mm of wood or plastic.
- .5 Provide transition/reducing strips tapered to meet abutting materials.
- .6 Provide threshold of thickness and width as shown on the drawings.
- .7 Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with colour to match or contrast with the flooring, or as selected by the Consultant from standard colours available.
- .8 Provide metal edge strips of required width and thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3 EXECUTION

3.1 <u>Inspection</u>

- .1 Remove existing sheet flooring and base clean subfloor of all adhesives and patching compounds.
- .2 Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- .3 Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- .4 Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .5 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.2 Preparation

- .1 Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with fast-setting cement-based patch and underlayment as recommended by the flooring manufacturer.
- .2 Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.
- .3 Perform subfloor moisture testing in accordance ASTM F1869 and Bond Tests as described in manufacturer's installation guidelines to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity shall not exceed 80%. MVER

shall not exceed 5 lbs./1000 sq. ft./24 hrs. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

- .4 Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.
- .5 Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.

3.3 Installation of Sheet Flooring

- .1 Install flooring in strict accordance with the latest edition of manufacturer's installation instructions.
- .2 Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- .3 If required, install flooring on pan-type floor access covers. Maintain continuity of colour and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- .4 Scribe, cut, and fit or flash cove to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
- .5 Adhere flooring to the subfloor without cracks, voids, raising and puckering at the seams. Roll with a 45.36 kilogram roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer.
- .6 Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for colour shading and pattern at the seams in compliance with the manufacturer's recommendations.
- .7 Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

- .8 Prepare heat-welded seams with special routing tool supplied for this purpose and heat weld with vinyl welding rod in seams. Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas.
- .9 Provide integral flash cove wall base, including cove fillet support strip and top edge cap trim. Construct flash cove base in accordance with the flooring manufacturer's instructions. Heat-weld seams as specified for those on the floor.

3.4 Installation of Accessories

- .1 Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
- .2 Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- .3 Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
- .4 Apply metal edge strips, after flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.5 Resilient Base Application

- .1 Lay out base to keep number of joints to a minimum. Locate joints at maximum available spacing or at internal or pre moulded corners.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using a 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use pre-moulded end pieces at flush door frames.

- .7 Cope internal corners. Use pre moulded corner units for right angle external corners. Use formed straight base materials for external corners of other angles, minimum 300 mm each leg.
- .8 Provide rubber base at all locations specified, regardless of floor finish.

3.6 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 10 Cleaning.
- .2 Perform initial maintenance according to manufacturer's instructions.
- .3 Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 09 65 16 Sheet Vinyl Flooring
- .3 Section 09 65 66.13 Resilient Athletic Flooring

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM F710-21 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .3 ASTM F1066-04(2018) Standard Specification for Vinyl Composition Floor Tile
 - .4 ASTM F1344-21a Standard Specification for Rubber Floor Tile
 - .5 ASTM F1861-21 Standard Specification for Resilient Wall Base
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Submit duplicate samples of manufacturer's full range of colours for specified products for selection of colours by the Consultant.
- .3 Submit a complete list of all materials proposed to be furnished and installed under this portion of the Work, stating manufacturer's name and catalogue number for each item, and product samples in colours specified.
 - .1 Submit two copies of the manufacturer's current recommended method of installation for each item.
- .4 Provide maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 Closeout Submittals.
- 1.5 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Use all means necessary to protect resilient flooring materials before, during and after installation and to protect the installed work and materials of all other trades.

1.6 <u>Maintenance Materials</u>

- .1 Provide extra stock materials of resilient flooring, base and adhesives in accordance with Section 01 78 00 Closeout Submittals.
 - .1 Provide one carton of each colour, pattern and type flooring material required for this project for maintenance use.
 - .2 Provide one container of adhesive.
 - .3 Clearly identify each container of floor tile and each container of adhesive.
- .2 Extra materials to be from same production run as installed materials.

1.7 Environmental Requirements

.1 Maintain air temperature and structural base temperature at floor installation area above 20° C for 48 hours before, during and after installation.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 <u>Warranty</u>

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Vinyl Composition Tile: to CSA A126.1 or ASTM F1066, 305 x 305 x 3.0 mm thick, nonasbestos, Class 2 through pattern tile with static load of not less than 517 kPa and U.L.C. flame spread rating of 75 or less.
 - .1 Armstrong: Standard Excelon Imperial Texture.
 - .2 Amtico: Commercial Color-Thru Duravinyl.

- .2 Rubber Stair Treads: one piece tread/riser combination with raised square pattern, full width and depth of stair with speckled pattern and 50 mm wide colour contrasting abrasive carborundum grit tape on stair nosing to meet ADA standards. Treads shall have a tapering thickness of 5.3 mm to 3.9 mm across a depth of 330 mm with a 180 mm integral riser.
 - .1 Johnsonite Roundel Rubber Model RTRSP.
 - .2 Roppe Raised Design Rubber Treads.
- .3 Resilient Base: To ASTM F1861, 100 mm high thermoplastic rubber, not less than 3.0 mm thickness with preformed internal and external corners. Base at resilient tile shall have standard toe.
 - .1 Johnsonite DuraCove DC Rubber Wall Base.
 - .2 Roppe Pinnacle Rubber Base.
 - .3 Amtico Marathon.
 - .4 Burke Mercer BurkeBase.
- .4 Rubber Tactile Warning Surface:
 - .1 Tactile Warning Tile (Attention Tile) Rubber Tiles (TW1): 4.0 mm dome height with 3.2 mm base thickness; 7.2 mm overall thickness.
 - .2 Meets current ISO/FDIS 23599 Assistive Products for the Blind & Vision-Impaired, Ontario Regulation 332/12, and Accessibility for Ontarians with Disabilities Act (AODA)
 - .3 Solid rubber floor tile to ASTM F1344.
 - .4 Hardness ASTM D2240: Not Less than 85 Shore A
 - .5 Slip resistance ASTM D2047 SCOF ≥ 0.6
 - .6 Smoke Generation ASTM E662 < 450
 - .7 Johnsonite Tactile Warning Tile Rubber
- .5 Primers, Adhesives and Caulking: non-flammable, solvent free, waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .6 Sub-floor filler and leveler shall be white premixed latex compatible with flooring products and adhesive as recommended by flooring manufacturer for specific flooring types.
- .7 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .8 Transition strips, mouldings and adaptors shall be rubber or vinyl, manufactured by Johnsonite, Roppe or Burke Mercer with lip to extend under floor tile with tapered edge, colour matched to flooring.
- .9 Sealer: water based, type recommended by flooring manufacturer.

- .10 Wax: type recommended by flooring manufacturer.
- .11 All colours and patterns shall be as selected by the Consultant from the complete range of manufacturer's colours and patterns.

PART 3 EXECUTION

3.1 <u>Surface Conditions</u>

- .1 Conform to requirements of ASTM F710.
- .2 Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- .3 Confirm that resilient flooring and base may be installed in accordance with the original design and the manufacturer's recommendations.
- .4 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Concrete must be cured a minimum of 35 days prior to commencement of resilient flooring application.
- .5 In the event of discrepancy, immediately notify the Consultant. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- .6 Perform subfloor moisture testing in accordance with ASTM F1869 and Bond Tests as described in manufacturer's installation guidelines to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity shall not exceed 80%. MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

3.2 Sub Floor Treatment

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Install sub floor and levelling compound to manufacturer's recommended standard limits and deviations. Levelling compound shall be applied to all subfloors and shall meet flatness requirements of flooring manufacturer and in accordance with ASTM F710.
- .3 Remove all substance and materials affecting adhesive bond.
- .4 Vacuum clean floors.

- .5 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is cured and dry.
- .6 Prime or seal substrates to flooring and adhesive manufacturer's instructions.
- .7 Allow for excessive leveling of existing slabs.

3.3 Application

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 hours after installation. Whenever possible, ventilate directly to outside. Do not allow contaminated air to re-circulate through the building ventilation system.
- .2 Install all resilient flooring in strict accordance with the manufacturer's printed instructions and recommendations.
- .3 Do not lay floor coverings and base until all trades, except painter, have completed their work and just prior to completion of the building.
- .4 Apply adhesive uniformly with recommended trowels, at coverage as recommended by the manufacturer. Do not spread more adhesive than can be covered before initial set takes place.
- .5 Lay flooring with joints parallel to building lines unless otherwise indicated, to produce symmetrical tile pattern. Patterns shall be as directed by the consultant. Allow for one field tile and one accent tile in each room or space. Border tiles shall be minimum ½ tile width.
- .6 Install flooring to square grid pattern with all joints aligned unless otherwise indicated.
- .7 As installation progresses, and after installation, roll flooring in 2 directions with a 45 kg roller to ensure full adhesion.
- .8 Cut and fit tile neatly around fixed objects.
- .9 Install feature strips or feature tiles where directed. Fit joints tightly.
- .10 Continue flooring throughout areas to receive movable type partitions or fitments without interrupting floor pattern.
- .11 Install flooring full depth of closets, toe spaces, and recesses.
- .12 Terminate flooring at centre line of door in openings where adjacent floor finish or colour is dissimilar.

.13 Install transition strips at unprotected or exposed edges where flooring terminates. Locate transition strip at centre line of door where a door occurs.

3.4 <u>Tactile Warning Tile Installation</u>

.1 Install in accordance with manufacturer's instructions.

3.5 <u>Stair Tread Application</u>

- .1 Install stair treads and risers in one piece, full width and height of stairs and risers in accordance with manufacturer's printed instructions. Adhere over entire surface and fit accurately.
- .2 Caulk edges of nosings with epoxy caulking.

3.6 Base Application

- .1 Lay out base to keep number of joints to a minimum. Locate joints at maximum available spacing or at internal or pre moulded corners.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using a 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use pre-moulded end pieces at flush door frames.
- .7 Cope internal corners. Use pre moulded corner units for right angle external corners. Use formed straight base materials for external corners of other angles, minimum 300 mm each leg.
- .8 Provide rubber base at all locations specified, regardless of floor finish.

3.7 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Remove excess adhesive from resilient floor coverings, base and adjacent finished surfaces as the work progresses.

.3 Clean, seal and wax floor and base surfaces to manufacturer's instructions. In carpeted areas, clean base before installation of carpet.

3.8 <u>Protection</u>

- .1 Protect new floors until time of final inspection.
- .2 Prohibit traffic on floors for 48 hours after installation.
- .3 Immediately prior to final inspection, remove protection, clean, dry or damp mop resilient flooring and apply one additional coat of wax.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 09 65 19 Resilient Tile Flooring

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM D2047-17 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
 - .2 ASTM D2240-15(2021) Standard Test Method for Rubber Property—Durometer Hardness
 - .3 ASTM D5116-17 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
 - .4 ASTM E648-19ae1 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - .5 ASTM E662-21ae1 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - .6 ASTM E1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
 - .7 ASTM F710-22 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .8 ASTM F970-22 Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading
 - .9 ASTM F1869-23 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - .10 ASTM G21-15(2021)e1 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- .2 National Fire Protection Association (NFPA)
 - .1 NFPA 101 Code for Safety to Life from Fire in Buildings and Structures.
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-03 Adhesives and Sealants Applications.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Before any rubber flooring materials are delivered to the job site, submit to the Consultant a complete list of all materials proposed to be furnished and installed under

this Section of the Work, stating manufacturer's name and catalogue number for each item, and product samples in colours specified.

- .3 Submit two copies of the manufacturer's current recommended method of installation for each item.
- .4 Submit Manufacturer's current printed data sheets on specified products.
- .5 Samples: submit duplicate 100 x 100 mm samples of full range of manufacturer's specified products and colours.
- .6 Submit shop drawings illustrating layouts, details, dimensions and other data.
- .7 Submit maintenance data for athletic rubber tile flooring for Operation and Maintenance Manual specified under Section 01 78 00.
- .8 Maintenance Material Submittals: Provide extra stock materials for use in facility operation and maintenance. Provide amount of approximately 2% of the total floor surface, of each type, colour and dye lot.
- 1.5 <u>Quality Assurance</u>
 - .1 Manufacturer must be certified ISO 9001 and ISO 14001.
 - .2 Manufacturer must have experience in the manufacturing of prefabricated rubber athletic flooring.
 - .3 Installer must have performed installations of the same scale in the last three years.
 - .4 Installer to be recognized and approved by the rubber athletic flooring manufacturer.
 - .5 Mock Up: Mock up is to be installed following the same procedures and utilizing the same specified materials that will be used for the actual project. Mock-up size: minimum 3.0 square meters.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Materials must be delivered in Manufacturer's original, unopened and undamaged containers with identification labels intact.

- .4 Store material upright on a clean, dry, flat surface protected from all possible damage, and protect from exposure to harmful weather conditions.
- .5 Store materials at a minimum temperature of 13 °C.
- .6 Use all means necessary to protect rubber flooring materials before, during and after installation and to protect the installed work and materials of all other trades.
- .7 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.

1.7 <u>Project Conditions</u>

- .1 Maintain a stable room and subfloor temperature between 18 °C to 30 °C for a period of 48 hours prior, during and 48 hours after installation.
- .2 Installation to be carried out no sooner than the specified curing time of concrete subfloor.
- .3 Moisture vapor emission content of the concrete slab must not exceed the tolerance of the adhesive used when tested using the anhydrous calcium chloride test as per ASTM F1869.
- .4 Perform an alkalinity test and moisture test before commencing. Moisture content must not exceed the capacity of the specified adhesive (verify using the anhydrous calcium chloride test as per ASTM F1869 and pH level should be in the range of 7 to 8.5.
- .5 Installation of rubber athletic flooring shall not commence unless all other trades in the building are completed.
- 1.8 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

1.9 <u>Warranty</u>

.1 Warrant the work of this Section against defects of workmanship and material, for a period of three years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

- 2.1 <u>Materials</u>
 - .1 Athletic rubber shall be Mondo Ramflex as distributed by Gym-Con Ltd.
- .2 Material shall be rubber athletic flooring, calendered and vulcanized with a base of natural and synthetic rubbers, stabilizing agents and pigmentation.
 - .1 Thickness: 10 mm
 - .2 Tile size: 610 x 610 mm
 - .3 Colour: standard, solid background colours with random marbleization throughout material. Four colours to be selected by the Consultant from manufacturer's standard colour range.
 - .4 Finish: hammered.
 - .5 Manufactured in two layers, vulcanised together. The shore hardness of the top layer shall be greater than that of the bottom layer, shore hardness of layers to be recommended by the manufacturer and the limits specified.
- .3 Performance of the prefabricated rubber athletic flooring shall conform to the following criteria:

Performance Criteria	Test Method	Result
Hardness Shore A	ASTM D2240	77/71
Critical Radiant Flux	ASTM E648, NFPA 101	0.58 W/cm ² , Type I
Optical Density of Smoke	ASTM E 662	< 450, Class I
Fungal Resistance Test	ASTM G21-90	No growth
Coefficient of Friction	ASTM D2047	1.0 dry, 1.2 wet
V.O.C. Compliant	ASTM D5116	Yes
Colour Stability		Good
Light reflection		Average
Chemical Resistance		Good

- .4 Adhesive: Provide adhesive recommended and certified by the manufacturer, PU 105 Polyurethane Adhesive or EP 55 epoxy adhesive.
- .5 Primers shall be waterproof, best quality formulated for the application of the rubber floor coverings over subfloor as indicated on the drawings and Room Finish Schedule. Primers to be type and brand recommended and certified by the manufacturer of the products for use with his materials and used in strict accordance with the manufacturer's directions.
- .6 Patching or levelling compound to be recommended by manufacturer and shall be compatible with tile adhesive.
- .7 Reducer strips: manufacturer's standard reducer strips, 38 mm wide tapered from 9.5 mm to 0 mm.
- .8 Sealant: As recommended by tile manufacturer.

PART 3 EXECUTION

3.1 <u>Examination</u>

- .1 New concrete floors and toppings must be thoroughly cured minimum 28 days prior to tile installation.
- .2 Carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation of rubber flooring may properly commence.
- .3 Confirm that rubber flooring may be installed in accordance with the original design and the manufacturer's recommendations.
- .4 Ensure that no concrete sealers or curing compounds are applied or mixed with the subfloors.
- .5 Ensure concrete surfaces are smooth, dense finish, highly compacted with a tolerance of 3 mm in 3.00 m radius.
- .6 In the event of discrepancy, immediately notify the Consultant. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 <u>Preparation</u>

- .1 Prepare subfloor in accordance with manufacturer's current printed subfloor preparation guidelines.
- .2 Perform subfloor moisture testing in accordance with ASTM F1869 and Bond Tests as described in manufacturer's installation guidelines to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity shall not exceed 80%. MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

3.3 Installation

- .1 Install rubber athletic flooring in accordance with manufacturer's instructions.
- .2 Fill all cavities, cracks, joints and all other surface imperfections in concrete substrate with latex fill or other approved subfloor filler in order to produce a smooth, flat, hard surface for receipt of rubber flooring. Scrape off all ridges, droppings, scale and other projections. Clean floor with an industrial vacuum cleaner. Remove all substance and materials affecting adhesive bond.

- .3 Prime concrete floors and apply adhesive uniformly with notched spreaders, at correct coverage as recommended by the manufacturer. Do not spread more adhesive than can be covered before initial set takes place. Place tiles so that adhesive is squeezed into tile joints and provides a watertight joint.
- .4 Where tiles terminate at doorways, or where tiles of different type or colour butt together the joint shall centre on the door.
- .5 Provide and install reducer strips where rubber floor tiles terminate against a concrete floor where no applied architectural floor finish is required. Reducer strip shall be installed below centre of door where a door occurs.
- .6 Tile shall be laid with all joints square and tightly butted together. Start installation from centre of rooms to ensure equal maximum size edge tiles. Pattern and direction of tile shall be as directed by the Consultant.
- .7 Tile to be laid full depth of closets, toe spaces, and recesses. Cut and fit tiles tightly against openings, breaks, frames, fixtures, columns and other vertical surfaces. Carry tile under all movable fitments. Apply adhesive to provide watertight joint around all cut areas.
- .8 Seal perimeter of all athletic rubber tile at walls and penetrations in accordance with manufacturer's recommendations.
- .9 Rubber base in locations specified shall be installed under Section 09 65 10.

3.4 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Remove surplus adhesive from athletic rubber floor tiles as the work progresses.
- .3 Initial cleaning should only be performed 72 hours after the rubber athletic surface has been completely installed.
- .4 Maintain rubber athletic flooring according to manufacturer's current maintenance instructions for specified product.
- .5 Protect with non-staining building paper or masonite.
- .6 Immediately prior to Substantial Performance. Remove protection, clean, dry or damp mop floors.

End of Section

PART 1 GENERAL

1.1 <u>General</u>

.1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 05 12 23 Structural Steel
- .2 Section 05 50 00 Metal Fabrications
- .3 Section 06 20 00 Finish Carpentry
- .4 Section 08 11 00 Metal Doors and Frames
- .5 Section 09 21 16 Gypsum Board

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- .2 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2018
 - .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
- .4 Society for Protective Coatings (SSPC)
- .1 Systems and Specifications, SSPC Painting Manual 2009
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .6 South Coast Air Quality Management District, California State (SCAQMD) .1 SCAQMD Rule 1113-96, Architectural Coatings.
- .7 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
- .8 National Fire Code of Canada

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish

and limitations.

- .3 Samples:
 - .1 Submit full range colour sample chips.
 - .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.
- .5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
 - .1 Product name, number, type and use.
 - .2 Colour numbers.
 - .3 MPI Environmentally Friendly classification system rating.
- 1.5 <u>Quality Assurance</u>
 - .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
 - .2 Conform to latest MPI requirements for painting work including preparation and priming.
 - .3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
 - .4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
 - .5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
 - .6 Provide mock-up in accordance with Section 01 45 00 Quality Control.

- .1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures. Locate where directed.
- .2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
- .3 Allow 24 hours for inspection of mock-up before proceeding with work.
- .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 ° C to 30 ° C. Store materials and supplies away from heat generating devices.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.
- .6 Remove paint materials from storage only in quantities required for same day use.
- .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .8 Remove damaged, opened and rejected materials from site.

1.7 <u>Fire Safety Requirements</u>

- .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from

site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.
- .3 Unused materials must be disposed of at official hazardous material collections site.
- .4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.
- .5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.
- 1.9 <u>Maintenance</u>
 - .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 Closeout Submittals.
 - .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Deliver to Owner and store where directed.

1.10 <u>Ambient Conditions</u>

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 Temporary Utilities.
 - .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 ° C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Provide continuous ventilation for seven days after completion of application of

paint.

- .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .5 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless pre-approved in writing by Consultant and product manufacturer, perform no painting when:

- .1 Ambient air and substrate temperatures are below 10 ° C.
- .2 Substrate temperature is above 32 ° C unless paint is specifically formulated for application at high temperatures.
- .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
- .4 The relative humidity is under 85% or when the dew point is more than 3 ° C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 ° C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
- .2 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .3 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
- .4 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .5 Test concrete and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Provide paint materials for paint systems from single manufacturer.
- .2 Products to meet requirements of GS-11 or SCAQMD Rule 1113-96
- .3 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use.
- .5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Non-flammable, biodegradable.
 - .2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .3 Manufactured without compounds which contribute to smog in the lower atmosphere.
 - .4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.
 - .5 Recycled content of 15% post-consumer and $\frac{1}{2}$ post-industrial waste.
- .7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Flash point: 61 °C or greater for water-borne surface coatings and recycled water-borne surface coatings.

2.2 <u>Colours</u>

- .1 Consultant will provide Colour Schedule.
- .2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.
- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to

show visible difference between coats.

2.3 <u>Mixing and Tinting</u>

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 <u>Gloss/Sheen Ratings</u>

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

2.5 Interior Painting Systems

- .1 Concrete Horizontal Surfaces:
 - .1 INT 3.2A Latex floor enamel [gloss] [low gloss] finish.
 - .2 Concrete Floor Sealer: Refer to Section 09 67 00-Fluid Applied Flooring.
- .2 Concrete Vertical Surfaces:
 - .1 Water repellant sealer as specified in Section 07 19 00 Water Repellants.
- .3 Structural Steel:

- .1 INT 5.1X Latex G5 semi-gloss finish (over quick dry shop primer).
- .4 Metal Fabrications:
 - .1 INT 5.3A Latex G5 semi-gloss finish
- .5 Galvanized Metal: interior doors, frames, railings, misc. steel, pipes, and ducts. .1 INT 5.3A Latex G5 semi-gloss finish
- .6 Concrete Masonry:
 - .1 INT 4.2D High performance architectural latex G5 semi-gloss finish.
- .7 Concrete masonry units at showers and washrooms: .1 INT 4.2G Epoxy (tile-like) finish.
- .8 Wood Clear Polyurethane Finish:
 - .1 INT 6.3K Polyurethane varnish G6 gloss finish.
- .9 Interior Wood Doors
 - .1 INT 6.3A High performance architectural latex G5 semi-gloss finish.
- .10 Wood Fire Retardant Finish (ceilings and soffits)
 - .1 INT 6.3S water-borne fire retardant, clear finish, ULC approved. Flame spread rating 150.
- .11 Electrical Equipment Backboards:
 - .1 INT 6.4P Fire retardant, pigmented coating. Low odour/low VOC. Semi-gloss (UL/ULC rated).
- .12 Gypsum Board: Walls and Bulkheads.
 - .1 INT 9.2A Latex G3 eggshell finish over latex sealer.
- .13 Gypsum Board: Ceilings and Bulkheads (showers and washrooms)
 - .1 INT 9.2E Epoxy (tile like) finish
 - .2 Gypsum Board: Ceilings and Bulkheads:INT 9.2A Latex G2 velvet finish over latex sealer.
- .14 All other surfaces not noted above: high performance finish suitable for commercial and institutional environment and in accordance with MPI painting manual.

PART 3 EXECUTION

3.1 <u>General</u>

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

3.2 <u>Examination</u>

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavourable conditions to Consultant before proceeding with work.

3.3 <u>Preparation</u>

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking and in accordance with paint manufacturers and MPI recommendations. If damaged, clean and restore surfaces as directed by Consultant.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
 - .1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .2 Place "WET PAINT" signs in occupied areas as painting operations progress.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.

- .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.
- .7 Touch up of shop primers with primer as specified.
- .8 Do not apply paint until prepared surfaces have been accepted by Consultant.
- 3.4 <u>Application</u>
 - .1 Apply paint materials in accordance with paint manufacturer's written application instructions.
 - .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
 - .3 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in uniform layer, overlapping at edges of spray pattern. Back roll first coat application.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.
- .8 Finish alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 Mechanical/Electrical Equipment

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces.
- .2 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.

- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint fire protection piping red.
- .9 Paint natural gas piping yellow.
- .10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .11 Do not paint interior transformers and substation equipment.

3.6 Field Quality Control

- .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .2 Standard of Acceptance:
 - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 <u>Cleaning and Restoration</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

End of Section

PART 1 <u>GENERAL</u>

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.

1.2 <u>Related Sections</u>

- .1 Section 06 61 16 Solid Surfacing
- .2 Section 09 21 16 Gypsum Board

1.3 <u>References</u>

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A924/A924M-22a Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - .3 ASTM B456-17(2022) Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 - .4 ASTM C1036-21 Standard Specification for Flat Glass
 - .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirror
 - .6 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-M90 Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-92 Gloss Alkyd Enamel, Air Drying and Baking.
- .3 CSA Group (CSA)
 - .1 CSA/ASC B651:23 Accessible Design for the Built Environment.
 - .2 CSA G164-18(R2023) Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Shop Drawings:
 - .1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.
- .3 Samples:
 - .1 Submit samples when requested.

- .2 Samples to be returned for inclusion into work.
- .4 Closeout Submittals:
 - .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 Closeout Submittals.

1.5 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.6 Waste Management and Disposal
 - .1 Refer to Section 01 74 19 Construction Waste Management and Disposal.

1.7 <u>Extra Materials</u>

- .1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 Closeout Submittals.
- .2 Deliver special tools to Owner.

PART 2 PRODUCTS

2.1 <u>Materials</u>

- .1 Sheet steel: to ASTM A653 with ZF001 designation zinc coating.
- .2 Stainless steel sheet metal: Type 304, with Brushed finish.
- .3 Stainless steel tubing: Type 304, commercial grade, seamless welded, minimum 1.2 mm wall thickness.
- .4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.2 <u>Manufacturers</u>

.1 Products and components listed are minimum standard of acceptance. Alternative products by recognized manufacturers of toilet and bath accessories may be

accepted subject to review by the Consultant of manufacturer's product information and specifications.

- .2 Acceptable manufacturers include:
 - .1 Bobrick
 - .2 Bradley
 - .3 Frost
 - .4 Hafele
 - .5 Richelieu
 - .6 Watrous

2.3 <u>Components</u>

- .1 TPD: Toilet Tissue Dispenser:
 - .1 Tork, 3 Roll Bath Tissue Roll Dispenser for Opticore. Model T11, 14.6" H x 14.1" W x 6.3" D. Black.
- .2 SD1: Soap Dispenser: Wall mounted, high capacity, foaming hand soap dispenser.
 - .1 GOJO #FMX-20 surface-mounted, push style, soap dispenser. (2000 ml capacity)
- .3 SD2: Shower Soap Dispenser: Wall mounted, high capacity, liquid shower soap dispenser.
 - .1 PROVON # FMX-20, surface mounted, push style, soap dispenser. (2000ml capacity)
- .4 GB1: Grab Bar, 38 mm diameter x 1.6 mm wall tubing of stainless steel, 76 mm diameter wall flanges, concealed screw attachment, flanges welded to tubular bar, provided with steel back plates and all accessories. Knurl bar at area of hand grips. Grab bar material and anchorage to withstand downward pull of 2.2 kN. 600 mm long.
 - .1 Bobrick B-6806.99 x 24
- .5 GB2: Barrier Free Toilet Grab Bars 2 (L-shaped) 760 x 760 38 mm dia. Peened finish c/w mounting kits.
 - .1 Bobrick B-6898.99, 90° Angle Grab Bar.
- .6 SC: Shower Rod, Curtain and Hooks: Bobrick B-6047, 32 mm diameter rod, 65 mm square flanges, Bobrick 204-2 white vinyl curtain and Bobrick B-204-1 Curtain Hooks.

- .7 Framed Mirror: Bobrick B-165 1830.
- .8 SND: Sanitary Napkin Disposal .1 Bobrick B-35139, TrimLine Series, surface mounted sanitary napkin disposal.
- .9 Stainless Steel Shelf: To CSA B651. 455 mm long x 125mm wide, 1.2mm type 304 stainless steel, satin finish. 19mm return edge; front edge hemmed for safety.
 1.6mm brackets.
 - .1 Bobrick B295 x 18
- .10 Coat Hook: Stainless steel, satin finish, coat hook with bumper.
 - .1 Bobrick B-9541
- .11 Robe/Towel Hook: Satin finish stainless steel. 50 x 50 mm flange. 40 mm projection. Satin stainless steel.
 - .1 Bobrick B-76717 Single Robe Hook.
- .12 Hand Dryers: Polycarbonate construction with HU02 Sprayed nickel finish. 200-24 V, 60 Hz. 1000 W digital brushless motor. Back plate ABS/PBT plastic mounting brackets. H13 HEPA filter. Touch free capacitive sensor activation. CSA labelled. .1 Dyson Airblade V or equivalent as approved by the Consultant.
- .13M&BH: Mop and Broom Holder. 610mm long. Type 304 stainless steel, satin finish. Anti-slip mop holders with spring-loaded rubber cam to grip handles 20–30mm diameter. To hold 3 mops 85mm from wall. Height 125mm.
 - .1 Bobrick B223 x 24
- .14 Towel Rack: Surface mounted towel bar. 51 mm flanges and concealed heavy duty mounting plates. Satin finish.
 - .1 Bobrick B-545
- .15Backrest: Bobrick B-5892
- 2.4 <u>Fabrication</u>
 - .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
 - .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
 - .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 to CSA G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

2.5 <u>Finishes</u>

- .1 Chrome and nickel plating: to ASTM B456, satin finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to ASTM D1187, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Consultant.
- .3 Manufacturer's or brand names on face of units not acceptable.

PART 3 EXECUTION

3.1 Installation

- .1 Install toilet and bath accessories in accordance with the Ontario Building Code, CSA B651 and manufacturer's instructions.
- .2 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
 - .2 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.
 - .3 Solid masonry or concrete: use bolt with lead expansion sleeve set into drilled hole.
- .3 Install grab bars on built-in anchors provided by manufacturer.

- .4 Use tamper proof screws/bolts for fasteners.
- .5 Fill units with necessary supplies shortly before final acceptance of building.
- .6 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking has been installed properly.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Comply with manufacturer's recommendations for backing and proper support.
 - .4 Use fasteners and anchors suitable for substrate and project conditions.
 - .5 Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
 - .6 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .7 Test for proper operation.
- .7 Install electric hand dryers according to manufacturer's instructions. Installation shall be by an electrician and shall be completed in accordance with all relevant standards and Codes.

3.2 <u>Schedule</u>

.1 Locate accessories where indicated. Exact locations determined by Owner.

3.3 <u>Cleaning</u>

- .1 Proceed in accordance with Section 01 74 11 Cleaning.
- .2 Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
- .3 Touch-up, repair or replace damaged products until Substantial Performance.

End of Section

PART 1 GENERAL

- 1.1 <u>General</u>
 - .1 Conform to the requirements of Division 1.
- 1.2 <u>Related Sections</u>
 - .1 Section 03 30 00 Cast-in-Place Concrete
 - .2 Section 05 50 00 Metal Fabrications
 - .3 Section 06 10 00 Rough Carpentry
- 1.3 <u>References</u>
 - .1 ASI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated – Minimum standard for wood lockers shall conform to.

1.4 <u>Submittals</u>

- .1 Make submittals in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
 - .1 Preparation instructions and recommendations.
 - .2 Storage and handling requirements and recommendations.
 - .3 Installation methods.
 - .4 Product data specific to materials used in the construction of the locker.
- .3 Shop Drawings: Provide layout plan and elevations of lockers with overall dimensions, component profiles and accessories.
- .4 Verification Samples: For finish product specified, two samples, minimum size 150 mm square, representing actual product and colour selected.
- .5 Provide maintenance data for phenolic lockers for incorporation into maintenance manual specified in Section 01 78 00 Closeout Submittals.

1.5 Quality Assurance

- .1 Provide all lockers from a single manufacturer.
- .2 All parts and hardware shall be AWI compliant, structurally sound, and free of defects, in material and workmanship under normal use and service for the full warranty period.

1.6 <u>Shipping, Handling and Storage</u>

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Inspect lockers upon receipt for visible damage.
- .4 Store products in manufacturer's unopened packaging until ready for installation.

1.7 <u>Warranty</u>

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 <u>Manufacturer</u>

- .1 Acceptable Manufacturer:
 - .1 Hollman Inc.; 1825 W. Walnut Hill Lane, Suite 110, Irving, TX 75038, Tel (972) 815-4000, Fax (972) 815-2921, Email: <u>estimating@hollman.com</u>.

2.2 Laminate Lockers

- .1 Material shall be a high-industrial grade particle board core with 0.762mm (.030 inch) vertical grade high-density thermos-fused laminate.
- .2 Material Thicknesses:
 - .1 Doors, Trim Package including finish panels (filler, end, back and top panels), toe kicks and standard valence for 19mm (3/4") door models: Minimum19mm (3/4") total thickness.
 - .2 Locker boxes: Tops, back, bottoms, sides and shelves minimum 16mm (5/8") finished thickness.
- .3 Locker Doors: Locker door shall be the full width of the locker box (-3mm(1/8")) and shall be frameless, allowing access to the entire width fo the locker. Door edges will be sealed with 1mm PVC edge banding to closely match the locker door.
- .4 Locker Body: Locker body (tops, sides and back) shall be constructed of high-

density thermos-fused laminate, Cambric-Hollman standard preferred interior colour. Lockers will have a natural ventilation gap between the locker door and box allowing a continuous natural air flow. Finished lockers have an expansion or contraction of +/- 1/16" per locker. Locker boxes are edge banded with 1mm PVC edge banding to closely match the locker box.

- .5 Locker Base: laminate lockers shall include integral matching laminate base, 203mm (8") standard height.
- .6 Type of Lockers:
 - .1 Single Tier:
 - .1 Height: 2134mm (84") high.
 - .2 Size: 457mm (18") wide by 508mm (20") deep.
 - .3 Include 2 coat hooks, 1 upper shelf and 1 bottom shelf.
- .7 Colour: As selected by the Consultant from manufacturers full range of standard colours. Up to two colours will be selected.
- .8 Hardware:
 - .1 Hinges: Frameless hinge (European type) fully concealed, nickel-plated, heavy-duty steel allowing 110-degree opening with a limited lifetime warranty. Hinges will be attached to the locker box and door with theft-proof torx-head screws.
 - .1 4 hinges for doors 1524mm (60") and above.
 - .2 Coat hooks: chome-plated steel zinc.
 - .3 Locks:

.9 Accessories:

- .1 Identification Tags: Provide ID tag for each opening, sequenced as indicated by end user.
 - .1 Square number disc: 38mm x 38mm (1 ½"x1 ½") flush mounted disc with 10mm (3/8" high contrast digits in US Block 1L font.

PART 3 EXECUTION

- 3.1 Examination
 - .1 Do not begin installation until substrates have been properly prepared.
- 3.2 Installation
 - .1 Install lockers and accessories at locations shown in accordance with manufacturer's instructions.

- .2 Install lockers level and plumb with flush surfaces and rigid attachment to anchoring surfaces.
- .3 Anchor lockers to floor and wall at 1220 mm or less, as recommended by the manufacturer.
- .4 Fasten adjoining locker units together to provide rigid installation.
- .5 Install sloping tops and metal fillers using concealed fasteners. Provide flush hairline joints against adjacent surfaces.
- .6 Adjust doors and latches to operate without binding. Verify that latches are operating satisfactorily.
- 3.3 <u>Protection</u>
 - .1 Protect installed products until Substantial Performance.
- 3.4 <u>Cleaning</u>
 - .1 Proceed in accordance with Section 01 74 11 Cleaning.
 - .2 Touch-up factory-finish and repair or replace damaged products before Substantial Performance.

End of Section

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PART 1 - GENERAL PROVISIONS

1.01 GENERAL REQUIREMENTS

- .1 Conform to requirements of the Ontario Building Code, Municipality of Oshawa and the Authorities Having Jurisdiction (AHJs); note that there may be more than one AHJ.
- .2 Applicable Codes, Standards and Bylaws shall be strictly adhered to. Obtain necessary permits, approvals, and inspections from the Authorities Having Jurisdiction (AHJs).
- .3 Perform all mechanical work detailed in the Documents to provide a complete and fully functional operating system to the satisfaction of the Consultant.
- .4 The most rigorous of these Specifications and the Base Building Standards shall form the basis for acceptance of the Work.

1.02 DEFINITIONS

- .1 The word "provide" shall mean "supply, install, connect, test and commission".
- .2 The term "work" means all equipment, permits, materials and labor to provide a complete mechanical installation as required and detailed in the drawings and specifications.

1.03 SUBMITTALS

- .1 Submit shop drawings, unless otherwise specified, for each major item of equipment such as plumbing fixtures, pumps, air handling units, radiation, coils, and special systems.
- .2 Shop drawings shall be complete with contractors reviewed stamp. Allow five (5) days for Mechanical Sub-consultant review.
- .3 Resubmit shop drawings returned for correction until 'reviewed' or 'reviewed as noted' status has been achieved.
- .4 Documentation and systems acceptance: Provide the following on substantial performance of the work:
 - .1 As-built drawings: Record accurately installed (as-built) Mechanical Work as "red-line" mark-ups on white prints. Mechanical Trade's "red-line" as-built drawings shall be transferred to an editable AutoCAD format "as-built drawing" by the Mechanical Trade Contractor. Submit both copies for review. Keep one up-to-date set on site.
 - .2 Operating and Maintenance (O&M) Manuals

- .1 O&M Manuals shall be submitted to the Consultant for review.
- .2 O&M Manuals shall include Reviewed shop drawings, Testing, Adjusting and Balancing (TAB) Reports, equipment data sheets, written warranty, operating instructions, and maintenance procedures.
- .3 Provide piping pressure tests (fire protection, domestic water, HVAC piping) indicating system tested, pressure held, time of test and date, and certified by the Consultant.
- .4 O&M Manuals shall be separated with dividers in appropriate sections.
- .3 Make all corrections requested by the Consultant and resubmit for review.
- .4 Air balancing report: the Work of Division 15 will not be considered totally performed until completion of air balancing even if undertaken by separate contract from the Work of Division 15.
- 1.04 Permits, Fees, and Inspections
 - .1 Apply for, obtain, and pay for all permits, licenses, inspections, examinations, and fees required for the work prior to commencement of construction. Include all sales taxes and the GST.
 - .2 Arrange for inspection of all work by the authorities having jurisdiction over the work.
 - .3 In case of conflict, the codes take precedence over the contract documents. In no instance reduce the standard or scope of work or intent established by the drawings and specifications by applying any of the codes referred to herein.
 - .4 Request in writing for a completed rough-in and final inspection of the mechanical systems. When the final inspection request is made all deficiencies must be complete, balancing reports submitted, systems ready for operation, equipment has been commissioned, operating and maintenance manuals submitted, all tags, charts and nameplates completed, all fixtures and equipment cleaned, spare parts provided, record drawings complete, control systems operational and the Owner's staff instructed in all phases of the system operation.

1.05 CONTRACT DRAWINGS

- .1 The drawings for mechanical work are performance drawings, diagrammatic, intended to convey the scope of work and indicate general arrangement and approximate location of equipment, fixtures and systems runs. The drawings do not intend to show architectural, interior design and structural details.
- .2 Do not scale drawings. Obtain information involving accurate dimensions from dimensions shown on architectural and structural drawings, and by site measurement.

- .3 Make, at no additional cost, any changes, or additions to materials, and/or equipment necessary to accommodate structural conditions (ducts around beams, columns, etc.)
- .4 Alter, at no additional cost, the locations of materials and/or equipment as directed that do not necessitate additional material.
- .5 Confirm on the site the exact location and mounting elevation of fixtures as related to architectural and structural details.
- .6 Record set of drawings to be always kept on site and changes to piping, ductwork and equipment shall be recorded on same.

1.06 EXAMINATION OF SITE AND DOCUMENTATION

- .1 Existing site conditions affecting the work of this trade shall be reviewed prior to Bid submission. Failure to do so shall not relieve Mechanical Trades of full contract responsibility. Include for any alternate routing of new or rerouting of existing services to accommodate all site conditions in the Bid Price. Determine exact dimensions and other restrictive conditions on site, not from drawings.
- .2 Prior to submitting Bid, the Mechanical Trades shall report all discrepancies to the Consultant and verify the locations of all existing services that are being extended and the routing of new services. Report any ambiguities, discrepancies, departures from building by-laws and/or from good practice. Additional payments will not be made for extra labour or material necessary due to location or nature of beams, joists, walls, furred ceilings, or finishes with which Contractor should be familiar.
- .3 Reuse existing materials and equipment wherever possible. Provide new materials and equipment as required to ensure a complete installation.

1.07 PHASING AND SCHEDULING OF WORK

- .1 Comply with the General Contractor's construction schedule. Include the cost of premium time in the Bid Price for work provided during nights, weekends, or other times outside normal working hours, necessary to maintain all mechanical services in operation and to meet the project schedule.
- .2 Where project phasing is required, refer to the phasing plan(s) included with the Documents. Include all costs associated with completing the Work in sequential phases as outlined in the phasing plan(s).

1.08 COORDINATION DRAWINGS

- .1 Prepare drawings in conjunction with all trades concerned, showing sleeves and openings for passage through structure, and all inserts, equipment bases, and supports, and relate these to suitable grid lines and elevation datum.
- .2 When requested, provide weights of major items of equipment.

.3 Prepare interference and co-ordination drawings for all areas where the work of this division could conflict with and/or obstruct the work of other trades and/or other sections of this division. Submit drawings for review by the Consultant.

1.09 COORDINATION

- .1 Co-ordinate installation of new ductwork, sprinkler, and plumbing lines to suit installation of all other components being installed in ceiling space or extending into ceiling space. Review mechanical, electrical, and architectural drawings to become familiar with installation requirements of these components. Problems with installation of these components due to installation of new ductwork, sprinkler and plumbing lines will result in the Contractor having to relocate new ductwork, sprinkler, and plumbing lines at their own cost.
- .2 Co-ordinate arrangement, mounting, and support of mechanical equipment to allow right of way for piping and conduit installed at required slope.
- .3 Co-ordinate location of access panels and doors for mechanical items that are behind finished surfaces or otherwise concealed. Provide access doors and panels to suit the finish that it will be installed onto.
- .4 Co-ordinate sleeve selection and application with selection and application of firestopping.
- .5 Co-ordinate sizes and locations of required concrete pads and bases to support mechanical equipment.

1.10 PRODUCT STANDARDS AND ALTERNATIVES

- .1 Use only new materials, capitals and code approved in accordance with all laws, regulations, and Authorities Having Jurisdiction (AHJs).
- .2 All material and equipment shall meet or exceed base building standards and have Landlord/Owner's approval before ordering.
- .3 Base Bid Price on equipment specified. Show alternative equipment and itemized cost savings with Bid submission.
- .4 Equipment substitutions proposed following award of contract will not be considered without written explanation.

- .5 The quality and performance characteristics of substituted product shall be equivalent in all respects to the specified product. Substitution of any product other than specified must assure no deviation below the stated capacities, air flow rate, heat transfer rate, filtration efficiency and air mixing quality. Power requirements must not be exceeded and, where specifically defined, sound power levels must not be exceeded. Equipment weight and space requirements shall not be in excess of those allowed in the design. Applications for "equal" or "alternate" must address these factors.
- .6 Where no other acceptable manufacturers are indicated, provide the exact make specified. Requests for acceptance of manufacturers not listed must be submitted not less than seven working days prior to closing date of the tender and submissions must bear proof of acceptance by the Consultant if used in the tender.
- .7 All substitute products shall be reviewed by the Consultants; do not proceed with substituted equipment without Consultant's written authorization. Revise Record Drawings, incorporating alternates and/or substitutes and all related changes.
- .8 Any additional costs incurred by affected Trades for substituted equipment shall be borne by the Mechanical Trades without additional compensation.

1.11 RIGHTS RESERVED

.1 Rights are reserved to furnish any additional detail drawings, which in the judgement of the Consultant may be necessary to clarify the work, and such drawings shall form a part of this contract.

1.12 EXPEDITING AND DELIVERY

- .1 Provide new material and equipment as specified and to the acceptance of the Consultant. Manufacturer's names are listed to set a standard of quality, performance, capacity, appearance, and serviceability.
- .2 Where no other acceptable manufacturers are indicated, provide the exact make specified. Requests for acceptance of manufacturers not listed must be submitted not less than seven working days prior to closing date of the tender and submissions must bear proof of acceptance by the Consultant if used in the tender.

1.13 SUPERINTENDENCE

.1 Maintain at the job site, at all times, qualified personnel and supporting staff, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.

1.14 SKILLFULNESS

- .1 Install equipment, piping, ductwork, and cables in a skillful manner to present a neat appearance to function properly to the satisfaction of the Consultant. Install runs parallel and perpendicular to building lines, in chases, behind furring or above ceilings, where such concealment is possible. In areas where systems are to be exposed install neatly and group to present a tidy appearance.
- .2 Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with due allowance therefore.
- .3 Include in the work all requirements of manufacturers shown on the shop drawings or manufacturers installation instructions.
- .4 Replace work unsatisfactory to the Consultant without extra cost.
- .5 Make provision to accommodate future plant and equipment indicated on drawings.
- .6 Protect from damage all equipment delivered to the site and during installation. Any damage or marking of finished surfaces shall be made good to the satisfaction of the Consultant.
- .7 The Contractor and all sub-trades are responsible to repair or replace any item damaged while performing work outlined in this contract.
- 1.15 NOISE AND VIBRATION
 - .1 Mechanical equipment is to operate without objectionable noise or vibration. If, in the opinion of the Consultant, the equipment operates with excessive noise or vibration, then the equipment must be replaced, or noise or vibration eliminated.
 - .2 Connections to noise-producing and vibrating equipment must be made with flexible connection. Refer to details for more information.
 - .3 Vibration isolators are to be provided where indicated or required.
- 1.16 INTERRUPTION OF SERVICES
 - .1 Comply with Landlord/Owner's requirements for system planned interruption to existing services. Interruption of service must occur at the times and for the duration stipulated by the Landlord/Owner. Carry out all preparatory work, measurements, and similar, without interruptions of existing services.
 - .2 Arrange with Landlord/Owner for necessary shutdowns of all systems and include all overtime costs in the Bid Price for tie-ins and work within other tenant spaces to be completed on weekends and at other times suitable to Landlord/Owner and other occupants.
- 1.17 CLEANING

- .1 During construction, keep site reasonably clear of rubbish and waste material resulting from work. Clean the Work area on a daily basis.
- .2 After completion of the Work, remove rubbish and debris from the site, arrange and pay for disposal of all waste materials. Repair any damage caused. Clean all polished, painted and make plated work bright.
- .3 Leave systems operating and premises in good order working. Clean areas to acceptance of the Landlord/Owner.
- .4 Carry out additional cleaning operating of systems as specified in other sections of the specification.

1.18 COMPLETION

- .1 Consultant's Final Inspection is imperative. Contractor shall contact the Consultant and the Landlord/Owner's Representative to arrange for a final inspection at substantial completion of mechanical work.
- .2 Should mechanical work be covered up at the time of the Final Inspection, including services enclosed behind finished drywall, above finished ceilings, or concealed by finished millwork, the Mechanical Trades shall arrange for the Work to be exposed to complete the inspection.
- .3 When the final inspection request is made all deficiencies must be complete, balancing reports submitted, systems ready for operation, equipment has been commissioned, operating and maintenance manuals submitted, all tags, charts and nameplates completed, all fixtures and equipment cleaned, spare parts provided, record drawings complete, control systems operational and the Landlord/Owner's staff instructed in all phases of the system operation.
- .4 The Mechanical Work will not be considered Substantially Performed until completion of air and water balancing, even if undertaken by separate contract from the Mechanical Trades.
- .5 On completion of work, present to the Landlord/Owner a final unconditional certificate of approval from the Authorities Having Jurisdiction (AHJs).

1.19 INSTRUCTION TO OWNER

- .1 Instruct the owner's representatives in all aspects of the operation of systems and equipment.
- .2 Arrange for and pay for services of service engineers and other manufacturers' representatives required for instruction on specialized portions of the installation.
- .3 Submit to the Consultant at the time of final inspection a complete list of systems stating for each system:

- .1 Date instructions were given to the owner's staff.
- .2 Duration of instruction.
- .3 Name of persons instructed.
- .4 Other parties present (manufacturer's representative, Consultants, etc.).
- .4 Signatures of the owner's staff stating that they properly understood the system installation, operation, and maintenance requirements.

1.20 ADDITIONAL WORK

- .1 Before proceeding with any changes, submit for review and approval by the Consultant; approval shall come in the form of a Change Order signed by the Landlord/Owner.
- .2 Change quotations shall be submitted complete with an itemized cost breakdown of all materials, equipment and labour costs associated with each submission for additional or deleted work. Failure to provide will result in rejection.
- .3 All Mechanical Change Notices shall be priced using mechanical labour unit costs in accordance with Mechanical Contractors Association of America (MCAA) Labor Estimating Manual.
- .4 It is understood that each change may have a variety of non-typical or abnormal factors that will require adjustments. Under no circumstances shall the cumulative total of additional factors exceed 20% of the hours established using Base Labour units.
- .5 Provide copies of the Allpricer published list prices used to estimate material and equipment costs, less discount of 20%.
- .6 The mark-up for overhead and profit shall be limited to and be calculated per Division 1 specifications.

1.21 COMMISSIONING

- .1 Contractor shall provide commissioning for all the new and modified equipment as part of the Work.
- .2 Test and demonstrate all automatic equipment is operating as per sequence of operation (example: test boiler controls package and associated circulating pump interface as an integrated system).
- .3 Provide on-site training instruction to the Owner of the proper operation and maintenance of all Mechanical Equipment installed for a minimum of two 4-hour sessions (total 8 hours).
- .4 Pressure Testing:

- .1 Do not insulate piping systems until pressure testing has been completed, and proven tight. Should leaks develop in any part of the piping system, remove, and replace defective sections, fittings, and other piping system ancillaries.
- .2 Flushing and testing shall be completed prior to connection into building system.
- .3 Hydrostatically test piping at not less than 1.5 times working pressure of final system, but not less than 75 psi (520 kPa), for a period of not less than 12 hours without pumping.
- .4 Test piping system in sections as required by the progress of work.
- .5 Test gas piping in accordance with CGA standard and Authorities Having Jurisdiction (AHJs).
- .5 Existing Equipment:
 - .1 Verify with building property manager that existing equipment and controls are maintained and operating as originally designed.
- .6 Terminal Units:
 - .1 Verify that filters, coils, and nozzles are clean, air is balanced,
 - .2 Calibrate and check all Terminal Unit controls and ensure they are operating as intended.
 - .3 Repair and clean all Terminal Units.
- .7 VAV Boxes, control dampers:
 - .1 Verify that dampers, actuators, and thermostats are operating as intended.
- .8 Commissioning Report:
 - .1 Provide a Commissioning Report that includes a description of all Commissioning Activities undertaken and the results thereof. Commissioning Report shall be in a format acceptable to the Consultant.
- .9 Provide record data of test results to the Consultant for review. Include a copy of all the test results in the Commissioning Report.

1.22 WARRANTY

.1 Submit written warranty to Landlord/Owner covering remedy of defects in work at completion of work. Submit similar written warranty for one (1) year from date of Substantial Performance for any part of work accepted by Landlord/Owner.
- .2 Repair and/or replace any such defects which appear in work within warranty period without additional expense to owner; ordinary wear and tear and wilful damage by, or carelessness of owner's staff or agents excepted. Where such defects occur, be responsible for costs incurred in making defective work good, includes repair or replacement of building finishes, other materials, or damage to other equipment caused by such defects, or by subsequent replacement or repairs.
- .3 During the one-year warranty period, the Mechanical Trades shall respond to the site on a 24 hour "call out" period whereby at any time of day or night appropriate Trades shall attend to all faults and complaints, remedy all defects, replace all malfunctioning items, and maintain the complete installation in a clean and tidy condition to the satisfaction of the Consultant.

PART 2 - DEMOLITION

- .1 Demolition work will be executed in accordance with the latest edition of:
 - .1 CAN/CSA-S350-M1980 Code of Practice for Safety in Demolition of Structures;
 - .2 Occupational Health & Safety Act;
 - .3 Ontario Building Code;
 - .4 Ontario Fire Code.
- .2 Visit the site, examine the existing conditions, and become familiar with the extent of the necessary removal, relocation, reconnecting, and rerouting of mechanical equipment and services as necessary for the completion of the project. The drawings indicate the approximate locations of services as far as these are known. Immediately advise Consultant in writing when unknown services are encountered.
- .3 Review and confirm with the architect/designer's drawings for the complete extent of demolition and alteration.
- .4 Ensure that all mechanical, life safety services, and services for existing equipment in areas outside the areas of this work are required to remain in service, unless otherwise approved by the Owner.
- .5 Use only those existing entrances and stairs designated by the Owner for access to the egress from the existing buildings and various floors when work of this contract is to be carried out. No traffic through other areas of the building will be permitted without the prior consent of the Owner. Protect walls of passenger elevators to approval of Owner prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Remove and replace any mechanical equipment on walls or ceilings that will be demolished and rebuilt.

- .7 Disconnect, capping and make-safe all gas, water, sewer, storm and other services affected by the Work being demolished.
- .8 Package and turn-over any Owner supplied existing equipment, materials and associated controls that is removed or unused under this contract.
- .9 Be responsible and pay for any damage to the Base Building incurred by work of this division, or repair to the satisfaction of the Consultant.
- .10 Carry out the work with minimum of noise, dust, and disturbance.
- .11 Ensure that all existing equipment which are to be reused and/or relocated is thoroughly inspected and refurbished to ensure correct operation when put back into service.
- .12 Include in the Bid Price for all shipping and placement in a designated on-site storage location.

PART 3 - BASIC MATERIALS AND METHODS

- 3.01 EXISTING AND NEW EQUIPMENT
 - .1 Reuse existing materials and equipment wherever possible. Provide new materials and equipment as required to ensure a complete installation. All existing equipment, materials and associated controls not used in this contract shall be packaged and turned over to the Owner. Include in the tender for all shipping and placement in a designated on-site storage location. Remove any equipment or material not wanted by the Owner from the site.
 - .1 Reused material and equipment
 - .2 Do not reuse flexible ductwork.
 - .2 All existing mechanical equipment (VAV boxes, dampers, heat pumps, valves, etc.) to be relocated out of new drywall ceiling areas.
 - .3 Existing Equipment: Verify with building property manager that existing equipment and controls are maintained and operating as originally designed.
 - .1 VAV Boxes: Verify that dampers, actuators, and thermostats are operating, etc.
 - .4 All existing external duct insulation to be inspected and repaired as required.
 - .5 Existing roof top unit to be thoroughly reconditioned. Clean coils, cabinet interiors, fan scrolls, fan blades, etc. Replace worn belts. Thoroughly test all controls and replace faulty components. Lubricate all bearings where required. Change filters where required.

- .6 Where specified, install all equipment provided by the Tenant. Receive, store, install equipment, and accept full responsibility for its correct operation.
- .7 Prior to operating any existing or new equipment during any stage of construction, approval from the Owner and Consultant must be received in writing.
- .8 All power wiring and equipment starters for mechanical equipment and associated devices including connections shall be provided under the Electrical Contract, Division 16, unless noted otherwise in the specification. Confirm the power characteristics on site prior to processing shop drawings and ordering equipment. All control wiring, line, or low voltage shall be by this Contractor.
- .9 Where the drawings indicated equipment to be furnished by the Owner, or by Trades outside of this Contract, provide mechanical rough-in for each unit pursuant to its shop drawings, and make final connections and other mechanical facilities for a complete installation.
- .10 Provide all rigging as may be required for all system materials and equipment. Provide all required supplementary steel supports necessary for mounting or hanging equipment. Equipment being suspended from the floor structure, or supported from or on the roof, with a weight greater than 500 pounds, shall have supports reviewed by a structural Consultant. All required structure as recommended by the Consultant, shall be included in the tender.

3.02 MATERIALS AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

- .1 Where materials are furnished by others for installation under this division, the sub-Contractor shall notify the supplier of dates they will be ready for delivery as specified in the general conditions. The sub-Contractor shall receive, unload, handle, store, protect and insure the material until ready for actual installation. Upon receipt of material furnished by others, the sub-Contractor shall spot-check or check the entire shipment and promptly advise the Consultant in writing of any damage and/or missing components. Any material which is subsequently lost or damaged due to negligence on the part of the sub-Contractor shall be promptly replaced (or repaired to the satisfaction of the owner) at the sub-Contractor's expense.
- .2 Where the drawings indicated equipment to be furnished by others, provide mechanical rough-in for each unit pursuant to its shop drawings, and make final connections and other mechanical facilities for a complete installation.

3.03 TEMPORARY FILTERS

- .1 Cover open end of all base building return air openings including registers, return or exhaust air ducts which are to remain operational during construction with 1" (25mm) thick filter media secured by metal band pulled tight around duct.
- .2 Filters shall be replaced weekly.

- .3 Remove filters upon construction completion.
- .4 Maintain this condition until plastering, drywall and other finishing operations are complete.

3.04 EQUIPMENT HANGERS AND SUPPORTS

- .1 Provide any additional structural steel channels, angles, inserts, beam champs and similar accessories required for hanging or supporting equipment. All new and relocated existing services and equipment must be supported from the building structure. Design steel to support and distribute operating and static loads. All drilling, approved type inserts and hangers shall be included.
- .2 Support suspended equipment from the bottom or from manufacturer's designated suspension points. Support tanks and similar equipment with adequate beam strength by saddles with curvature to match the equipment. Continuously support all other equipment.
- .3 Auxiliary structural members shall be included and installed where required to accommodate hangers.
- .4 Provide base supports for all pipe risers.
- .5 Fabricate steel supports in contact with water or humidity conditions from materials having approved corrosion resistance or galvanize after fabrication or brush welds clean and apply a prime coat of rust inhibiting paint.
- .6 All supports shall be connected to the top of joists and beams where applicable.
- .7 Suspension from metal deck is not allowed.
- .8 Suspending one hanger from another is not permitted.

3.05 PIPE HANGERS AND SUPPORTS

.1 All new and relocated existing services must be supported from the building structure. All drilling, approved type inserts and hangers shall be included.

3.06 SEALANT, INSERTS, AND SLEEVES

- .1 All new penetrations through floors to be sealed with approved non-shrink, waterproof, and fireproof sealant.
- .2 Mechanical service penetrations of required fire separations shall be fire stopped using a ULC listed fire stopping assembly. Repair and/or provide all spay fireproofing affected by the Mechanical Work to maintain required ratings.
- .3 Seal to be airtight around all ductwork and piping penetrations through partitions, baffles above ceilings, and through floors that are not fire rated.

.4 Provide sleeves for all new piping passing through floor and roof slabs, beams, concrete walls, and slab-to-slab partitions, etc.

3.07 CUTTING, PATCHING, AND CORE DRILLING

- .1 Any required cutting, patching and core drilling required to perform the Mechanical Work shall be included by the Mechanical Trades. Perform cutting in neat and true fashion, with proper tools and equipment to owner's approval. Patch surfaces to exactly match existing finishes. Utilize tradespeople skilled in particular trade or application worked on to Landlord/Owner's approval.
- .2 X-Ray concrete structure in accordance with Landlord/Owner structural engineer's requirements. Verify exact location of core drilling to check for existence of any services (example: electrical conduit, structural re-bar) with Landlord/Owner and Landlord/Owner's structural engineer.
- .3 Provide details of new openings through structural components for engineer's approval. Incur all related costs to obtain structural engineer's approval.
- .4 For exterior and/or underground penetrations, provide waterproof, weather-tight, fire rated materials in compliance with local governing authority and code requirements to seal openings.
- .5 Patch fire rated partitions and floor to maintain ULC listing for rating upon removal of mechanical services originally spanning fire rated assembly.
- .6 Ensure areas of both sides of surface being cut are protected from debris. Be responsible for damage done to existing building and services caused by cutting or drilling.

3.08 GENERAL REQUIREMENTS FOR ALL VALVES

- .1 Generally, valve locations are indicated or specified on drawings or specified in Sections of the Specification, however, regardless of locations shown or specified, following requirements shall apply:
 - .1 Provide shut-off valves to isolate systems, at base of vertical risers, in branch take-offs at mains and risers on floors, to isolate equipment, to permit work phasing as required, and wherever else required for proper system operation and maintenance;
 - .2 Install shut-off valves with handles upright or horizontal, not inverted, and located for easy access;
 - .3 Unless otherwise specified, provide a check valve in discharge piping of each pump;
 - .4 Valve sizes are to be same as connecting pipe size;
 - .5 Valves are to be permanently identified with size, manufacturer's name, valve model or figure number and pressure rating, and wherever possible, valves are to be a product of the same manufacturer;

.2 For values in insulated piping, design of value stem, handle and operating mechanism is to be such that insulation does not have to be cut or altered in any manner to permit value operation.

3.09 FLASHING AND COUNTER FLASHING

- .1 Flashing and counter flashing for exterior mechanical service penetrations or penetrations of water-proofed floors shall be provided by Mechanical Trades.
- .2 Flash all mechanical parts passing through, or built into a roof, outside wall or waterproof floor.
- .3 Use prefabricated aluminum or PVC flashings for roof, and membrane or copper for walls and floors.
- .4 Ensure all openings are weather, water and fireproof, using an approved flexible sealant.

3.10 ACCESS DOORS

- .1 Access doors shall be provided for all inaccessible mechanical equipment and services requiring inspection or service. Finish shall suit architect/designer's requirements.
- .2 All access doors shall be 12"x12" (300mm x 300mm), except provide 24"x24" (600mm x 600mm) where personnel entry is required.
- .3 Provide to the appropriate trade for installation co-ordinate exact location with other trades and architect. Provide for plaster surfaces, recessed 16-gauge prime painted steel door and welded metal lath, ready to take plaster. Provide with concealed hinge and stainless-steel studs with brass sleeves.
- .4 Provide to suit wall surface or type of construction, other factory prime coated access doors of welded 12-gauge steel, flush type with concealed hinges, lock, and anchor straps.
- .5 Provide fire rated access doors in fire rated partitions. Provide hinged access doors equal to fire rating of wall or ceiling in which installed.
- .6 Lay-in type ceiling tiles, properly marked, may serve as access panels. Provide stick-on circular tab (approximately ¼" diameter), located on a tee supporting ceiling tile used as access panel, for all new equipment located in ceiling space. (example: VAV terminals)

3.11 RIGGING AND HOISTING

.1 Mechanical Trades shall be responsible for all lifting, hoisting and transportation of all equipment on site from the point of delivery to the point of installation.

- .2 Provide all rigging and hoisting as may be required for all system materials and equipment.
- .3 Provide all required supplementary steel supports necessary for mounting or hanging equipment. Equipment being suspended from the floor structure, or supported from or on the roof, with a weight greater than 500 lb. (227 kg), shall have supports reviewed by a Structural Engineer.
- .4 All required supplementary structure as recommended by the Consultant, shall be included in the Bid Price.

3.12 CONCRETE WORK

.1 Provide minimum 4" (100 mm) concrete housekeeping pads, unless noted otherwise, complete with reinforcing steel under all floor mounted mechanical equipment and supports. Extend pads over the full equipment base and isolator area.

3.13 MECHANICAL WIRING

- .1 All power wiring for mechanical equipment shall be provided by Electrical Trades unless noted otherwise. Confirm the voltage and phase characteristics on site with the Electrical Trades prior to producing shop drawings and ordering equipment.
- .2 All control wiring, line or low voltage, shall be by Mechanical Trades; follow Electrical Trades wiring specifications.

3.14 CHEMICAL TREATMENT

- .1 Perform piping system cleaning and water treatment services under the supervision of the Base Building Water Treatment Specialist.
- .2 Clean and degrease the piping systems prior to connection to the base building system. Clean strainer baskets as often as necessary during cleaning and degreasing. Verify chemical treatment and antifreeze concentrations with the Base Building Water Treatment Specialist.
- .3 Add chemical solution to system, circulate for periods required, drain and refill. Repeat chemical treatment rinse. Refill the system, and connect to base building condenser water system.
- .4 Maintain chemical levels from the time the system is filled after cleaning, up to Substantial Performance of the Contract.
- .5 Provide service visits during Warranty period as required to stabilize and commission the systems. Perform corrosion tests to verify performance requirements are being achieved. Document recommendations and submit a written report to the Owner's representative after each visit.

- .6 Pipes intended to carry potable water shall be flushed and disinfected before being placed in service.
 - .1 Disinfection procedures shall conform to AWWA C601 and AWWA C651, and the requirements of the Authorities Having Jurisdiction (AHJs).
- .7 Where stainless steel piping is used for domestic water applications, piping systems shall be annealed, de-greased and pickled and will be subject to formal cleaning and disinfecting along with all other parts and components of the domestic water system as per ASTM A-380.

PART 4 - AIR DISTRIBUTION

4.01 GENERAL REQUIREMENTS

- .1 Provide ductwork and hangers in accordance with SMACNA and ASHRAE standards.
- .2 Fabricate ductwork from galvanized sheet metal with a minimum coating of 0.60 oz/sq. ft. (1.83 grams/sq. m) (G60 coating) unless other materials are specifically named.
- .3 Seal all transverse joints in supply, return and exhaust ductwork with high velocity duct sealer (Bakelite 530-09 or equivalent). Duct tape not acceptable.

4.02 FLEXIBLE DUCTWORK

- .1 At the inlet of each VAV terminal control unit, provide a minimum of three (3) diameters of straight flex duct. Maximum length 4'-0" (1200mm).
- .2 Flexible ducts serving diffusers shall be installed as one continuous piece and shall not exceed 10'-0" (3m) lengths.
- .3 Connect flexible ductwork to with a minimum of three (3) self-tapping screws, seal with duct sealer and wrap with glass fab tape.
- .4 Flexible ductwork to be supported from building structure where it is not selfsupporting and must not be allowed to lie on ceiling or other equipment.
- .5 Externally insulated flex duct to be Thermaflex type M-KE, Flexmaster Low Pressure Acoustic or approved equal.
- .6 Uninsulated flex duct to be Flexmaster T/L spun aluminum or approved equal. Ducting such as aluminum foil, PVC, Mylar, fibreglass mesh and other fibre type will not be accepted.

4.03 BALANCING DAMPERS:

- .1 Provide air balancing damper for each branch duct tee-off.
- .2 Provide splitter dampers as shown on drawings. Construct of not less than 22gauge material. Where installed in ducts up to 12" (300mm) deep, provide single blade, and in ducts greater than 12" (300mm) provide multi-blade with linkages, each blade being not wider than 9" (228mm).
- .3 Provide spin-on connectors complete with balancing damper at take-off for grilles and diffusers from main duct.

4.04 GRILLES, DIFFUSERS AND REGISTERS

- .1 As manufactured by Nailor, E.H. Price or equal as accepted by the Consultant. Refer to Equipment Schedules.
- 4.05 LINED DUCTWORK
 - .1 Provide internally lined ductwork as indicated on the drawings. Lining to be 1" (25mm) thick, 1.5 lb/cu. ft (25 kg/cu.m) density fibreglass with neoprene coating. Seal all cut edges of insulation with Bakelite 200-32 or equivalent to ensure fibreglass does not come into contact with air stream.
 - .2 Duct sizes to increase accordingly to maintain equivalent free area.
 - .3 All transfer air ductwork to be internally lined.

4.06 FIRE DAMPERS

.1 Provide fire dampers as per wall type layout requirements. ULC listed and labelled type B or C, non-asbestos. Provide latched access doors in ductwork for access to all fire dampers. Minimum 12"x12" (300mm x 300mm) access required.

4.07 SMOKE DAMPERS

.1 To be installed at locations shown on drawing ULC listed and labeled. All smoke damper units to be equipped with linkages for mounting of actuators for smoke control operation. Unit to be positive seal and able to maintain smoke barrier in lobby and corridor. Provide all electric actuators. Actuators to be mounted outside duct. Supply voltage of actuators shall be 120V, 1 phase. Control voltage of actuators shall be 24 Vdc; to facilitate actuator upon fire alarm. Contractor to provide all necessary hardware to achieve this operation.

4.08 CEILING DAMPERS

.1 ULC listed and labeled. For diffusers, damper to be complete with thermal blanket.

4.09 EXPOSED RETURN AIR OPENINGS

.1 All services above return air grilles to be painted flat black.

4.10 TRANSFER AIR OPENINGS

.1 Provide transfer air openings as indicated without ductwork extension shall be the responsibility of the Mechanical Trades to advise size and location required to General Trades.

4.11 FLEXIBLE CONNECTIONS

.1 ULC listed and labelled, neoprene coated, glass fabric, factory fabricated as approved by local authorities. Connection must not be under tension.

4.12 DUCT HEATERS

- .1 Electric duct coils: All duct heaters to be CSA approved and ULC listed. Each completely rewired with:
 - .1 Air pressure differential switch.
 - .2 Fused control circuit and transformer.
 - .3 Single or multistage type contactors as indicated.
 - .4 Over temperature protection.
 - .5 Prewired terminals for connection of power and control circuits.
 - .6 Incaloy sheathed elements.
 - .7 SCR controls for make-up air application.
 - .8 3 minutes time delay interlocking with fan controls
 - .9 Main isolators disconnect switches
- .2 Acceptable Manufacturers: Chromalos, FPE & Thermolec
- .3 Canadian Standards Association (CSA International).
 - .1 CSA C22.2 No.46, Electric Air-Heaters.
- .4 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
 - .2 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).
- .5 Submit manufacturer's printed product literature, specifications, and datasheet in accordance with Section 20 05 01. Submit product data and include:
 - .1 Element support details.
 - .2 Heater: Total kW rating, voltage, phase.
 - .3 Number of stages.
 - .4 Rating of stage: Rating, voltage, phase.
 - .5 Heater element watt/density and maximum sheath temperature.
 - .6 Maximum discharge temperature.
 - .7 Physical size.
 - .8 Unit support.
 - .9 Performance limitations.

- .10 Clearance from combustible materials.
- .11 Internal components wiring diagrams.
- .12 Minimum operating airflow.
- .13 Pressure drop at operating and minimum airflow.
- .6 Elements:
 - .1 Helical coils of nickel chrome alloy resistance wire.
 - .2 Finned tubular.
 - .3 Incoloy sheathed.
- .7 Staging:
 - .1 Staged heaters: Balanced line current at each stage.
 - .2 Each stage: Uniform face distribution.
- .8 Controls:
 - .1 Factory-mounted and wired in control box. Use terminal blocks for power and control wiring to thermostat and sail switch.
 - .2 Remote mounted as indicated with terminal strips in heater terminal box for power and control wiring.
 - .3 Controls mounted in a CSA enclosure and to include:
 - .1 SCR controller.
 - .4 Where controls are mounted in heater, exercise care in mounting contactors to minimize switching noise transmission through ductwork.
 - .5 High temperature cut-out and air proving switch.
- .9 Installation
 - .1 Make power and control connections to CSA C22.2 No. 46.
- .10 Provide test report and include copy with Operations and Maintenance Manuals.

PART 5 - FANS

5.01 GENERAL REQUIREMENTS

- .1 Fans to be suspended from structure complete with vibration isolation and flexible connections. Fan power wiring by Electrical Trades, control wiring by Control Trades. Refer to Equipment Schedules for manufacturer, model, and performance.
- .2 Provide V-belt drives, unless noted otherwise, selected for 200% service factor, based on motor nameplate data. Provide variable pitch motor pulley for motors up to 5HP (3.7 kW). For motors larger than 5 HP (3.7 kW) provide for at least one drive change to adjust fan speed for site conditions.

.3 Equip fans with backdraft dampers unless motorized dampers are noted.

5.02 POWER ROOF VENTILATORS EXHAUST

- .1 Provide centrifugal fan ventilators constructed of aluminum with aluminum birdscreen over outlet.
- .2 Provide belt drives with adjustable pitch sheaves. Units shall be selected for quiet operation. Provide a factory installed disconnect switch.
- .3 Provide ventilators with factory fabricated self-flashing sound curbs, suitable for the respective fan.

5.03 CEILING CIRCULATING FANS

.1 Provide 36" (915 mm) diameter ceiling fans with sealed chrome steel ball bearings, totally enclosed motor, statically and dynamically balanced fan wheels, baked enamel finish and speed controller.

PART 6 - PLUMBING

6.01 GENERAL REQUIREMENTS

- .1 Provide all parts of the plumbing system including all required venting in accordance with the Ontario Building Code, Part 7.
- .2 Install all fixtures, drains, cleanouts, brass, and specialties to manufacturer's requirements.
- .3 Pipe installation: Install straight, parallel, and close to walls and ceilings, with specified pitch. Use standard fittings for direction changes.
- .4 Install groups of piping parallel to each other on trapeze hangers; Space piping to permit application of insulation, identification, and service access.
- .5 Install eccentric reducers in horizontal piping to permit drainage and eliminate air pockets.
- .6 Where pipe sizes differ from connection sizes of equipment, install reducing fittings close to equipment. Reducing bushings are not permitted.

6.02 POTABLE (DRINKING) WATER

.1 Domestic Water: Type L copper marked certified for compliance with ASTM B88-83 standard with wrought copper or cast bronze pressure solder fittings to ANSI B22.18 and ANSI B16.18 respectively. (Buried piping: Soft temper type K with soldered fittings).

- .2 Soldered fittings in potable water systems: Provide lead, antimony, cadmium, and zinc free solders composed of tin/copper/silver or nickel components.
- .3 Use nontoxic lubricant or Teflon tape applied to male thread.
- .4 Clean ends of pipes or tubing and recesses of fittings to be brazed or soldered. Assemble joints without binding.
- .5 Run water piping from service connection to fixtures and equipment. At lavatories install supplies as high as possible. Install brass and copper pipe and tubing free from surface damage. Replace damaged pipe or tubing.
- .6 Lay copper tubing so that it is not in contact with dissimilar metal and will not be kinked or collapsed.
- .7 Provide washroom groups and branch take-offs from mains with isolating valves. Install stop valve in each fixture supply.
- .8 Provide PRV's to match base building standard, where required at new domestic water connections.

6.03 STORM AND SANITARY DRAINAGE

- .1 Internal Suspended:
 - .1 Cast iron pipe and fittings to CSA B70
 - .2 DWV copper to ASTM B306 with 50-50 soldered cast brass drainage fittings to CSA B158.1 or wrought copper fittings to ANSI B16-29.
- .2 Below Grade:
 - .1 Cast iron pipe and fittings to CSA B70, or PVC pipe and fittings.
 - .2 Provide all trenching and backfilling required for Mechanical Trades work.
- .3 Run storm and sanitary drainage piping to main sewers with uniform grade, minimum 2% unless noted otherwise.
- .4 Extend condensate drains from air conditioning equipment terminating over floor drains or service sink.
- .5 Verification of Inverts:
 - .1 Existing drain locations and invert elevations shall be verified on site prior to commencement of work.
 - .2 On projects with existing drainage piping that will be utilized, provided snaking of pipework and camera drain inspections as necessary to ensure a functional system.

6.04 VENT PIPING

.1 DWV Grade copper to ASTM B306 with 50-50 soldered cast brass or wrought copper drainage fittings to CSA B158.1 and ANSI B16-29 respectively or cast-iron pipe and fittings to CSA B70.

6.05 FITTINGS

- .1 Valves: All valves to have minimum certified rating of 1380 kPa (200 psi) WOG.
- .2 Ball Valves: Full port bronze or brass body with stainless-steel ball, blowout proof stem rated at 400 WOG.
- .3 On water services, install drain valves with hose thread end adjacent to and downstream of shut-off valves. Slope water piping to drain points.
- .4 Provide shut-off valves on supply and return piping connections to all fixtures and pieces of equipment.
- .5 Drain Valves:
 - .1 Install ³/₄" (20 mm) drain valves with hose thread end cap and chain in water services adjacent to and downstream of shut-off valves and at all system low points. Slope water piping to drain points.
- .6 Provide ball or butterfly valves for all shut-off requirements.
- .7 Ball Valves:
 - .1 Ball valves shall be 2-piece full port design constructed using lead free forged copper silicon alloy brass body and end adapter.
 - .2 Free valves shall be NSF certified for use in potable (drinking) water systems requiring reduced lead content.
 - .3 Seats and stem packing shall be virgin PTFE. Stem shall be bottom loaded, blowout proof design with fluorocarbon elastomer O-ring to prevent stem leaks. Valve shall have chrome plated lead-free brass ball and adjustable packing gland.
 - .4 Soldered end valves ½" to 2" (12mm to 50mm) to be UL listed FM approved and certified to NSF/ANSI standard 61/8. Valve sizes ¼" to 2" (6mm to 50mm) shall be rated to 600psi (41 bar) WOG non-shock and 150psi (10.3 bar) WSP.
- .8 Butterfly Valves:
 - .1 NSF Certified for potable (drinking) water use, resilient seated butterfly valves sizes 2" to 12" (50mm to 300mm), wafer or lug body design.

- .2 200psi (13.8 bar) pressure rating constructed of a ductile iron body, an aluminum bronze, and a 316 stainless-steel shaft, and EPDM seat material. Mounting pad is designed to accommodate 10 position lever handles; provide gear operators where indicated. Butterfly valves shall be designed and manufactured for use with ANSI 125 or 150 Class flanges and to comply with API 609 and MSS-SP-67.
- .9 Strainers:
 - .1 Sizes ¼" to 4" (6mm to 100mm): NSF Certified for potable (drinking) water, wye-pattern lead free cast copper silicon alloy strainer shall have a solid retainer cap with gasket. Strainer shall be rated to 400psi (27.6 bar) WOG @ 210°F (99°C); 125psi (8.6 bar) WSP @ 353°F (178°F) for sizes 1⁄4" 3" and 300psi (20.7 bar) WOG @ 210°F (99°C); 125psi (8.6 bar) @ 353°F (178°C) for size 4".
 - .1 Body: lead free cast copper silicon alloy
 - .2 Retainer Cap: ¹/₄" to 4" (6mm to 100mm: Lead Free copper silicon alloy
 - .3 Cap Seal: ¼" to 3" (6mm to 75mm): EPDM O-Ring; 4" (100mm): Garlock gasket
 - .4 Standard Screen: ½" to 2 ½" (12mm to 65mm): 304 stainless-steel #20 mesh; 3" (75mm): 3⁄64" (1.2mm) 304 stainless-steel perforated screen; 4" (100mm): 1/8" (3mm) 304 stainless-steel perforated screen
 - .5 Maximum Working Pressure: ¼" to 3" (6mm to 75mm): 400psi (27.6 bar) WOG @ 210°F (99°C) 125psi (8.6 bar) WSP @ 353°F (178°F); 4" (100mm): 300psi (20.7 bar) WOG @ 210°F (99°C) 125psi (8.6 bar) WSP @ 353°F (178°F)
 - .2 Sizes 2" to 12" (50mm to 300mm): NSF Certified for potable (drinking) water, wye pattern, cast iron strainer with a double coated, heat fused, FDA approved epoxy coating on the interior and exterior surfaces for FDA sanitary applications. Flanges to conform to ANSI B16.1 Class 125, 304 stainless-steel perforated screens, and a drain/blowoff connection furnished with a closure plug. Pressure rating 200psi (13.8 bar) WOG.
 - .1 Maximum Operating Pressure: 200psi (13.8 bar) WOG, non-shock, @ 210°F (99°C), 125psi (8.6 bar) WSP @ 353°F (178°C)
- .10 Check Valves:
 - .1 Swing Check Sizes ¼" to 2" (6mm to 50mm) soldered ends: NSF Certified for potable (drinking) water, lead free swing check valve suitable for installation in either horizontal or vertical orientation with upward flow.
 - .1 References: MSS SP-80 Design & Tested; MSS SP-139, "Copper Alloy Gate, Globe, & Check Valves"; ASME B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings"
 - .2 Body: ASTM B584-C89836 Bronze
 - .3 Cap: ASTM B584-C89836 Bronze
 - .4 Hanger: 304 stainless-steel or ASTM B584 C89836 Bronze

- .5 Pin: 304 stainless-steel
- .6 Seat: C27451 lead free brass
- .7 Plug: ASTM B16 Brass
- .8 Temperature Range: -20°F to 406°F
- .9 Cold Working Pressure rating: 200 psi (13.8 Bar) at 100°F
- .10 Saturated Steam Pressure rating: 125 psi (8.6 Bar) at 353°F
- .2 Swing Check Sizes 2" to 20" (50mm to 500mm) flanged ends: NSF Certified for potable (drinking) water, lead free, full port, swing check valve compatible with ANSI Class 125 and Class 150 Flanges.
 - .1 References: MSS SP-71 "Gray Iron Swing Check Valves Flanged and Threaded - Type 1"; ASME B16.10 "Face-to-Face and End-to-End Dimensions of Valves"
 - .2 Bonnet: Cast Iron (ASTM A126 CL B)
 - .3 Body Gasket: Graphite
 - .4 Side Plug: Cast Lead Free Bronze
 - .5 Gasket: PTFE
 - .6 Hanger Pin: Cast Lead Free Bronze
 - .7 Hanger: Ductile Iron (ASTM A536 65-45-12)
 - .8 Disc Ring: Cast Lead Free Bronze (2" to 6"); Cast Iron (ASTM A126 CL B) (8" to 20")
 - .9 Disc: Cast Iron (ASTM A126 CL B)
 - .10 Seat Ring: Cast Lead Free Bronze (2" to 6"); Cast Iron (ASTM A126 CL B) (8" to 20")
 - .11 Body: Cast Iron (ASTM A126 CL B)
 - .12 Cold Working Pressure rating: 200 psi (13.8 Bar) at 100°F (2" to 12"); 150 psi (10.3 Bar) at 100°F (14" to 20")
 - .13 Saturated Steam Pressure rating: 125 psi (8.6 Bar) at 353°F (2" to 12"); 100 psi (6.9 Bar) at 338°F (14" to 20")
 - .14 Temperature Range: -20°F to 406°F

6.06 ACCESSORIES

- .1 Provide backflow prevention for the coffer maker and humidifier unit.
- .2 Trap seal primers: Enpoco Fig. TSP-1 cast bronze with 1/2" copper-to-copper connections or 3/8" soft copper connected to nearest W.C.-flush valve flush tube. Connect at back of flush tube with chrome-plated exposed piping. Unit to be connected to existing supply piping with backflow preventer in washroom and to serve elevator machine room and sump pump pit prime line.
- .3 Water hammer arrestors: Enpoco "Hammertrol" series "HT" with pre-charged stainless-steel bellows in a stainless-steel casing sized according to manufacturer's recommendations in washroom supply piping.

6.07 PLUMBING EQUIPMENT

.1 Domestic Hot Water Storage Tank

- .1 As per size and capacity indicated on the Drawings.
- .2 Heater to be fully insulated complete with inlet diffuser, drain valve, high limit shut off and self-contained control system. Provide 6" (150mm) deep metal drain pan below water heater. Pipe ½" drain and ½" pressure relief lines as indicated on detail. Provide unions and shut-off valves at water heater and inlet and outlet.
- .2 Domestic Cold-Water Meter:
 - .1 Provide positive displacement cold water meter complete with remote readout.
 - .2 Unit to be bronze with suitable adaptors to fit piping as shown on drawing.
 - .3 Meter capacity up to 150 US GPM (9.5 l/s).
 - .4 Include self-powered 2 wire generator with wall unit remote readout and 100 ft (30m) of wire as provided by manufacturer.
 - .5 Provide lockable valved bypass to allow for meter maintenance.

6.08 PLUMBING FIXTURES

- .1 All plumbing fixtures, where indicated on plan, shall be provided by Mechanical Trades unless otherwise indicated on the drawings.
- .2 Fixtures shall be piped with all necessary appurtenances (i.e. vents, sanitary, hot and cold connections). Install all components in strict accordance with the manufacturer's recommendations. Install shock arrestors.
- .3 Fixture installation: Install all fixtures, drains, cleanouts, brass, and specialties to manufacturer's requirements.
- .4 Connect fixtures, complete with supplies and drains, separately trapped, supported level and square. Provide chrome plated piping for all exposed water supply, waste, and vent connections complete with C.P. escutcheons.
- .5 Provide supports to set fixtures square and level.
- .6 Obtain Architects acceptance of mounting heights of all wall mounted fixtures.
- .7 Fixtures mounted on glazed tile surfaces: Provide ground faces to finished surfaces.
- .8 Install water hammer arrestors for each fixture or group of fixtures.
- .9 Floor Drains
 - .1 Provide with trap primers connected to nearest cold water flush valve, or to automatic primer. Prime all floor drain traps and sump pump pits.

- .2 Finished Area Round Floor Drain (FD-1): Equal to Watts "FD-200-B" ongrade epoxy coated cast iron floor drain with anchor flange, weepholes, adjustable **round** heel proof heavy duty **nickel bronze strainer**, and no hub (standard) outlet.
- .3 Finished Area Square Floor Drain (FD-2): Equal to Watts "FD-200-L" ongrade epoxy coated cast iron floor drain with anchor flange, weepholes, adjustable **square** heel proof heavy duty **nickel bronze strainer**, and no hub (standard) outlet.
- .4 Finished Area Funnel and Floor Drain (FD-3): Equal to Watts "FD-100-C-EG" epoxy coated, cast iron body, floor drain with anchor flange, reversible membrane clamp with primary and secondary weepholes, 5" (127 mm) diameter ¼" (6 mm) thick adjustable **nickel bronze strainer**, 4 in. x 9 in. (102 x 229) cast iron (standard) **oval funnel**, and no hub (standard) outlet.
- .5 Service Area Round Floor Drain (FD-4): Equal to Watts "FD-320" epoxy coated cast iron area drain with anchor flange, body collar with weepholes, 8 in.(203mm) **diameter** adjustable top with heel proof **ductile iron grate**, and no hub (standard) outlet.
- .6 Service Area Square Floor Drain (FD-5): Equal to Watts "FD-330-Y" epoxy coated cast iron area drain with anchor flange, weepholes, 8 in. x 8 in. (203 x 203mm) **square** fixed top with heel proof **ductile iron grate**, and no hub (standard) outlet.
- .7 Service Area Funnel and Floor Drain (FD-6): Equal to Watts "FD-320-G-50" epoxy coated cast iron area drain with anchor flange, body collar with weepholes, 8 in.(203mm) **diameter** adjustable top with heel proof **ductile iron grate**, 4" x 9" cast iron **oval funnel**, and no hub (standard) outlet.
- .10 Cleanouts
 - .1 Line Cleanouts: Equal to Smith Series 4420, in cast iron pipe with taper thread cover secured to body and with full size pipe opening.
 - .2 Stack Cleanout: Equal to Smith Series 4510, in base of cast iron stacks with neoprene gasketed secured cover.
 - .3 Where cleanouts are concealed behind tiled walls or finishes; Equal to Smith Series 4530 round stainless-steel plate and slotted flat head stainless-steel screws.
 - .4 Floor Cleanouts:
 - .1 In unfinished and outside areas: Equal to Smith Series 4220, Duco coated cast iron body with integral clamp device, and removable positive seal closure plug and heavy duty 6" (150mm) adjustable cover secured with stainless-steel screws.
 - .2 In tiled areas: Equal to Smith Series 4140, same as above with square nickel bronze cover recessed for tile. Cover can be adjusted to suit floor lines when installing finished floor.

- .3 In terrazzo areas: Equal to Smith Series 4180, same as above with nickel bronze cover recessed for terrazzo. Cover can be adjusted to suit floor lines when installing finished floor.
- .4 Install cleanouts at traps, in accessible locations and where required.

PART 7 - INSULATION

7.01 GENERAL REQUIREMENTS

- .1 Execute work of this Section only by skilled tradesperson regularly employed in the application of insulation of mechanical systems.
- .2 Provide pipe and ductwork insulation with maximum flame spread rating of 25 and smoke development classification of 50 in accordance with CAN/ULC S102.2.
- .3 All existing exposed ductwork and piping insulation to be inspected and repaired as required.
- .4 The word "exposed" where used in this Section means any work which is not concealed in wall, shaft, or ceiling cavities or spaces. Work behind doors in closets or cupboards or under counters is not considered to be exposed.
- .5 Concealed insulated items require no further finish than provided in factory applied jacket. Cover exposed insulation and all insulated equipment with canvas, field applied, adhered and lap sealed and finished off by a brush coat of approved sizing. Paint and label canvas as noted in specifications or drawings.
- 7.02 DUCTWORK INSULATION:
 - .1 Provide external ductwork insulation in thickness as listed below:
 - .1 Insulate all supply air ductwork from unit outlet of air handling systems delivering air at temperatures less than 64°F (18°C) and greater than 86°F (30°C). This includes supply air ductwork connected to fan coil units, heat pumps, VAV/CAV terminals, air handling systems with cooling and/or heating coils, and direct or indirect fired burner sections.
 - .2 Provide 1¹/₂" (40 mm) (thick for systems with 64°F (18°C) or less air supply temperature.
 - .3 Provide 1¹/₂" (40 mm) thick for systems with 86°F (30°C) or greater air supply temperature.
 - .4 Outdoor intake ductwork, ductwork conveying mixed outdoor/return air and mixed air plenums: 4" (100mm) thick applied in two (2) layers of 2" (50mm) thick insulation on staggered centres.
 - .5 Return air ductwork located outdoors: 4" (100mm) thick applied in two (2) layers of 2" (50mm) thick insulation on staggered centres.

- .6 Exhaust ductwork located outdoors: 4" (100mm) thick applied in two (2) layers of 2" (50mm) thick insulation on staggered centres.
- .7 Exhaust ductwork located indoors for a minimum of 20 ft. (6m) back from the discharge point to outdoors: 2" (50mm) thick.
- .8 Where specifically noted on drawings that could be an exception to the foregoing.
- .2 Material to ASTM C1290 "Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts"
 - .1 FSK jacket of kraft bonded to aluminum foil reinforced with glass fibre yarn.
 - .2 Thermal performance: R = 4.2 sq. ft*°F*hr/BTU @ 75°F (0.74 sq. m*°C/W @ 24°C)
 - .3 Density: 0.75 lb/cu. ft (12 kg/cu. m)
 - .4 Rated 25/50 per ASTM E84, UL 723 and NFPA 255
 - .5 Vapor transmission: maximum 0.02 perms
- .3 Exceptions: external duct insulation is not required where:
 - .1 Supply air ductwork installed exposed within conditioned space.
 - .2 NOTE: Supply air ductwork installed concealed in ceiling spaces, whether used as return air plenums or not, is to be completely insulated.
 - .3 Ductwork is internally insulated.
 - .4 Acoustic type flexible ductwork is used.
 - .5 Duct silencers are installed.

7.03 PIPE INSULATION

- .1 Drains and water supplies for Barrier-Free lavatories and sinks:
 - .1 Provide non-premolded pipe insulation on exposed water supplies and drain under lavatory and finish with canvas.
- .2 Preformed fiberglass pipe insulation, complying with ASTM C 547, Class 3 to 850°F. (454°C.), rigid, moulded pipe insulation, non-combustible and conforming with the following:
 - .1 reduced environmental impact feature of either: bio-based binders, 25% minimum recycled glass content, and/or paper-free ASJ jacket material.
 - .2 thermal performance: 0.23 btu/hr/in/sq ft/°F @ 75°F (0.033 W/m/°C @ 24°C)
 - .3 service temperature: 0°F (-18°C) to jacket surface temperature (air contact) of 150°F (66°C) and un-jacketed surface temperature (equipment contact) up to 450°F (232°C).
 - .4 non-combustible meeting 25/50 flame spread/smoke developed when tested to ASTM E84, UL 723 and NFPA 255.
 - .5 when used over stainless-steel, product must comply with ASTM C795 "Standard Specification for Thermal Insulation for Use in Contact with Austenitic stainless-steel".

.3 Piping Insulation Application Schedule:

Item	Insulation Thickness & Type
Domestic hot water	25mm (1") premolded for pipe up to and including 50mm (2"). 40 mm (1 1/2") for 65mm (2 1/2") pipe and greater.
Domestic cold water	25mm (1") premolded.
Domestic hot water recirculation	25mm (1") premolded for pipe up to and including 50mm (2"). 40 mm (1 1/2") for 65mm (2 1/2") pipe and greater.
Condensate, horizontal drains from fan coil units, heat pumps and cooling coils, suspended horizontal drains receiving cooling coil condensate,	25mm (1") premolded.
Suspended horizontal drains from urinals and water closets and roof drain receptors and horizontal rainwater leaders and fittings	1" (25mm) premolded.

PART 8 - FIRE PROTECTION

- 8.01 FIRE EXTINGUISHERS
 - .1 Provide new fire extinguishers and accessories to Ontario Fire Code and NFPA 10.
 - .2 Provide portable filled and tested 4A-60BC fire extinguishers. Provide wall brackets as required.
 - .3 Where shown, provide prime painted, semi-recessed fire extinguisher cabinets with 1" (25mm) return, prime painted, full glass front, piano hinge, flush stainless-steel latch.
 - .4 Acceptable manufacturers are: National Fire Equipment, CFH, Stelpro, or equal as accepted by the Consultant.
- 8.02 TESTING AND CERTIFICATION:

- .1 Provide certificate of compliance that systems have been tested to applicable NFPA requirements, and the requirements of the Authorities Having Jurisdiction (AHJs) and is certified for intended use.
- .2 Submit one copy of all fire protection test results to the Owner/Landlord and Consultant.

PART 9 - IDENTIFICATION OF EQUIPMENT AND PIPING

9.01 EQUIPMENT

- .1 Identify all automatic control devices and motor driven equipment with 3 mm (1/8") lamacoid plastic plates with bevelled edges having engraved white letter on black background giving the nature of equipment service and its number, i.e. "Washroom Exhaust E1", and similar. Provide plates with 6 mm (1/4") lettering for motor starters and 12 mm (1/2") lettering for equipment.
- .2 Fix to equipment using sheet metal screws or brass chain.
- .3 Where equipment is locally switched, (e.g. Room exhaust fans) provide suitable label at switch. Co-ordinate with architect on site for labelling the switches in an aesthetically pleasing manner.
- .4 Coordinate with controls Sub-Contractor and obtain list of automatically operated equipment and provide warning identification on lamacoid plate for each item as follows:

"Warning: This equipment may start at any time. Do not service without disconnecting power."

9.02 PIPING

- .1 Provide all major valves with brass or plated plastic numbered tags, 16 mm (5/8") diameter with stamped numbers. Secure by brass chains to the valve. Valves adjacent to plumbing fixtures, convectors, unit heaters and entrance heaters need not be tagged. Prepare an approved list detailing the valve location, tag numbers and purpose it serves. Mount one (1) copy of this list in a glazed frame where advised by the Owner and provide additional copies for the manuals.
- .2 Identify the following piping as to service and direction of flow using stencils and black lettering behind each access door, in each room, and/or every 12 m (40 ft.)
 - .1 Domestic hot, cold, recirculation
 - .2 Gas (identify to code requirements).
 - .3 Supply air and fan system identification
 - .4 Return air and fan system identification.

PART 10 - TRIAL USAGE AND TESTS

10.01 AIR BALANCING

- .1 The mechanical Contractor shall carry the cost of the Air Balancing Company in their tender submission.
- .2 Prior to operating any existing or new equipment during any stage of construction, approval from the Landlord and Consultant must be received in writing. Provide assistance to the Consultant for on-site spot verifications of air and water balance report.
- .3 Air Balance Report: Air balancing shall be performed by normally employed in this field. All air quantities to be balanced with a tolerance of +/-5%. Issue a report and certificate covering the following:
 - .1 Nameplate and actual motor loading in amperes at actual voltage and installed overload heater size and manufacturer.
 - .2 Specified and achieved air quantities per outlet complete with supporting schematic diagram.
 - .3 Specified and actual fan total static pressures with breakdown showing inlet and discharge pressures.
 - .4 Temperature at diffuser farthest from source of air supply.
 - .5 Supply air quantity and temperature where main duct enters space.
 - .6 Return air quantity and temperature where air leaves space.
- .4 Fan sheaves, belts and pulleys shall be adjusted or replaced as required to obtain design air quantities. Coordinate this Work with Owner/Landlord.
- .5 Balance all supply, exhaust and fresh air quantities noted on drawing or in specification.
- .6 Provide assistance to the Consultant for on site spot verifications of air and water balance report.
- .7 Submit one copy of report to each: Owner, Tenant, and Consultants.

10.02 TRIAL USAGE

- .1 The Landlord/Owner has the privilege of trial usage of Mechanical Systems, or parts thereof, for the purpose of testing.
- .2 Assist in trial usage over a length of time as deemed reasonable by the Consultant at no extra cost, and do not waive any responsibility because of trial usage.
- .3 Temporary trial usage and testing shall not be construed as "beneficial use" when making an application for Substantial Completion of the Work.

10.03 TESTS

- .1 Provide and pay for all testing required on the system components where, in the opinion of the Consultant the manufacturer's ratings or specified performance is not being achieved.
- .2 Test and demonstrate all automatic equipment is operating as per sequence of operation. (I.e. Test boiler controls package and circ pump interface, etc.)
- .3 Piping system tests: Do not insulate piping systems until completed, perfected, and proven tight. Should leaks develop in any part of the piping system, remove, and replace defective sections, fittings, etc.
 - .1 Test piping system in sections as required by the progress of work.
 - .2 Test domestic water piping hydraulically to a pressure of 1100 kPa (150 psi) and prove tight for a period of 8 hours with nitrogen is also acceptable provided a pressure of 1380 kPa (200 psi) is used. Test natural gas piping as required by codes and authorities.
- .4 All tests must be recorded. Submit recorded data to the Consultant.
- .5 Test gas piping in accordance to CGA standard and authorities having jurisdiction. Provide record data of test results to the Consultant for review.
- .6 Include a copy of all the test results in the maintenance manuals.

PART 11 - BUILDING AUTOMATION AND CONTROLS

11.01 GENERAL REQUIREMENTS

- .1 Control Work shall be completed by Owner's approved contractor. The Mechanical Trades shall carry the cost of the Control Work in their Bid Price.
- .2 Provide a complete and fully functioning system operating in accordance with the sequence of operations.
- .3 Align all access doors, unit access locations and piping/duct connections to ensure future serviceability of all system.

11.02 THERMOSTATS

- .1 Thermostats to be located at same mounting height as light switches. Final mounting height and location of the thermostat to be coordinated on site with Interior Designer.
- .2 Add and relocate thermostats and revise control wiring as indicated on drawing.
- .3 Thermostats to be located a minimum 300 mm (12") away from, but never above, dimmer switches.
- .4 New thermostats must be submitted for approval to the consultant.

11.03 SEQUENCE OF OPERATION

.1 Control dampers modulate to suit thermostat set point.

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PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

.1 The project shall be constructed in accordance with all codes in affect including all authorized agencies having jurisdiction over the work including, but not restricted to the Canadian Electrical Safety Code, Ontario Electric Safety Code, Ontario Building Code, Municipality of Clarington Town of Bowmanville, and all other building codes in effect at the time of construction.

1.02 DEFINITIONS

- .1 The term "sub-contractor" means the firm having a subcontract with the "contractor" to perform, supervise and co-ordinate all work of this division.
- .2 The term "install" (and tenses of "install") means install and connect complete.
- .3 The term "supply" means supply only.
- .4 The term "provide" or "provision of" are used in relationship to equipment and other materials specified, meaning "supply, install and connect". Wherever the terms "provide" or "provision of" are used in connection with services such as testing, start-up and commissioning for any part of the work, it means the contractor shall procure, supervise, take responsibility and pay for these services.
- .5 "Drawings and Specifications" means "The Contract Documents".
- .6 The term "work" means all equipment, permits, materials and labor to provide a complete electrical installation as required and detailed in the drawings and specifications.
- .7 The term "approved" means acceptable to the consultant.

1.03 SUBMITTALS

.1 Submit shop drawings for all material and as further identified herein.

1.04 PERMITS, FEES AND INSPECTIONS

- .1 Apply for, obtain, and pay for all permits, licenses, inspections, examinations and fees required for the work prior to commencement of construction. Include all sales taxes and the GST.
- .2 Arrange for inspection of all work by the authorities having jurisdiction over the work. On completion of the work, present to the consultant the final unconditional certificate of approval of the inspecting authorities.

.3 In case of conflict, the codes take precedence over the contract documents. In no instance reduce the standard or scope of work or intent established by the drawings and specifications by applying any of the codes referred to herein.

1.05 CONTRACT DRAWINGS

- .1 The drawings for electrical work are performance drawings, diagrammatic, intended to convey the scope of work and indicate general arrangement and approximate location of apparatus, fixtures and conduit runs. The drawings do not intend to show architectural, interior design and structural details. Be responsible for a thorough knowledge of same before proceeding with the work.
- .2 Do not scale drawings. Obtain information involving accurate dimensions from dimensions shown on architectural and structural drawings, and by site measurement.
- .3 Make, at no additional cost, any changes or additions to materials, and/or equipment necessary to accommodate structural conditions (conduits around beams, columns, etc.)
- .4 Alter, at no additional cost, the locations of materials and/or equipment as directed that do not necessitate additional material.
- .5 Install ceiling mounted components (e.g., light fixtures, speakers, heat or smoke detectors) in accordance with reflected ceiling drawings.
- .6 Confirm on the site the exact location and mounting elevation of outlets and fixtures as related to architectural and structural details.

1.06 EXAMINATION OF SITE AND DOCUMENTATION

- .1 Prior to submitting tender, carefully examine conditions at the site which could affect the work. Refer to and examine all contract documents.
- .2 Ensure that materials and equipment are delivered to the site at the proper time and in such assemblies and sizes so as to enter into the building and to be moved into the spaces where they are to be located without difficulty. Be responsible for any cutting and patching involved installing assemblies.
- .3 Before tendering, examine site and all applicable drawings to ensure the tender price includes for all necessary labour and materials for completion of work. Failure to visit the site or adequately review all the required interfacing details will not entitle this sub-contractor to any additional compensation..

1.07 PHASING AND SCHEDULING OF WORK

.1 Prior to commencing any work, refer to scope of work for a detailed description of the phasing and scheduling of the work. Execute work in accordance with the phasing and construction schedule. Provide all necessary temporary connections and equipment to provide functional, operational systems during construction period when part of the building will be occupied and construction is still continuing in other portions.

1.08 COORDINATION DRAWINGS

- .1 Prepare drawings in conjunction with all trades concerned, showing sleeves and openings for passage through structure, and all inserts, equipment bases, and supports, and relate these to suitable grid lines and elevation datum.
- .2 When requested, provide weights of major items of equipment.
- .3 Prepare interference and co-ordination drawings for all areas where the work of this division could conflict with and/or obstruct the work of other trades and/or other sections of this division. Submit drawings for review by the consultant.

1.09 COORDINATION

- .1 Co-ordinate arrangement, mounting, and support of electrical equipment:
 - .1 To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - .2 To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - .3 To allow right of way for piping and conduit installed at required slope.
 - .4 So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- .2 Co-ordinate installation of required supporting devices and set sleeves in cast-inplace concrete, masonry walls, and other structural components as they are constructed.
- .3 Co-ordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Provide access doors and panels to suit the finish that it will be installed onto.
- .4 Co-ordinate sleeve selection and application with selection and application of firestopping.
- .5 Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.
- .6 Co-ordinate sizes and locations of required concrete pads and bases to support electrical equipment.

1.10 PRODUCT STANDARDS AND ALTERNATIVES

- .1 Provide new material and equipment as specified and to the acceptance of the consultant. Manufacturer's names are listed to set a standard of quality, performance, capacity, appearance and serviceability.
- .2 Where no other acceptable manufacturers are indicated, provide the exact make specified. Requests for acceptance of manufacturers not listed must be submitted not less than seven working days prior to closing date of the tender and submissions must bear proof of acceptance by the consultant if used in the tender.
- .3 Assume full responsibility for ensuring that when providing other acceptable manufacturers all space, weight, connections, power and wiring requirements, etc., are considered, and costs therefore included in the tender. Equipment requiring greater than specified energy requirements or unduly limiting service space requirement will not be accepted.
- .4 All electrical equipment, material, wiring and devices to conform to the Ontario Electrical Safety Code for the purpose for which they are to be used and bear the approval of CSA or other acceptable testing agency, alternately the equipment must bear special approval of the inspection authority.

1.11 RIGHTS RESERVED

.1 Rights are reserved to furnish any additional detail drawings, which in the judgement of the consultant may be necessary to clarify the work, and such drawings shall form a part of this contract.

1.12 EXPEDITING AND DELIVERY

- .1 Continuously check and expedite delivery of equipment and materials. Where necessary, inspect at the source of manufacture.
- .2 Continuously check and expedite the flow of necessary information to and from all parties involved.
- .3 Immediately inform the consultant in case information is required.

1.13 SUPERINTENDENCE

- .1 Maintain at the job site, at all times, qualified personnel and supporting staff, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
- 1.14 WORKMANSHIP

- .1 Install equipment, conduit and cables in a skillful manner to present a neat appearance to function properly to the satisfaction of the consultant. Install runs parallel and perpendicular to building lines, in chases, behind furring or above ceilings, where such concealment is possible. In areas where systems are to be exposed install neatly and group to present a tidy appearance.
- .2 Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with due allowance therefore.
- .3 Include in the work all requirements of manufacturers shown on the shop drawings or manufacturers installation instructions.
- .4 Replace work unsatisfactory to the consultant without extra cost.
- .5 Make provision to accommodate future plant and equipment indicated on drawings.
- .6 Protect from damage all equipment delivered to the site and during installation. Any damage or marking of finished surfaces shall be made good to the satisfaction of the consultant.
- 1.15 TRIAL USAGE AND TESTS
 - .1 The owner has the privilege of the trial usage of electrical systems or parts thereof for the purpose of testing and learning the operational procedures.
 - .2 Assist in trial usage over a length of time as deemed reasonable by the consultant and do not waive any responsibility because of trial usage.
 - .3 Trial usage shall not be construed as substantial completion of the work, or acceptance by the owner.
 - .4 Provide and pay for all testing required on the system components where, in the opinion of the consultant, manufacturer's ratings or specified performance is not being achieved.

1.16 NOISE AND VIBRATION

- .1 Electrical equipment is to operate without objectionable noise or vibration. If, in the opinion of the consultant, the equipment operates with excessive noise or vibration, then the equipment must be replaced or noise or vibration eliminated.
- .2 Connections to noise-producing and vibrating equipment must be made with liquidtight flexible conduit and associated connectors. This includes transformers, dimming equipment racks, and motors. Use a minimum of 3ft of flexible cable with slack at each device.
- .3 Vibration isolators are to be provided where indicated or required. Transformers to be isolated from the structure, with spring and rubber isolators when wall mounted or suspended and 1/2" high density neoprene sandwich pads (type MWP) when floor mounted.

1.17 INTERRUPTION OF SERVICES

- .1 Where disruptions of existing services are required co-ordinate the shut-downs with the Owner and carry out the work at a time and in a manner acceptable to them. Carefully schedule all disruptions and/or shut-downs and ensure that the duration of same is kept to the absolute minimum. Submit for approval a written concise schedule of each disruption at least 72 hours in advance of performing work and obtain Owner's written consent prior to implementing.
- .2 Where disruptions of life safety systems are required comply with paragraph .1 above Provide continuous monitoring during shut-down period and ensure all systems are reactivated prior to leaving the site at the end of each working day.
- .3 Interruptions shall only occur during premium time periods; all allowances for this shall be included in the price submitted.
- .4 Assume full responsibility for any disruption or damage to existing services or systems. Should any temporary connections be required to maintain services during work in the existing building, supply and install all necessary material and equipment and provide all labour at no extra cost. Should this Division damage any existing system or device in the course of work, make full repairs without extra cost and to the satisfaction of the Owner.

1.18 DEMOLITION

- .1 Visit the site, examine the existing conditions and become familiar with the extent of the necessary removal, relocation, reconnecting, and rerouting of electrical equipment and wiring as necessary for the completion of the project.
- .2 Review and confirm with the architect/designer's drawings for the complete extent of demolition and alteration.
- .3 Make safe and disconnect all power and systems, as and when, and to the extent required to facilitate with the demolition.
- .4 Ensure that all electrical, life safety services, and services for existing equipment, in areas outside the areas of this work, that are required to remain in service, shall do so.
- .5 Relocate any electrical feeders or equipment that are required to remain in service, that are secured to existing walls, floors or ceilings to be demolished or that are buried and required to be excavated for new work.
- .6 Remove and replace any electrical equipment on walls or ceilings that will be demolished and rebuilt.

- .7 When deleting and/or making safe existing electrical work, ensure that it includes all conduit and wiring back to the associated panelboards or control panel. Where floor boxes are being removed, ensure under-floor conduit is removed back to source and fill all core holes, in floors and in walls, with appropriate concrete.
- .8 Disconnect and remove existing light fixtures, devices, outlets, etc. which are not to be reused. Such items shall be boxed and turn over to the owner at a place designated by the owner. Cut back and cap unused raceway and outlets and removed unused wiring back to panelboard in approved manner.
- .9 Include in demolition work for removal of all communication devices, outlets, cables, conduits, etc., which are not to be reused. All redundant cabling and conduit shall be removed in its entirety from tenant space back to base building riser rooms. Remove all unnecessary cables and equipment in hub rooms and/or telephone rooms with extreme care to avoid any accidental shutdown to existing services serving other parts of the building.
- .10 Provide blank cover plate where outlets are removed from existing walls to remain.
- .11 All existing electrical equipment which is no longer required shall be removed and disposed of, off site.
- .12 Return to landlord any unused landlord supplied equipment and materials; exit signs, light fixtures, speakers, speaker/strobes.
- .13 Be responsible and pay for any damage to the base building incurred by work of this division, or repair to the satisfaction of the consultant.
- .14 Carry out the work with minimum of noise, dust and disturbance.
- .15 Ensure that all existing equipment which are to be reused and/or relocated is thoroughly inspected and refurbished to ensure correct operation when put back into service and meets the local electrical safety authority's approval. Outlet boxes and wiring and for conduit which are corroded or damaged are to be replaced.

1.19 CLEANING

- .1 Before energizing any systems, inspect and clean the inside of panel boards, switchgear and cabinets to ensure that they are completely free from dust and debris.
- .2 Clean all polished, painted and make plated work bright. Clean all lighting fixtures.
- .3 Remove all debris, surplus material and all tools.
- .4 Carry out additional cleaning operating of systems as specified in other sections of the specification.
- 1.20 COMPLETION

- .1 All equipment must be cleaned and tested before final acceptance by consultant.
- .2 Leave electrical work in specified working order.

1.21 INSTRUCTION TO OWNER

- .1 Instruct the owner's representatives in all aspects of the operation of systems and equipment.
- .2 Arrange for and pay for services of service engineers and other manufacturers' representatives required for instruction on specialized portions of the installation.
- .3 Submit to the consultant at the time of final inspection a complete list of systems stating for each system:
 - .1 Date instructions were given to the owner's staff.
 - .2 Duration of instruction.
 - .3 Name of persons instructed.
 - .4 Other parties present (manufacturer's representative, consultants, etc.).
- .4 Signatures of the owner's staff stating that they properly understood the system installation, operation and maintenance requirements.

1.22 ADDITIONAL WORK

- .1 In case where extra work of any kind is required, obtain written instruction from the architect / design consultant before proceeding. Payments will be made for authorized changes only.
- .2 Quotation with breakdown of material, labour, overhead, profit, etc., shall be submitted for each change. Labour units shall be based on the latest National Electrical Contractors Association (NECA) labour column one for the complete duration of the project. Material prices shall be based on the current National Price System with trade discounts. Hourly labour rate shall include all rated changes for supervision, Hydro inspection, hand tools, parking, clean-up, as-built drawings and additional bonding.

1.23 TENANT'S EQUIPMENT

- .1 Where specified, install all equipment provided by the tenant. Receive, store and install equipment and accept full responsibility for its correct operation. Provide conduit, wire, boxes, switches, outlets, devices, flex connections, etc., as required.
- 1.24 MATERIALS AND CONNECTIONS TO EQUIPMENT FURNISHED BY OTHERS

- .1 Where materials are furnished by others for installation under this division, the subcontractor shall notify the supplier of dates they will be ready for delivery as specified in the general conditions. The sub-contractor shall receive, unload, handle, store, protect and insure the material until ready for actual installation. Upon receipt of material furnished by others, the sub-contractor shall spot-check or check the entire shipment and promptly advise the consultant in writing of any damage and/or missing components. Any material which is subsequently lost or damaged due to negligence on the part of the sub-contractor shall be promptly replaced (or repaired to the satisfaction of the owner) at the sub-contractor's expense.
- .2 Where the drawings indicated equipment to be furnished by others, provide electrical rough-in for each unit pursuant to its shop drawings, and make final connections, disconnect switches and other electrical facilities for a complete installation.

1.25 INSERTS, HANGERS AND SLEEVES

- .1 Sleeves are to be of a type suitable for the application and be sealed and made watertight.
- .2 Provide hangers, inserts, sleeves and supports as required.
- .3 Steel pipe sleeve shall be ASTM a 53/a 53/a 53m, type e, grade b, schedule 40, galvanized steel, plain ends.
- .4 Sleeves for rectangular openings shall be galvanized sheet steel. Minimum metal thickness:
 - .1 For sleeve cross-section rectangle perimeter less than 6" and no side more than 16", thickness shall be 1/16".
 - .2 For sleeve cross-section rectangle perimeter equal to or more than 4'-0" and 1 or more sides equal to or more than 16", thickness shall be 1/8".
- .5 Provide a concrete base 4" high at all sleeve locations and conduits penetrating the floor slab. Concrete base to extend 4" beyond the edge of the sleeve or conduit. All concrete work to be included in this division.
- .6 Inserts are to be of a lead shield type.
- .7 Hangers must not be welded to structural steel members and burning of holes in structural steel is prohibited.
- .8 Do not use any base building supports or equipment, including ceiling support system.
- 1.26 CUTTING AND PATCHING
- .1 All cutting and patching required to the existing building structure for the work shall be included under this contract and be acceptable to the landlord. Obtain written approval from landlord before any cutting is carried out.
- .2 Where conduits pass through fire rated walls or floors, provide fire stopping material and maintain same fire rating of building component through which penetration occurs. Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1.27 PLYWOOD

.1 All surface mounted electrical distribution equipment shall be mounted on plywood backboards. Provide all plywood backboards required for the work of this division. Plywood backboards shall be (3/4" thick, of highest quality fire retardant fir. Prime and paint backboards with fire retardant paint equal to CGSB spec. #1-gp-151 m, of a colour as selected by the design consultant/architect.

1.28 CORE DRILLING

- .1 Before core drilling floor slab or structural walls, scan slab or walls and have the locations accepted by the landlord in writing.
- .2 Any existing building service damaged by core drilling must be repaired immediately at no cost to landlord or Tenant.
- .3 Floor drilling to be carried out after normal working hours and at a time acceptable to landlord and allowances for this work shall be included in bid price submitted.

1.29 METERING

- .1 Provide digital meters to match the base building standard except where noted otherwise. Carry the costs of the base building metering contractor for all meter installations.
- .2 Provide all required potential transformers, current transformers, reference voltages, breakers, conduit, wire, etc. for a complete installation as per the manufacturer's recommendations.

1.30 IDENTIFICATION

- .1 Provide identification on all panels, disconnect switches, splitters, etc., showing the size, name of equipment, serial number and all information usually provided, which also includes voltage, cycle, phase, horsepower of motors and the name and address of the manufacturer. Nameplate shall be mechanically attached to equipment by means of rivets or soft tapping screws.
- .2 Nameplates shall generally be black-white-black with bevelled edges, secured to apparatus with stainless steel screws. Generally lettering shall be 6mm high but equipment in the main electrical room shall be provided with lettering 13mm high.

- .3 Warning signs, if and when required, shall be red with white lettering.
- .4 Equip large multiple cell or component apparatus such as switchboards and distribution panels with main nameplates identifying the equipment, voltage characteristics and capacity, and with sub-nameplates clearly identifying each cell or component and its service.
- .5 Panelboard nameplates shall identify the panelboard numbers designated on the drawings, unless otherwise instructed. Nameplates for disconnect switches, control panels and cabinets shall outline their service.
- .6 Motor starters, magnetic and manual, shall identify the piece of motorized equipment being serviced.
- .7 Exact nameplate wording and sizes must be approved by and confirmed by the Consultant prior to manufacture.
- .8 Directories for branch circuit panelboards shall be clearly and neatly typewritten, accurately identifying the type, location and wattage of the connected load for each circuit breaker. Directories shall be secured to the rear of the cabinet door under protective plastic. Incorporate copies of all panel board directories in each copy of operating and instruction manuals.
- .9 Clearly identify main pull or junction boxes (excluding obvious outlet boxes) by painting the outside of the covers. Paint colours shall be in accordance with the following schedule:

Lighting	-	Yellow
Power	-	Blue
Emergency Power	-	Orange
Fire Alarm	-	Red
Telephone	-	Cream
Miscellaneous Signals	-	Brown

- .10 In addition to painting miscellaneous signal boxes clearly identify the specific system in which the box is installed.
- .11 Colour code empty conduit capped and terminated for future use as specified above and clearly identify its intended use by means of securely attached tags.
- .12 Colour code conductors throughout, to identify phases, neutrals and grounds, by means of coloured conductor insulation. Colours shall be as follows:

Phase A	-	Red
Phase B	-	Black
Phase C	-	Blue
Ground	-	Green
Neutral	-	White

- .13 Control conductors, in addition, shall be numbered with Brady Ltd., or Electrovert Ltd., Z-type markers. Colour code conductors, for special component per manufacturer's recommendations.
- .14 Use dymo tape to label each receptacle with its circuit number (e.g., UA-27).

1.31 DOCUMENTATION AND SYSTEMS ACCEPTANCE

- .1 Assemble three copies of operating and instruction manuals in three ring binders with index tabs each containing this subcontractor's and suppliers names and telephone numbers.
- .2 Each manual shall contain the following data:
 - .1 A set of as-built prints and Auto Cad files
 - .2 Letters of Owner's Instructions
 - .3 Final Hydro certificate.
 - .4 A copy of each "reviewed" shop drawing.
 - .5 Complete explanation of operation principles and sequences.
 - .6 Complete part lists with numbers.
 - .7 Recommended maintenance practices and precautions.
 - .8 Complete wiring and connections diagrams.
 - .9 Certificate of warranty.
 - .10 Representative certificates for Fire Alarm System
- .3 Ensure that operating and maintenance instructions are specific and apply to the models and types of equipment provided.

1.32 TESTING AND COMMISSIONING

- .1 Perform, in conjunction with the consultant, testing and verification of all following systems as discussed hereinafter. This testing and verification shall be provided after, and in addition to, the standard manufacturers' testing and verification procedures.
- Major distribution equipment and components;
- Wiring;
- Emergency lighting;
- Fire alarm system;
- Lighting control system.
- Dimming system.
 - .2 Test and verify that all equipment is installed within and operating within manufactures' guidelines and in accordance with the contract document requirements, to ensure the systems can be safely energized and operated.
 - .3 Obtain and have available the necessary reference document for review during the testing period.

.4 Execute Work of this section only by personnel that have taken part in the construction program of this project and manufacturer appointed qualified technical staff capable of setting-up, adjusting, balancing and calibrating all equipment, components and systems.

PART 2 - MATERIAL AND INSTALLATION

2.01 WIRING METHODS:

- .1 All building wires and cables shall be copper thermoplastic type TWH 90 degrees C rated and installed in conduit. Minimum size shall be #12 AWG. For final connections to lighting fixtures use type GTF wire. For final connections to heating equipment use silicone insulated type wire, suited for this purpose. All conduit shall be EMT type galvanized steel utilizing set screw fittings, insulated throat connection and couplings. All conduit shall be concealed except in unfinished areas.
- .2 Branch circuit wiring exceeding 100 feet to the furthest outlet from a panel board shall be #10 AWG.
- .3 Armoured cable (BX) may be used for fixture tails and wall mounted outlets maximum length 10 feet.
- .4 All conduit shall be run parallel to walls and ceilings. Provide a nylon fish wire in all empty conduit. All connectors shall be Ideal wing nut type.
- .5 Support all conduit independent of ceiling system.

2.02 RACEWAYS

- .1 Rigid steel conduit (RSC) shall be zinc-coated steel that conforms to industry standards. Lock nuts shall be steel/zinc plated. Connectors and couplings shall be steel. Insulated bushings shall be iron/zinc plated. Fittings shall be threaded with insulated bushings.
- .2 Electrical metallic tubing (EMT) shall be zinc-coated steel that conforms to industry standards. Fittings shall be steel with set screw connectors and couplings.
- .3 Rigid non-metallic conduit (RNMC) shall be type epc-40-pvc, db-120 and epc-80pvc. Conduit shall be 100% virgin polyvinyl chloride (PVC), 90°c UL-rated that conforms to industry standards.

2.03 BOXES

.1 Support all boxes independent of conduit.

DIVISION 26 ELECTRICAL DWG GENERAL ELECTRICAL REQUIREMENTS

- .2 In areas with drywall ceilings, contractor shall locate/relocate all new/existing junction boxes, pull boxes, disconnects, etc. to accessible areas; as required by the Canadian Electrical Code. Where it is no possible to relocate/install existing/new services in accessible areas, Contractor shall provide access panels c/w fire ratings as required. Exact location of access panels shall be co-ordinated with the Architect.
- .3 Outlet boxes
 - .1 Provide an outlet box for each lighting fixture, wiring device, data outlet, telephone outlet, etc. Outlet boxes for various systems and components shall be as required by manufacturer and suitable for the application.
 - .2 Outlet boxes on concealed work shall be 4" square or octagonal, galvanized pressed steel with plaster rings as required. Outlet boxes for exposed conduit work shall be cast aluminum alloy with cast aluminum alloy covers.
 - .3 Where installed in plaster, boxes shall be fitted with galvanized steel plaster covers of required depth to finish flush with finished wall or ceiling.
 - .4 Switch boxes, receptacle boxes and other outlet boxes shall be standard 4" square with plaster rings or gang cover as required.
 - .5 Weatherproof boxes shall be condulet cast boxes with weatherproof devices and covers. Provide hot-dipped galvanized corrosion-resistant epoxy enamel finish or PVC-coated products, where noted on drawings.
 - .6 Provide screw-joint outlet boxes, with gasketed weatherproof covers in exterior locations, where exposed to moisture, at kitchen and cafeteria equipment with or next to water or steam connections, and where indicated as weatherproof on drawings.
 - .7 Provide only enough conduit openings to accommodate conduits at individual location. Each box shall be large enough to accommodate number and sizes of conduits, wires and splices to meet OESC requirements, but shall be at least size shown or specified. Necessary volume shall be obtained by using boxes of proper dimensions. Box depths greater than 2" shall not be used to obtain necessary volume but may be used with architect's approval to facilitate installation. Standard concrete boxes may be 6" deep where necessary to permit entrance of conduits into sides of boxes without interference with reinforcing bars. Octagonal hung ceiling boxes with suspension bars may be 3-1/2" deep. Rectangular boxes for inter-connection of branch circuit conduits may be 2-1/2" deep.
 - .8 Do not install outlet boxes "back-to-back" in walls and partitions. Such outlets must be staggered and sealed against noise transmission. "Thru-Wall" type outlet boxes will not be permitted for any application.
 - .9 All recessed outlet boxes for surface mounted devices or lighting fixtures must be totally concealed by the device or fixture.
- .4 Junction boxes, pull boxes and cable troughs

- .1 Provide code gauge galvanized steel junction and pull boxes for conduit 1-1/4" trade size and larger, where indicated and as necessary to facilitate installation, of required dimensions, with accessible, removable screw-on covers. Provide junction and pull boxes in special sizes and shapes determined in field where necessary.
- .2 Junction boxes for exposed conduit work in finished areas shall be cast aluminum alloy with cast aluminum alloy covers.
- .3 Provide cable troughs of special shapes, design and construction required to install, support and enclose feeder cable throughout indicated routing. Troughs shall be as specified above for junction and pull boxes, with reinforcing, insulating supports and clamping for cable installation. Cables shall be continuous throughout troughs and shall be racked in distributed phase groupings arranged with phase cables surrounding neutral conductors.
- .4 All boxes shall be installed, so as to be accessible after work is complete. Provide pull boxes on all conduit runs on the basis of no more than two (2)
 - 90 deg bends or their equivalent, or a distance not to exceed 100 feet between boxes.

2.04 FLOOR BOXES

- .1 Floor outlet boxes shall be steel, concrete tight adjustable type Legrand Evolution series, EFB45S, 4 or 5 gang as required to suit devices and depth of concrete. Provide applicable floor plate assembly and wiring device to suit the power, communication and A/V requirements as indicated on the plans. (Alternate Manufacturers: Hubbell, Wellmark)
- .2 All floor plates shall be complete with cover and finishing flanges as required to suit floor finish and application as noted.

2.05 GROUNDING

- .1 Install green insulated equipment grounding conductors with all feeders and branch circuits.
- .2 Signal and communication equipment: for telephone, alarm, voice and data, and other communication equipment, provide no. #2 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - .1 Service and central equipment locations and wiring closets: terminate grounding conductor on a 1/8" x 2" x 12" grounding bus.
 - .2 Terminal cabinets: terminate grounding conductor on cabinet grounding terminal.
- .3 Conductors: install solid conductor for #4awg and smaller, and stranded conductors for #3awg and larger, unless otherwise indicated.

- .4 Underground grounding conductors: install bare tinned-copper conductor, 2/0 awg minimum.
 - .1 Bury at least 24" below grade.
 - .2 Duct bank grounding conductor: bury 12" above duct bank when indicated as part of duct-bank installation.
- .5 Isolated grounding conductors: green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- .6 Size all wire for maximum 2% voltage drop.
- .7 All home runs to be in conduit.
- 2.06 WALL PLATES
 - .1 Faceplates of flush-mounted toggle switches and receptacles shall be as follows:
 - .1 Finished areas: Nylon White finish each supplied individually wrapped in a sealed protective envelope. Manufacturer to match receptacle and switch manufacturer.
 - .2 Unfinished and surface areas: galvanized steel.
 - .3 Wet location, weather-proof cover plates.
- 2.07 LINE VOLTAGE SWITCHES
 - .1 Decorator switches (15A, 120/277V max.) shall be Pass & Seymour #2601 (Single Pole), #2603 (Three Way), mounted 4'-0" AFF
 - .2 Decorator exhaust fan switches (20A max.) shall be Pass & Seymour Cat. #2629, illuminated when on.
 - .3 Decorator variable speed exhaust fan switches shall be Pass & Seymour Lumaspec non-preset series, wattage as required.
 - .4 Wall mounted lighting dimmers shall be white, Lutron NT series, wattage as required.
 - .5 Variable speed exhaust fan switches shall be Lutron NTF Series, wattage as required.
 - .6 Pilot light switches, 20 A: single pole, with neon-lighted handle, illuminated when switch is "on."
 - .7 Alternate Manufacturers: Leviton, Lutron, Hubbell

2.08 RECEPTACLES

- .1 Devices shall be white in colour, unless otherwise specified.
- .2 Decora duplex receptacles shall be Pass & Seymour Cat# 26242 Heavy-Duty Decorator Spec Grade or equivalent from Leviton or Hubbell. 15A, Nema 5-15R
- .3 Isolated ground receptacles shall be Pass & Seymour Cat. #IG26262-HG.
- .4 All other receptacle types shall be as scheduled on the drawings.
- .5 Receptacles located in all rooms containing personal washing facilities such as washbasins bath tubs, showers, kitchen sinks or similar devices and located within 3 metres of such devices shall provide GFCI protection. Pass & Seymour #1595.
- .6 Receptacles located in kitchens and installed within 1.5 metre of kitchen sink along the wall behind counter work surfaces shall be protected by ground fault interrupter.
- .7 All receptacles designated 'WP' (weatherproof) on the drawings shall be G.F.I. protected and provided with "in use" weatherproof covers.
- .8 Alternate Manufacturers: Leviton, Hubbell

2.09 MECHANICAL TRADES WIRING

- .1 Unless otherwise noted, all starters and control wiring to be provided by division 15. Division 16 to receive, install starters and provide all line-side and load-side power wiring and required isolating disconnect switches.
- .2 Confirm electrical requirements and exact locations of all mechanical equipment with division 15 prior to installation.

2.10 LUMINAIRES

- .1 Provide all luminaires as shown on the drawings and as specified in the luminaire schedule.
- .2 Provide new lighting fixtures complete with mounting accessories, junction boxes, trims, and lamps as specified and per attached fixture cut sheets.
- .3 All products of a specified type are to be from the same manufacturer.
- .4 Fixture type catalogue numbers do not necessarily denote required mounting equipment or accessories. Provide complete mounting accessories appropriate for each mounting condition.
- .5 All new and relocated fixtures in scope of work shall be supported independent of the ceiling system to the approval of the Canadian Electrical Code.
- .6 All fixtures shall be installed with a frame or canopy that is compatible with the ceiling type specified by the consultant.

- .7 Provide appropriate accessories for proper mounting of all fixtures. Include plaster frames for plaster ceiling and firestop protection for fixtures in rated ceiling. For fixtures suspended from ceiling, provide pendants or air craft cables complete with accessories to complete the installation as indicated on the drawings.
- .8 Where light fixture or light fixture suspension apparatus penetrates metal pan or sheet metal ceiling or canopies, an approved copy of the shop drawings of those fixtures shall be provided to the ceiling manufacturer. Apertures in the ceiling or openings for suspension cables shall be pre-cut by the ceiling manufacturer to suit light fixtures. Instruct the manufacturer accordingly.
- .9 If the words "equivalent" or "approved equal" are not indicated after light fixture manufacturer and catalog number in the fixture schedule, no other manufacturer will be acceptable for that particular type.
- .10 With just emergency lighting in operation, and at night, the electrical contractor is to measure the "average" illumination on the floor (by establishing the maximum and the minimum level) in the principal routes providing access to exits. Plot all lighting results on a cad disk or on a set of reproducible sepia drawings for review by the consultant. Submission to the building inspection authorities to be by the electrical contractor.
- .11 All fluorescent lamps shall be T8 cool white unless noted otherwise on drawings.
- .12 Fluorescent ballasts shall be electronic type, energy saving rapid start high power factor "A" sound rated and complete with automatic reset thermal protection.

2.11 TRANSFORMERS

- .1 Transformer and enclosure shall be built as per the latest energy codes.
- .2 The enclosure coating shall be grey ASA 61 and suitable for indoor/outdoor use.
- .3 Transformer shall be sized as per contract documents, 3 phase, 3 coils with common core construction, 60 Hz.
- .4 All winding conductors shall be of copper.
- .5 Temperature rise at full load shall not exceed 80°c with a class 220 insulation system.
- .6 Primary winding shall be 600 volts, 3-phase, delta connected, complete with two full capacity 4.5% adjustment taps, 1 below (FCBN) and 1 above (FCAN) the rated voltage for 10 KVA and less and four full capacity 2.5% adjustment taps, 2 below (FCBN) and 2 above (FCAN) the rated voltage for more than10 KVA.
- .7 Secondary winding shall be 208Y/120, volts 3-phase, wye connected with a 30° angular displacement (lagging) with respect to the primary winding.

- .8 Ceiling mount transformers up to 45 KVA with suspension rods and spring isolators, transformers 60 KVA and larger to be floor mounted on isolation pads unless otherwise noted.
- .9 Windings shall be wound with the secondary winding nearest to the core and shall be round coils.
- .10 The core shall be constructed of high grade, grain oriented silicon steel laminations.
- .11 The impregnation process for the core-and-coil assembly shall include a period under vacuum, followed by pressure impregnation using epoxy resin (EVI process).
- .12 The transformer shall be isolated from the enclosure to reduce noise and vibration by means of anti-vibration pads.
- .13 The transformer enclosure shall be fabricated from sheet steel and shall be of Type 4 (totally enclosed), Sprinkler-proof.
- .14 The enclosure coating shall be grey ASA 61, color option available and suitable for indoor/outdoor use.

2.12 SERVICE EQUIPMENT

- .1 All new panelboards, disconnect switches, meters, transformers, etc., to be copper windings/bus-bars, same manufacture, rating and type as base building equipment unless otherwise noted. Molded case circuit breakers to be bolt-on and same manufacturer, rating and type at base building breakers. All ATS's and surface mounted panelboards to be sprinkler proof.
- .2 All new panelboards shall be complete with neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads and panelboards fed from "K" rated transformers.
- .3 All main breakers shall be separately mounted on top or bottom of panel to suit cable entry.
- .4 Provide breaker locks for all new and existing breakers serving exit lights, emergency lighting and emergency battery packs.
- .5 All floor mounted distribution equipment, including transformers, panelboards and/or ups modules shall be installed on a 100mm (4") high concrete base to extend (2") on all sides with chamfered corners.
- .6 Manual starters shall be Allan Bradley Bulletin 600, with pilot light and on/off toggle switch.
- .7 Fuses shall be Gould Shawmut HRC 1, Class J series CJ for constant running equipment and series AJT for equipment that cycles on and off.

- .8 Extend and modify the existing base building distribution system as indicated on the drawings.
- .9 Provide new switches and breakers in existing distribution equipment as detailed. New equipment shall, in all respects, be compatible with existing equipment.
- .10 Balance the loading on feeders so that unbalanced load is less than 10%.

2.13 EXIT AND EMERGENCY LIGHTING

- .1 Provide a new emergency and exit lighting system as detailed on the drawings.
- .2 All self contained equipment shall comply with C22.2.141.
- .3 Battery units shall be as specified with 10 year design life, integral high/low charger with indicating and pilot light, load transfer meters and test switch, low voltage cut out, overload protection, 10 min time delay off, AUTO test and 120 volt cord and plug.
- .4 Exit lights shall be as specified on the drawings. Provide directional arrows as shown and to suit the local authorities. Connect 3rd socket to battery unit.
- .5 Wiring shall conform to the manufacturer's recommendations.
- .6 Include cash allowance to supply and install two extra exit lights and emergency lights complete with required conduits and cables, according to building inspectors direction at the time of inspection.

2.14 FIRE ALARM

- .1 The building is not equipped with a fire alarm system. However integrated smoke/strobe alarms and integrated smoke/CO/strobe alarm shall be interconnected.
- .2 The integrated smoke/strobe alarm shall be Kidde model P4010ACLEDSCA or approved equal.
 - .1 It shall be powered by a regulated 120VAC, 60 Hz source with a maximum operating RMS current of 863ma. A sealed 3V lithium battery provides backup power for the smoke alarm only. The temperature operating range shall be between 4.4°C (40°F) to 37.8°C (100°F) and the humidity operating range shall be up to 95% relative humidity, non-condensing. The unit shall incorporate a photoelectric smoke sensor with nominal sensitivity of 2.32 ± 1.35 %/ft OBS.

- .2 The integrated smoke/strobe alarm can be installed on any standard single gang electrical box or a 4" octagon junction box. The electrical connection (to the alarm) shall be made with a plug-in connector. A maximum of 24 Kidde devices can be interconnected in a multiple station arrangement. The interconnect system must not exceed the limit of 18 initiating devices, of which 12 can be smoke alarms. With 18 initiating devices (smoke, heat, CO, etc), interconnected, it is still possible to interconnect 6 standalone strobes (SLED177iCA's) and/or relay modules.
- .3 The unit shall incorporate a green LED indicator, that when illuminated, indicates the presence of AC power and blinks every 60 seconds when powered by the backup battery.
- .4 The P4010ACLEDSCA shall include a bright 177 candela strobe light comprised of 10 Cree® LEDs, with a flash rate of one (1) flash per second during smoke alarm. This unit shall be interconnected with Kidde smoke alarms, heat detectors and/ or carbon monoxide alarms. This unit shall automatically synchronize (flash at the same time) with other P4010ACLEDSCA and P4010ACLEDSCOCA strobes that are part of the interconnected system. Synchronization can take up to 20 seconds when in alarm. Note: The alarms shall not synchronize during a push to test.
- .5 The alarm shall include a test feature that will electronically simulate the presence of smoke and briefly cause the unit to go into alarm when the strobe dome is pressed. This sequence tests the unit's electronics to ensure proper operation.
- .6 The unit shall also include a Hush® feature that silences the unit for approximately 9 minutes, when the strobe dome is pressed on the initiating alarm, during a nuisance alarm condition or when the smoke is not too dense. The Green LEDs on the alarm will flash every 2 seconds while in Hush® and the unit will automatically reset itself. It also provides voice annunciation of "Hush Mode Activated. Mode Hush activé." when Hush® is activated and "Hush Mode Cancelled. Mode Hush annulé." when the Hush cycle ends.
- .7 In addition to visual flash and LED notifications, this alarm shall have two methods of audible warnings for danger: a piezoelectric horn that is rated at 85 decibels at 10 feet and a voice warning that identifies the danger.
- .8 If smoke is detected, the horn will sound three (3) long beeps in time with red LED flashes, followed by "Fire! Feu!". This pattern is repeated until the smoke is eliminated. The strobe will flash once per second. When interconnected with a carbon monoxide alarm or combination smoke/CO alarm, in the event of a CO incident, the horn will sound four (4) short beeps in time with red LED flashes, followed by "Warning! Carbon Monoxide! Monoxyde de carbone!," repeating every 5 seconds. The strobe will flash 4 times every 5 seconds. This continues until the initiating unit is reset or the CO is eliminated.
- .9 Note: This alarm DOES NOT detect carbon monoxide.

- .10 The unit shall at a minimum meet the requirements of CAN/ULC-S531 and conform to the light dispersion requirements of CAN/ULC-S526. It also shall include a 10-year manufacturer's limited warranty.
- .3 The integrated smoke/CO/strobe alarm shall be Kidde model P4010ACLEDSCOCA.
 - .1 It shall be powered by a regulated 120VAC, 60 Hz source with a maximum operating RMS current of 863ma. A sealed 3V lithium battery provides backup power for the smoke and carbon monoxide alarm only. The temperature operating range shall be between 4.4°C (40°F) to 37.8°C (100°F) and the humidity operating range shall be 10% to 95% relative humidity, non-condensing. The unit shall incorporate a photoelectric smoke sensor with nominal sensitivity of 2.32 ± 1.35 %/ft OBS. The CO sensor shall be of a fuel cell design and shall meet the sensitivity requirements of CAN/CSA 6.19-01 Residential carbon monoxide alarming devices.
 - .2 The integrated smoke/CO/strobe alarm can be installed on any standard single gang electrical box or a 4" octagon junction box. The electrical connection (to the alarm) shall be made with a plug-in connector. A maximum of 24 Kidde devices can be interconnected in a multiple station arrangement. The interconnect system must not exceed the limit of 18 initiating devices, of which 12 can be smoke alarms. With 18 initiating devices (smoke, heat, CO, etc), interconnected, it is still possible to interconnect 6 standalone strobes (SLED177iCA's) and/or relay modules.
 - .3 The unit shall incorporate a green LED indicator, that when illuminated, indicates the presence of AC power and blinks every 60 seconds when powered by the backup battery.
 - .4 The P4010ACLEDSCOCA shall include a bright 177 candela strobe light comprised of 10 Cree® LEDs, with a flash rate of one (1) flash per second during smoke alarm, and 4 flashes every 5 seconds during CO alarm. This unit shall be interconnected with Kidde smoke alarms, heat detectors and/or carbon monoxide alarms. This unit shall automatically synchronize (flash at the same time) with other P4010ACLEDSCA and/or P4010ACLEDSCOCA strobes that are part of the interconnected system. Synchronization can take up to 20 seconds when in alarm. Note: The alarms shall not synchronize during a push to test.
 - .5 The alarm shall include a test feature that will electronically simulate the presence of smoke and CO and briefly cause the unit to go into alarm, when the strobe dome is pressed. This sequence tests the unit's electronics to ensure proper operation.

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- .6 The unit shall also include a Hush® feature that silences the unit for approximately 9 minutes, when the strobe dome is pressed on the initiating alarm, during a nuisance alarm condition or when the smoke is not too dense. The Green LEDs on the alarm will flash every 2 seconds while in Hush® and the unit will automatically reset itself. It also provides voice annunciation of "Hush Mode Activated. Mode Hush activé." when Hush® is activated and "Hush Mode Cancelled. Mode Hush annulé." when the Hush cycle ends.
- .7 In addition to visual flash and LED notifications, this alarm shall have two methods of audible warnings for danger: a piezoelectric horn that is rated at 85 decibels at 10 feet and a voice warning that identifies the danger.
- .8 If smoke is detected, the horn will sound three (3) long beeps in time with red LED flashes, followed by "Fire! Feu!". This pattern is repeated until the smoke is eliminated. The strobe will flash once per second. If CO is detected, the horn will sound four (4) short beeps in time with red LED flashes, followed by "Warning! Carbon Monoxide! Monoxyde de carbone!," repeating every 5 seconds. The strobe will flash 4 times every 5 seconds. This continues until the CO is eliminated.
- .9 The CO sensor will not alarm to levels of CO below 30 ppm and will alarm in the following time range when exposed to the corresponding levels of CO:
 - .1 70 ppm CO Concentration 60 240 minutes
 - .2 150 ppm CO Concentration 10 50 minutes
 - .3 400 ppm CO Concentration 4 15 minutes
- .10 The unit shall at a minimum meet the requirements of CAN/ULC-S531, CSA-6.19-01 and conform to the light dispersion requirements of CAN/ ULC-S526. It also shall include a 10-year manufacturer's limited warranty.
- .4 All wiring for the system shall be installed within conduit and shall comply with requirements of the system manufacturer.

2.15 COMMUNICATIONS

- .1 Telephone:
 - .1 Provide a system of empty conduits (grommets on the ends of all conduits that terminate at the outlet boxes and cable tray), pull wires, and outlet boxes as indicated on the drawings.
 - .2 Outlet boxes shall be 4 11/16" square. Flush mounted boxes shall be complete with plaster rings and stainless steel covers. Run ³/₄" empty conduit with pull string from each outlet box to cable tray.
 - .3 See communication cabling specifications for cabling requirements.
- .2 Data Communications:

- .1 Provide a system of empty conduits (grommets on the ends of all conduits that terminate at the outlet boxes and cable tray), pull wires and outlet boxes as indicated on the drawings.
- .2 Outlet boxes shall be 4 11/16" square. Flush mounted boxes shall be complete with plaster rings and stainless steel covers. Run ³/₄" empty conduit with string from each outlet box to cable tray.
- .3 All horizontal and backbone conduits must not have more than two ninety degree bends before installing a pull box. If entering a pull box from the bottom the conduit must be installed in the top of the pull box. If entering from the left side the outgoing conduit must leave from the right side. No changing of direction within the pull box.
- .4 See communication cabling specifications for cabling requirements.

END OF SECTION PART 2 MATERIALS