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SPECIFICATIONS

Volume 1 of 1

Trillium Lakelands
DISTRICT SCHOOL BOARD

Millwork Renovations
Various Locations

Issue Date: November 15, 2021

Projects: #20001, 20002, 20003 & 20004

PART 1 – THE CONSULTANTS

1.1 PRIME CONSULTANT (ARCHITECT)

Lennox Architects Limited
24 Morgan Heights Drive
Huntsville, ON,
P1H 1B7

Phone: 705.789.8960
Email: susan@lennoxarchitects.com

1.2 STRUCTURAL CONSULTANT

Lea Consulting Ltd.
425 University Avenue, Suite 400
Toronto, ON,
M5G 1T6

Phone: 416.572.1784
Email: jford@lea.ca

1.3 MECHANICAL & ELECTRICAL CONSULTANTS

HL Engineering
14721 Woodbine Ave.,
Stouffville, ON,
L4A 2G7

Phone: 905.713.0003
Email: mjli@hlengineering.ca

END OF SECTION

CATEGORY	SEAL & SIGNATURE
ARCHITECTURAL This seal governs all Documents and Sections of these Specifications, except for Section 00 31 19 Existing Conditions and all Divisions/Sections listed below.	
MECHANICAL This seal governs: Divisions 21 to 25	
ELECTRICAL This seal governs: Divisions 26 to 28	

END OF SECTION

END OF SECTION

PART 1 – GENERAL

1.1 LIST OF DRAWINGS

.1 Drawings forming part of the Contract Documents Labeled "Issued for Tender" in the revision column are as follows:

.1 Cardiff Elementary School Millwork Renovations

.1 Architectural:

A001 Cover Sheet & Key Plan
A301 Demo & New Plans – Classrooms 106 &107
A302 Demo & New Plans – Gym 109, Classroom 116 & Custodial 114
A303 Demo & New Plans – Classrooms 111 & 112
A304 Demo & New Plans – Classrooms 128 & 129
A305 Demo & New Plans – Classroom 127 & Kindergarten 126
A306 Demo & New Plans – Classroom 125
A401 Demo & New Elevations – Classroom 106 &107
A402 Demo & New Elevations – Gym 109 & Classroom 111
A403 Demo & New Elevations – Classrooms 112 & 115
A404 Demo & New Elevations – Classrooms 125 & 127
A405 Demo & New Elevations – Kindergarten 126 & Custodial 114
A406 Demo & New Elevations – Classrooms 128 &129
A501 Millwork Plans & Elevations
A502 Millwork Plans & Elevations
A511 Typical Details
A512 Typical Details

.2 Mechanical:

M001 Mechanical Legend, Drawing List, Key Plan and Schedule
M101 Mechanical Plan – Classroom 106, 107 & Gym 109
M102 Mechanical Plan – Classroom 111, 112 & 115 & Custodial Room 114
M103 Mechanical Plan – Classroom 125 & 127 and Kindergarten
M104 Mechanical Plan – Classroom 128 & 129

.3 Electrical:

E001 Legend & Drawing List – Electrical
E002 Key Plan & Details – Electrical
E201 Classroom Layouts – Electrical
E202 Classroom Layouts – Electrical
E203 Classroom Layouts – Electrical
E204 Classroom Layouts – Electrical
E205 Classroom Layouts – Electrical
E206 Classroom Layouts – Electrical
E207 Classroom Layouts – Electrical

.2 JD Hodgson Elementary School Door, Screen & Millwork Renovations

.1 Architectural:

A001 Cover Sheet, General Notes & OBC Matrix
A002 First & Second Floor Key Plan
A301 Demo & New Plans - Vest.101A and Foyer 101
A302 Demo & New Plans - Classrooms 104, 105 & Storage 125
A303 Demo & New Plans - Classrooms 109 &110
A304 Demo & New Plans - Classroom 129 & Music 130
A305 Demo & New Plans - Conf. Room 102 & Staff Room 132
A306 Demo & New Plans - Classrooms 204,206 & Storage 206A
A307 Demo & New Plans - Classrooms 208 & 209
A308 Demo & New Plans - Classrooms 210 & 211
A309 Demo & New Plans - Classrooms 227 & 228
A310 Demo & New Plans - Classrooms 232, 233 & Meeting Room 230
A311 Demo & New Plans - Classrooms 235 & 236
A312 Demo & New Plans - Classrooms 237 & 238
A313 New Plan & RCP - Universal Washroom 204A
A314 New Plan & RCP - Washroom 208A
A401 Demo & New Elevations - Classrooms 104 & 105
A402 Demo & New Elevations - Classrooms 109 & 110
A403 Demo & New Elevations - Classroom 129 & Storage 125
A404 Demo & New Elevations - Classroom 130
A405 Demo & New Elevations - Staff Rm. 132 & Conference 102
A406 Demo & New Elevations - P.A.L.S. Room 204
A407 Demo & New Elevations - Class. 206, Storage 206a & Univ.Wr.204A
A408 Demo & New Elevations - Classroom 208 & Washroom 208A
A409 Demo & New Elevations - Classrooms 209 & 210
A410 Demo & New Elevations - Classrooms 211 & 227
A411 Demo & New Elevations - Classroom 228 & Meeting Room 230
A412 Demo & New Elevations - Classrooms 232 & 233
A413 Demo & New Elevations - Classrooms 235 & 236
A414 Demo & New Elevations - Classrooms 237 & 238
A415 Demo & New Elevations - Vest. 101a & Foyer 101
A501 Millwork Plans & Elevations
A502 Millwork Plans & Elevations
A503 Millwork Plans & Elevations
A504 Millwork Plans & Elevations
A511 Millwork Details
A512 General Details
A513 Accessories Mounting Heights
A514 Door Schedule & Door /Screen Types
A515 Door / Screen Details

.2 Structural:

S100 General Notes
S101 Typical Details
S102 Typical Details
S103 Typical Details
S200 New Framing Plans
S201 New Framing Plans

.3 Mechanical:

M001 Mechanical Drawing List and Key Plan
M002 Mechanical Legend and Schedule
M003 Mechanical Detail and Plumbing Specification
M101 Mechanical Plan - Classroom 104,105 and Conference Rm 102
M102 Mechanical Plan - Classroom 109,110 and Staff Rm 132
M103 Mechanical Plan - Classroom 129 & 130
M104 Mechanical Plan - Classroom 204, 206 & Univ. Wr. 204A
M105 Mechanical Plan - Classroom 208, 209 & Washroom 208A
M106 Mechanical Plan - Classroom 210 & 211
M107 Mechanical Plan - Classroom 227 & 228
M108 Mechanical Plan - Classroom 232 & 233
M109 Mechanical Plan - Classroom 235 & 236
M110 Mechanical Plan - Classroom 237 & 238

.4 Electrical:

E001 Key Plan, Legend & Drawing List - Electrical
E002 Legend, Schedules & Details - Electrical
E003 Universal Washroom Layout & Details - Electrical
E101 Power & Systems Layout - Classroom 109 & 110
E102 Power & Systems Layout - Classroom 104 & 105
E103 Power & Systems Layout - Classroom 129 & 130
E104 Power & Systems Layout - Conf. 102, Staff 132 & Stor. 125
E201 Power & Systems Layout - Classroom 204, 206 & Stor. 206A
E202 Power & Systems Layout - Classroom 208, 209 & Washroom 208A
E203 Power & Systems Layout - Classroom 210 & 211
E204 Power & Systems Layout - Classroom 227 & 228
E205 Power & Systems Layout - Classroom 232, 233 & M. Room 230
E206 Power & Systems Layout - Classroom 235 & 236
E207 Power & Systems Layout - Classroom 237 & 238

.3 Monck Public School Millwork Renovations

.1 Architectural:

A001 Cover Sheet & Key Plan
A301 Demo & New Plans – Kindergarten 109 & 110
A302 Demo & New Plans – Laboratory 111 & 124
A303 Demo & New Plans – Classrooms 143, 144 & 145
A304 Demo & New Plans – Classrooms 162 & 163
A305 Demo & New Plans – Classrooms 174 & 175
A306 Demo & New Plans – Classrooms 167, 180 & 181
A307 Demo & New Plans – Classrooms 177 & 178
A308 Demo & New Plans – Classroom 107
A401 Demo & New Elevations – Kindergarten 109
A402 Demo & New Elevations – Kindergarten 110
A403 Demo & New Elevations – Senior Laboratory 111
A404 Demo & New Elevations – Junior Laboratory 124
A405 Demo & New Elevations – Classrooms 142 & 144
A406 Demo & New Elevations – Classrooms 145 & 162
A407 Demo & New Elevations – Classrooms 163 & 167

A408 Demo & New Elevations – Classroom 174
A409 Demo & New Elevations – Classroom 175
A410 Demo & New Elevations – Classrooms 177 & 178
A411 Demo & New Elevations – Classrooms 180 & 181
A412 Demo & New Elevations – Classroom 107
A501 Millwork Plans & Elevations
A502 Millwork Plans & Elevations
A503 Millwork Plans & Elevations
A511 Typical Details
A512 Typical Details

.2 Mechanical:

M001 Mechanical Legend, Drawing List, Key Plan, Schedule & Specification
M101 Mechanical Plan - Jr & Sr Laboratory 111 & 124
M102 Mechanical Plan - Kindergarten 109 & 110
M103 Mechanical Plan - Classroom 143 & 144 & 145
M104 Mechanical Plan - Classroom 174 & 175
M105 Mechanical Plan - Classroom 167
M106 Mechanical Plan - Classroom 180 & 181
M107 Mechanical Plan - Classroom 177 & 179
M108 Mechanical Plan - Classroom 107

.3 Electrical:

E001 Key Plan, Legend & Drawing List - Electrical
E002 Schedules & Details - Electrical
E101 Power & Systems Layout - Jr. & Sr Laboratory 111 & 124
E102 Power & Systems Layout - Kindergarten 109 & 110
E103 Power & Systems Layout - Classroom 143, 144 & 145
E104 Power & Systems Layout - Classroom 107 & 167
E105 Power & Systems Layout - Classroom 174 & 175
E106 Power & Systems Layout - Classroom 181 & 180
E107 Power & Systems Layout - Classroom 177 & 178

.4 Riverside Public School Millwork Renovations

.1 Architectural:

A001 Cover Sheet & Key Plan
A301 Demo & New Plans – Classrooms 111, 112 & 113
A302 Demo & New Plans – Classrooms 114 & 115
A303 Demo & New Plans – Sr. Laboratory & Classroom 119
A304 Demo & New Plans – Classrooms 120 & 121
A305 Demo & New Plans – Classrooms 123 & 124
A306 Demo & New Plans – Classrooms 131 & 132
A307 Demo & New Plans – Classrooms 134, 135 & 136
A308 Demo & New Plans – Jr. Laboratory 137 & Classroom 138
A309 Demo & New Plans – Classrooms 140 & 141
A310 Demo & New Plans – Kindergarten 142 & 147
A401 Demo Elevations – Classrooms 111, 112 & 113
A402 New Elevations – Classrooms 111, 112 & 113
A403 Demo Elevations – Kindergarten 142 & 147, Labs 117 & 137

A404 New Elevations – Kindergarten 142 & 147, Labs 117 & 137
A501 Millwork Plans & Elevations
A502 Millwork Plans & Elevations
A511 Typical Details
A512 Typical Details

.2 Mechanical:
M001 Mechanical Legend, Drawing List, Key Plan, Schedule & Specification
M101 Mechanical Plan - Classroom 111 & 112 & 113
M102 Mechanical Plan - Classroom 114 & 115
M103 Mechanical Plan - Sr.Lab 117, Prep. Room 118 & Classroom 119
M104 Mechanical Plan - Classroom 120 & 121
M105 Mechanical Plan - Classroom 123 & 124
M106 Mechanical Plan - Classroom 131 & 132
M107 Mechanical Plan - Classroom 134, 135 & 136
M108 Mechanical Plan - Jr.Lab. 137 & Classroom 138
M109 Mechanical Plan - Classroom 140 & 141
M110 Mechanical Plan - Kindergarten 142 & 147

.3 Electrical:
E001 Key Plan, Legend & Drawing List - Electrical
E002 Schedules & Details - Electrical
E101 Power & Systems Layout - Classroom 111, 112 &113
E102 Power & Systems Layout - Classroom 114 & 115
E103 Power & Systems Layout – Sr. Lab. 117, Class.119 & Prep.Rm.118
E104 Power & Systems Layout - Classroom 120 & 121
E105 Power & Systems Layout - Classroom 123 & 124
E106 Power & Systems Layout - Classroom 131 &132
E107 Power & Systems Layout - Classroom 134, 135 & 136
E108 Power & Systems Layout – Jr. Laboratory 137 & Classroom 138
E109 Power & Systems Layout – Classroom 140 & 141
E110 Power & Systems Layout - Kindergarten 142 & 147

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 A survey has been carried out concerning existing building conditions, reports for which are included in this specification as follows:

.1 Asbestos Containing Building Materials Re-Assessment Report Cardiff Elementary School

.1 A survey of asbestos containing materials has been carried out by Maple Environmental Inc. dated September 2019.

.2 Asbestos Containing Building Materials Re-Assessment Report J D Hodgson Elementary School

.1 A survey of asbestos containing materials has been carried out by Maple Environmental Inc. dated September 2019.

.3 Asbestos Containing Building Materials Re-Assessment Report Monck Public School

.1 A survey of asbestos containing materials has been carried out by Maple Environmental Inc. dated September 2019.

.4 Asbestos Containing Building Materials Riverside Public School

.1 A survey of asbestos containing materials has been carried out by Jacques Whitford Inc. dated January 11, 2007.

.2 Reports are hereby offered in good faith for general information and guidance. The Consultant assumes no responsibility for accuracy and completeness of the information provided.

.3 Contractor shall not be entitled to extra payment and/or performance time for conditions which are identified in the reports.

.4 In case of discrepancies between recommendations contained in reports and requirements of Contract Documents, the latter shall govern. Advise Consultant in writing of any discrepancies discovered.

END OF SECTION

PART 1 – GENERAL

1.1 SPECIFICATION FORMAT

.1 Specifications are addressed to the Contractor. Specifications are not intended as detailed descriptions of installation methods but serve to indicate particular requirements in completing the Work.

.2 Where Contract Documents do not provide sufficient information for complete installation of item, then as a supplement, comply with manufacturer's written instructions for quality of work.

.3 Portions of Specifications are written in short form. Therefore, it shall be understood that where item of the Work is stated in heading followed by material, equipment, component, or operation, words "shall be", "shall consist of" or similar words or phrases are implied which denote supply, fabricate and supply, install, provide or commission of such materials, equipment or operations for component of the Work designated by heading.

.4 Drawings, Lists or Schedules of Items are intended to show scope and arrangement of work. For location of item described refer to such Drawings, Lists or Schedules unless location stipulated in Specifications.

1.2 DIVISION OF WORK

.1 Work specified in the Specification has been divided into technical Sections for the purpose of ready reference. Division of work among Subcontractors and suppliers is solely the Contractor's responsibility and Consultant assumes no responsibility to act as an arbiter to establish subcontract limits between Sections or Divisions of work.

1.3 METRIC PROJECT

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

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

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

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

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

.6 Imperial size concrete blocks are only to be utilized for patching existing walls as per documents.

1.4 DISCREPANCIES/CONFLICTS/OMISSIONS

.1 If discrepancies or conflicts in, or omissions from Drawings, Specifications or other Contract Documents are suspected, or if there is doubt as to meaning or intent thereof, notify Consultant at once. Where there is conflict between Contract Documents, the most stringent requirement shall prevail.

.2 Drawings, Specifications and other Contract Documents are intended to be in compliance with federal, provincial and municipal laws, by-laws, regulations and other requirements of authorities having jurisdiction. Perform work in conformity with such requirements. If discrepancies, conflicts or omissions are suspected, notify Consultant at once.

.3 Comply with Consultant's written instructions or explanations.

.4 Promptly and not later than within 10 Working Days of becoming aware of circumstances which may require a change in the Work or other directions, give written notice to Consultant outlining such circumstances and request written directions. Do no work in affected area, or that would prevent Consultant from properly assessing situation or evaluating change, without its prior written approval. Consultant will act promptly to give Contractor directions so the Work is not unreasonably delayed.

1.5 PRE-CONSTRUCTION MEETING

.1 Immediately prior to construction, upon notification attend at location of Owner's choice, pre--construction meeting, along with authoritative representatives of certain key subcontractors as directed by Consultant.

.2 Purpose of meeting is as follows:

.1 Review project communications procedures.

.2 Review contract administration requirements including submittals, payment and change order procedures.

.3 Identify all critical points on construction schedule for positive action.

.4 Identify any product availability problems and substitution requests.

.5 Establish site arrangements and temporary facilities.

.6 Review Consultant’s inspection requirements.

.7 Review any points which, in Owner's, Consultant's and Contractor's opinion, require clarification.

.3 The Consultant shall organize and chair the pre-construction meeting. Consultant shall record minutes of pre-construction meeting and distribute a copy to each participant within ten days of meeting.

1.6 SITE MEETINGS

.1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding regular bi-weekly Contractor run site meetings.

.2 Contractor to organize and chair site meetings. Ensure that persons, whose presence is required, are present and that relative information is available to allow meetings to be conducted efficiently.

.3 Once a month, or more often if directed by Consultant, include review with Consultant and Owner of construction schedule and application for progress payment, during or immediately following site meeting.

.4 Record minutes of each meeting and promptly distribute copies to be received by all participants not later than seven days after meeting has been held. Distribute minutes of meetings to all Consultants, whether in attendance or not.

1.7 SUPERVISION

.1 Employ an experienced and qualified full time site supervisor who shall be in complete charge of the Work from commencement to final completion of the Work and who shall be present at the site whenever work is being carried out. A working foreperson will not be acceptable. The supervisor shall not be changed after commencement of work without the Consultant's approval.

.2 Supervise, direct, manage and control the work of all forces carrying out the Work, including subcontractors and suppliers. Carry out daily inspections to ensure compliance with the Contract Documents and the maintenance of quality standards. Ensure that the supervisory staff includes personnel competent in supervising all Sections of Work required.

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

1.8 DOCUMENTS ON SITE

.1 Contractor's field office shall at all times contain a complete set of Contract Documents (Drawings and Specifications) with all addenda, site instructions, change orders, reviewed shop drawings and samples, colour schedule, paint materials schedules, hardware list, progress reports and meeting minutes.

1.9 SCHEDULING

.1 Base sequence and scheduling of construction on maintaining continuous operation and access to the Work during construction.

.2 Phase construction as described herein. Notify Owner in writing 7 Days prior to beginning work in an occupied area. Owner will accommodate request within 7 Days of notification. Co-ordination with authority at the Place of the Work is crucial. Submit a progress schedule before commencement of the Work. Coordinate any suggested changes to schedule with Owner. Ensure schedule includes adequate time for Product delivery and Shop Drawing preparation, review and resubmission.

.3 Allow for un-schedule interruption to schedule of the Work and suspend parts of the Work affected to permit Owner to relocate furniture and equipment from Place of the Work, into finished spaces. Owner will coordinate this interruption.

1.8 INCLEMENT WEATHER AND COLD WEATHER WORK

.1 Take precautions during inclement weather and provide adequate protection.

.2 Continue the Work, including winter months, if applicable, until the Work is completed and accepted.

.3 Inclement weather or extra work caused thereby shall not be considered valid reason for additional payment or delay in satisfactory conclusion of the Work.

1.9 OWNER OCCUPANCY

.1 Owner reserves right to occupy and use portions of premises, whether partially or entirely completed, or whether completed on schedule or not, provided such occupancy does not interfere with Contractor's continuing work.

.2 Partial occupancy or installation of equipment by Owner does not imply acceptance of the Work in whole, or in part, nor shall it imply acknowledgment that terms of Contract are fulfilled.

1.10 PLACE OF THE WORK

.1 Confine extent of construction activities to area indicated on Drawings as Place of the Work and/or within area defined by property lines. Confine all equipment, materials, debris, offices, storage sheds and storage areas to area previously defined.

.2 Contractor has complete and exclusive use of Place of the Work for performance of the Work. Assume responsibility for premises assigned, for performance of the Work.

.3 Should Contractor require that boundaries of Place of the Work be temporarily extended, obtain approval of Consultant.

.4 Certain restrictions are specified as to use by Contractor of various portions of Place of the Work. Become familiar with these restrictions and establish work plan to accommodate these restrictions. No claims for extra costs due to such restrictions will be considered by Owner.

.5 Assume responsibility for care, custody and control of property which is assigned for performance of the Work. Assume responsibility for and Make Good damage to existing property attributable to performance of the Work.

1.11 DEMOLITION, SECURITY AND ACCESS

.1 Coordinate demolition times, security requirements and access with Owner.

1.12 SITE DIMENSIONS

.1 Before proceeding with Shop Drawings, fabrication, or supply of each new part of the Work, examine installed parts of the Work and verify as-built site dimensions to coordinate previously built construction with pending construction.

1.13 EXISTING AREAS AND WORK OF OTHER CONTRACTORS

.1 Commencement of parts of the Work, in existing areas and in areas provided by Other Contractors, will be deemed to signify Contractor's acknowledgment and acceptance of those parts of the Work.

.2 Immediately report defects, which affect quality and performance of the Work, in writing to Consultant.

.3 Existing premises will remain occupied during the Work. Execute the Work to cause minimum interference with activities in existing premises and maintain maximum safety to occupants. Take reasonable measures to minimize and control noise, dirt and dust during the Work.

.4 Before entering existing premises to carry out the Work or to obstruct or take out of use any area of existing premises, or to cause any other interference, request meeting with Consultant in order to reach agreement as to time and length of time you may interfere, possess, obstruct or remove from use any such area or services.

.5 Maintain temporary entrances to building(s) including enclosed hoardings as required. Maintain access to existing service entrance(s) at all times, including ready access for fuel oil trucks and delivery vehicles. Bridge excavations with construction to safely support any load that could be imposed or provide personnel to assist in deliveries to building(s) as required.

1.14 SECURITY AND SAFETY REGULATIONS

.1 Execute the Work in accordance with following security requirements and regulations.

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

.3 Ensure only necessary tools and equipment are brought to each work area where access by public is possible. Keep constant check on these items and, at end of each work shift, bring all tools and equipment to storage room as directed.

.4 Perform the Work between hours of 7:30 a.m. and 7:00 p.m., Monday to Friday unless directed otherwise by the Client. Obtain prior written approval to do work on other Days and times.

.5 Owner will provide security escort for the Work in locations it deems necessary.

.6 Owner may issue suitable keys to Contractor, where possible. Contractor shall sign receipt for keys issued and shall be responsible for admittance of its authorized personnel only to areas for which keys provide access. Return keys to Owner immediately upon request.

.7 Direct enquiries regarding security regulations to Owner, who will advise Contractor of any additional requirements.

.8 Maintain fire protection for work. Store paints and volatile substances in a separate and controlled location and inspect frequently. Inspect temporary wiring, drop cords, extension cables for defective insulation or connections frequently. Remove combustible wastes frequently.

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

1.15 TEMPORARY SHUT DOWNS OF CONSTRUCTION OPERATIONS

.1 Contractors and Subcontractors shall be aware at all times that ongoing functions and activities of existing facility will continue. Owner may at any given time request that any work of Contract be temporarily ceased.

.2 Temporary reasonable shut downs and interference are for emergency and/or sensitive health and security reasons and they shall not be construed as cause of elimination or restriction of Contractor's Working Schedule, claims for delay of Work, nor additional costs.

.3 Contract Price shall include and allow for such temporary shut downs.

1.16 NO SMOKING POLICY

.1 Cooperate, respect and comply with Smoke Free Workplace policy requirements of Place of the Work. This policy applies to everyone who visits and works on this Project.

.2 Ensure Contractor's staff, Subcontractors and Suppliers performing work on site on Contractor's behalf are instructed to comply with Smoke Free Workplace policy requirements.

END OF SECTION

PART 1 – GENERAL

1.1 DEFINITION

.1 Comply with GC 4.1 Cash Allowance.

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

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

1.2 AUTHORIZATION

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

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

1.3 CASH ALLOWANCE

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

.2 Supply only allowances shall include:

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

.3 Supply and install allowances shall include:

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

.4 Inspection and testing allowances shall include:

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

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

.6 Include a total of thirty thousand dollars ($30,000.00) not including HST, in the Contract at JD Hodgson Elementary School for the following cash allowances:

.1 Concrete sidewalk

.2 Additional Heater Replacements

END OF SECTION

PART 1 – GENERAL

1.1 DEFINITION

.1 Comply with GC 4.2 Contingency Allowance.

.2 Contingency allowances are designated for additional work and services deemed to be necessary by Owner, from time to time, throughout the execution of the Work.

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

1.2 AUTHORIZATION

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

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

1.3 CONTINGENCY ALLOWANCE

.1 The following contingency allowance amounts are to be carried for the projects (excludes HST):

.1 Cardiff Elementary School Millwork Renovations: $15,000.

.2 JD Hodgson Elementary School Door/ Screen and Millwork Renovations: $25,000

.3 Monck Public School Millwork Renovations: $20,000.

.4 Riverside Public School Millwork Renovations: $25,000.

END OF SECTION

PART 1 – GENERAL

1.1 CONSTRUCTION SCHEDULE

.1 Within 5 days of Contract award, submit in format acceptable to Consultant, minimum four copies of Contractor's critical path construction schedule, using suitable computer scheduling software, such as “MS Project” or “Primavera”.

.2 Schedule proposed by the Contractor shall be based on the following assumptions:

.1 Critical path base line is considered by Contractor as reasonable and achievable.

.2 Schedule is based on resources which have been committed for this project by Contractor and will be readily available when needed.

.3 Schedule is based on normal range of weather conditions, as documented by official weather records.

.4 Float belongs to Project.

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

.4 Schedule shall show:

.1 Commencement and completion dates of Contract.

.2 Commencement and completion dates of construction stages/phases, if any.

.3 Commencement and completion dates of each trade. Major trades shall be further broken down as directed by Consultant; generally follow Specification format.

.4 Order and delivery dates for major or critical equipment.

.5 Critical dates for shop drawing/sample submissions.

.6 Any other information relating to orderly progress of Contract, considered by Contractor or Consultant to be pertinent.

.5 Submit copy of schedule showing actual progress, to Consultant once a month, concurrently with application for payment. Consultant, together with Contractor, shall review construction progress once a month during or immediately following regular site meeting, or more often as directed by Consultant.

.6 Update construction schedule, whenever changes occur, in manner and at times acceptable to Consultant. Include with each update a written report of activity progress reflected in the revised critical path schedule, and the corrective actions which have been or are to be taken to maintain progress on the schedule in the future, anticipated delay, resource availability, schedule changes, and work to be completed in the next 2 month period.

.7 Plot actual construction progress on schedule at least once a week.

1.2 CASH FLOW CHART

.1 Within 5 days after award of Contract, submit, in form approved by Consultant, cash flow chart broken down on a monthly basis in an approved manner. Cash flow chart shall indicate anticipated Contractor's monthly progress billings from commencement of work until completion.

.2 Update cash flow chart whenever changes occur to scheduling and in manner and at times satisfactory to the Consultant.

1.3 PROGRESS RECORD

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

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

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

1.4 AS-BUILT DRAWINGS

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

.2 Note clearly, neatly, accurately and promptly as the work progresses location of services, piping, conduits, ductwork embedded in concrete/masonry and location and depth of underground services below building.

.3 As-built drawings shall be available for review at each site meeting.

.4 Refer to Section 01 77 00 for requirements on submission of as-built drawings.

1.5 PRODUCT DELIVERY CONTROL

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

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

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

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

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

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

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL

.1 Unless specified or directed otherwise, make all submissions to the Consultant at his office.

.2 Make all submissions required by the Contract Documents with reasonable promptness and in orderly sequence so as to cause no delay in the work.

.3 Arrange and pay for delivery to and return from Consultant of all submittals.

1.2 RELATED REQUIREMENTS

.1 Make the following submissions in accordance with requirements specified elsewhere:

.1	Applications for payment:	General Conditions of the Contract
.2	WSIB certificates of clearance:	General Conditions of the Contract
.3	Insurance certificates:	General Conditions of the Contract
.4	Bonds:	General Conditions of the Contract
.5	Construction schedule:	Section 01 32 00
.6	Cash flow chart:	Section 01 32 00
.7	Maintenance and operations data:	Section 01 77 00
.8	As-built drawings:	Section 01 77 00
.9	Maintenance materials:	Section 01 77 00

1.3 SCHEDULE OF VALUES

.1 Submit schedule of values in accordance with requirements of GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT.

.2 Follow specifications table of contents as basis for degree of breakdown required. Show breakdown for different construction phases/stages if required by Consultant.

.3 Break down cost for large items of work as directed by Consultant.

.4 Provide additional cost breakdown information if requested by Consultant.

1.4 SCHEDULE OF SUBMITTALS

.1 Within 10 days of submission of construction schedule submit a schedule of submittals for shop drawings, samples, lists of materials and other documentation requiring Consultant's review.

.2 For each item requiring submission and review show anticipated date of submission and critical date for return of reviewed submission.

.3 Design sequence of submissions to reflect requirements of construction schedule.

.4 Allow up to 10 days for Consultant's review for each submission. Stagger submissions as much as possible to permit adequate review time for each item submitted. If several submissions are made

at the same time or within a short time of each other, indicate order of priority in which submissions should be reviewed.

.5 Include sufficient time to permit corrections and resubmission, if necessary, without affecting construction schedule.

1.5 PRODUCT DATA

.1 Submit product data sheets, required by Contract Documents, and others as may be reasonably required by Consultant.

.2 Submit product data sheets in digital or printed hardcopy form and in accordance with the following requirements:

.1 Show detailed comprehensive information on products to be used.

.2 Clearly identify product/model number on data sheets containing multiple products.

.3 Supplement manufacturers/distributor's standard schematics, diagrams, brochures data sheets, catalogue sheers, charts and other descriptive data as required to give a clear understanding of the properties of the product and how product is to be incorporated into project.

1.6 SHOP DRAWINGS

.1 Submit shop drawings required by Contract Documents, in accordance with requirements of GC 3.11 SHOP DRAWINGS.

.2 Prepare shop drawings in metric measurements only. Shop drawings containing imperial measurements will be rejected.

.3 Provide shop drawings bearing seal and signature of professional engineer licensed to practice in Ontario where required. Shop drawings submitted without required seal and signature will be rejected and returned to Contractor without review.

.4 Contractor to set up an online account (dropbox or similar) and upload a digital copy for each shop drawing required. Email notification of the upload to be sent to all applicable consultants.

.5 After review, Consultant will return the marked up digital copy to the Contractor. Contractor shall be responsible for the distribution of reviewed shop drawings as required.

.6 Shop drawings which require the approval of a legally constituted authority having jurisdiction shall be submitted by Contractor to such authority for approval. Such shop drawings shall receive final approval of authority having jurisdiction before Consultant's final review.

.7 No work requiring a shop drawing submission shall be commenced until the submission has received Consultant's final review. Do not use any shop drawing, erection drawing or setting drawing which does not bear the stamp and signature of the Consultant.

.8 The Consultant's review is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and this review shall not relieve the Contractor of his responsibility for meeting the requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all subtrades.

1.7 SAMPLES AND MOCK UPS

.1 Submit samples and provide mock ups as required by Contract Documents and as directed by the Consultant.

.2 Unless indicated otherwise submit samples in duplicate.

.3 Where colour selection is required submit manufacturer's full colour range for specified product line.

.4 Submit samples with identifying labels bearing material or component description, manufacturer`s name and brand name, Contractor's name, project name, location in which material or component is to be used, and date.

.5 Prepay any shipping charges involved for delivering samples to destination point and returning to point of origin if required.

.6 No work requiring a sample submission shall be commenced until the submission has received Consultant's final review.

1.8 REQUESTS FOR INFORMATION (RFI'S)

.1 Submit RFI's only after a thorough review has determined that the required information is not included in the Contract Documents.

.2 Submit RFI's in a timely manner so as not to cause any delay and leaving sufficient review time for the Consultant.

.3 The Consultant will identify each RFI with the time and date received and assign an anticipated review time of one to five working days depending on the complexity of the matter under review, applied consecutively.

.4 The Consultant will review RFI's in the order received, unless, upon Contractor's request, the Consultant agrees to prioritize the review of a particular RFI, adjusting the review time accordingly.

.5 The consultant will advise the Contractor within the assigned review time with one of the following responses:

.1 Information requested is included in the Contract Documents.

.2 A site instruction will be issued.

.3 A change notice will be issued.

.4 A change directive will be issued.

1.9 CHANGES IN THE WORK

.1 When a change in the Work is proposed or required, the Consultant will provide the Contractor with a written description of the proposed change in the Work. The Contractor shall promptly present, in a form acceptable to the Consultant, an amount of adjustment for the Contract Price, if any, and the adjustment in the contract time, if any, for the proposed change in the Work.

.2 Allowance for overhead and profit shall be as per the CCDC and as per the Trillium Lakelands District School Board's Supplementary Conditions.

.3 The costs for the following items shall be considered to be included in the allowance for overhead and profit and may not be charged separately.

.1 Contractor's head office expenses, including estimating and accounting services.

.2 Wages of project managers, superintendents, assistants, watchpersons and administrative personnel.

.3 Temporary site office including costs for telephone, facsimile machine and internet equipment.

.4 Small tools.

.5 Insurance and bonding premiums.

.6 Construction safety program.

.7 Shop, record drawings and interference drawings.

.8 Clean up and disposal of waste materials.

1.10 ELECTRONIC DOCUMENT FILES

.1 Apply and pay for electronic documents in accordance with "Electronic Document Transfer Request" form, attached to this Section.

END OF SECTION

LENNOX ARCHITECTS LIMITED
24 MORGAN HEIGHTS DRIVE
HUNTSVILLE, ON, P1H 1B7
T 705 789 8960
Wwww.lennoxarchitects.com

Electronic Document Transfer Request
All Disciplines

Project Name:	
Project No.:	
Date:	
Company requesting files:	
Person requesting files:	
Intended use of files	
Description of files:	

1. The requested electronic file(s) (the "Files") remain the property of the applicable consultant (Lennox Architects Limited, Lea Consulting and HL Engineering) including all copyright therein.
2. There is no warranty expressed or implied, that the intended use of the Files will meet the business purpose of the Company receiving the Files or that the Files represent or reflect the complete scope of work.
3. Company receiving the Files shall indemnify and hold the consultant harmless from any claims or damages arising from the use of the Files in the execution of the work.
4. In the event that drawing files transferred contain consultant title block, permits or professional seals, the Files shall be immediately returned to consultant and all copies thereof destroyed.
5. The Company receiving the Files is not permitted to alter or revise the Files, including the drawings or the scope of work, unless authorized in writing by the consultant.
6. No use shall be made of the Files for any purpose other than the one stated above, without the written consent of the consultant.
7. No retransmission of the Files, or parts thereof, in any form to any third party is permitted unless authorized in writing by the consultant.
8. Any data contained in the Files, including the internal file structure, etc., is the property of the consultant. and shall be kept confidential by the recipient.
9. The Undersigned agrees to pay the consultant a fee of **$500 per discipline set** (plus HST). The fees noted are to cover the cost of preparation of the Files. By paying the fee quoted, the Company receiving the Files has in no way acquired any rights to the Files or the drawings or the information contained therein.

Having read and understood the above, the undersigned agrees to be bound by the terms hereof.

_____ _____

Signature of Company's Authorized Representative Date

The above requested files will only be released upon receipt by Lennox Architects Limited of an **original of this form** signed by a duly authorized representative of the company requesting the files along with the **cheque payable to the applicable consultant** in the amount consistent with note 9 above. The consultants reserves the right to deny any request for copies of electronic files.

PART 1 – GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Requirements for protection of existing facilities during construction operations.

.2 Demolition and removals of building elements.

.3 Progress photos documentation procedures.

.4 Products and installation for patching and extending Work within construction areas of existing facilities.

.5 Providing transitions and adjustments.

.6 Repair of damaged surfaces and finishes.

.7 Encountering Hazardous materials procedures.

1.2 QUALITY ASSURANCE

.1 Conform to Ontario Building Code, Ontario Occupational Health and Safety Act and all other Standards and Regulations noted.

.2 All work performed and materials used shall be of the same standard of quality as that of the existing finished building as a minimum level of acceptance.

.3 Any welding shall be performed by Welders certified in accordance with CSA W47, and shall conform to CSA W59.

1.3 OCCUPANCY, ACCESS AND PROTECTION

.1 Entire existing facility will be occupied and in full operation during execution of this Work.

.2 Coordinate with the Owner in scheduling access and storage space to minimize conflict and to permit continuous usage and operation of the occupied areas.

.3 When necessary to perform the Work, the Owner will issue keys to existing mechanical/electrical equipment spaces. Contractor to return the keys at the end of the warranty period.

.4 Contractor to exercise every precaution to ensure safety and protection for existing facilities, occupants, merchandise, pedestrians and vehicles. The following must meet required codes and accessibility requirements:

.1 Maintain safe access and egress at all times for occupants, pedestrians and vehicles.

.2 Provide protection to prevent damage to facilities, merchandise, and vehicles from dust, water, weather and other similar harmful elements.

.3 Maintain exiting from facilities to provide safe passage complying with applicable codes.

1.4 SCHEDULING OF WORK

.1 Make arrangements with the Owner and schedule the Work to avoid interference with normal operations of occupied areas. Submit a schedule and summary of applicable Work within occupied areas and obtain Owner approval not less than two days prior to commencement of such Work.

.2 Requests for use of certain existing loading docks, passage ways and other similar spaces within areas outside limits of construction operations will be limited to day-by-day basis and must be approved in advance by the Owner.

.3 Coordinate access with scheduling of Work within tenant areas with the Owner.

1.5 UTILITY SERVICE OUTAGES

.1 Contractor to keep utility and service outages to a minimum and perform only after written approval of the Owner is received.

.2 Make requests to the Owner for outages a minimum of two (2) calendar days in advance of the proposed outage.

.3 Contractor is responsible for investigating utility and service lines to determine the effect of a scheduled outage on building operations outside of the limit of the Work.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Use products of types and construction that exist currently as needed to patch, extend or match existing Work.

.1 Contract documents do not define products or standards of workmanship present in the existing construction.

.2 Determine by inspecting and testing products where necessary, referring to existing work as the quality standard.

.2 New Materials to comply with Specifications for each product involved.

.3 When material is not readily obtainable on the current market, salvaged sufficient quantities of cut or removed material to replace damaged Work of existing construction. Store salvaged material in a dry, secure space on site until reinstallation.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify existing conditions to determine that all areas meet constructability and are ready for alteration and remodeling as per the contract documents.

.2 Contractor shall notify the Consultant of any discrepancies prior to commencing the Work.

3.2 PREPARATION

.1 Construct temporary fire-rated partitions to separate existing occupied areas from construction and alteration areas.

.2 Cut, move or remove items as necessary for access to alteration and renovation Work.

.3 Cutting and removal work shall be performed so as not to cut or remove more than is necessary and in a manner to avoid damage to adjacent work. Cut finish surfaces such as masonry, tile, pilaster or metals by methods to terminate surfaces in a straight line at a natural point of division.

.4 Prepare surfaces and remove surface finishes as necessary to provide for proper installation of new material and finishes.

.5 Close openings in exterior surfaces to protect the existing building from weather, temperature and humidity variations. Insulate ductwork and piping to prevent condensation in exposed areas.

.6 Provide temporary barriers and closures to control operations to prevent spread of dust to occupied sections of the building.

3.3 PROGRESS PHOTOGRAPHIC DOCUMENTATION

.1 Contractor to provide to the Consultant a daily photographic documentation report for the progress of windows, framed entrances and storefront work at the following key stages:

.1 Removal of existing screens, doors and windows;

.2 Removal of vapour barrier and insulation;

.3 Installation of insulation;

.4 Installation of blue skin.

.2 Contactor's photographs are to be clear and of a scale that allows viewing of the specific conditions.

.3 Contractor to identify any unforeseen existing conditions discovered during the four stages of documentation when the photos are emailed to the Consultant.

.4 Contractor to provide a floor plan is to accompany the photos to identify the room name and day work completed.

3.4 HAZARDOUS MATERIALS PROCEDURES

.1 Refer to the Asbestos Survey in Section 00 31 19 for the anticipated existing condition details.

.2 If materials are encountered that are suspected to be lead, PCB, asbestos, contain asbestos or any other hazardous material, the Contractor shall immediately notify the Owner and take precautions as required to avoid disturbing materials until directed by the Owner.

.3 When removing asbestos or silica board fireproofing comply strictly with health and safety regulations. Bag material and dispose of in accordance with regulations. Enforce use of breathing masks during cleaning operations.

3.5 INSTALLATION

.1 Carefully perform demolition and removals in such a manner to insure safety in handling and to prevent damage to construction and materials indicated to remain. Provide shoring, bracing and other temporary measures as required to maintain safe conditions.

.2 Protection and prepare existing millwork identified to be turned over to the Owner as identified on the drawings.

.3 Remove, cut and patch Work in a manner to minimize damage and to provide means of restoring products and finishes to specified conditions.

.4 Install products as specified in individual Specification Sections.

.5 Where new Work abuts or aligns with existing, perform smooth and even transition to match existing adjacent surfaces in texture and appearance.

.6 When finished surfaces are cut so that a smooth transition with the new Work is not possible, terminate existing surface along a straight line and request instructions from the Consultant as to methods of making the transition.

.7 Where there is an extreme level change (>50mm), obtain instructions from the Consultant for transition methods ie. Installation of bulkheads, ramping, sloping etc.

.8 Remove debris promptly from site each day in a safe and legal matter. Do not burn debris on site or allow it to enter the sewers.

.9 If applicable, TLDSB will remove window roller shades and curtains. Contractor to maintain existing mounting rods, where possible.

3.6 ADJUSTMENTS

.1 Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls and ceilings to provide smooth surface without breaks, steps or soffits.

.2 Patch or replace portions of existing surfaces which are damaged, lifted, discoloured or showing other imperfections.

.3 If the surrounding surface cannot be matched, repaint or recoat the entire surface.

.4 Trim existing doors as necessary to allow swing clearances for new floor finishes.

.5 Where the existing ceiling finish is scheduled for removal, include existing suspension system in suspended ceiling systems, existing gypsum backer boards in adhesive-applied acoustical tile installation, and all other ceiling system components as applicable.

.6 Restore existing work that is damaged during construction to a condition equal to its condition at the time of the start of the Work.

.7 If any repair work is not equal to the standard of the new Work, the Contractor will be required to cut out and replace with new Work at no additional cost to the Owner.

3.6 CLEANING

.1 At the end of each day, any spillage, overspray, dust, debris or damage to adjacent Owner occupied spaces shall be cleaned.

.2 As soon as installation of the Work in each area is complete, clean up all surfaces, remove equipment, salvage debris and return in a condition suitable for use by the Owner.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL INSTRUCTIONS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 REFERENCE STANDARD

.1 Comply with provisions of OAA, OGCA Document No. 100, revised January 8, 2019 "Take-Over Procedures" except as modified in these Specifications.

1.3 CLOSEOUT PROCEDURES

.1 Final Site Review: Consultant will perform final inspection in accordance with provisions under final Certificate for Payment. Conform to Construction Lien Act for commencement, procedure and release of hold back fund. Lien Period commencement, procedure and release of hold back monies will be in accordance with Construction Lien Act.

.2 Takeover Procedure: Conform to requirements of following General Conditions of Contract for take-over procedure:

.1 Comply also with recommended takeover procedures contained in OAA/OGCA Document No. 100, except as modified by Contract Documents. In case of conflict with Contract Documents conform to more stringent requirements. Procedure described in document consists of following stages:

.1	Stage 1	Contract Submissions
.2	Stage 2	Contractor's Inspection for Substantial Performance
.3	Stage 3	Contractor's Application for Certificate of Substantial Performance
.4	Stage 4	Certificate of Substantial Performance
.5	Stage 5	Certificate for Payment of Basic Statutory Holdback Monies
.6	Stage 6	Contractor’s Completion of the Contract
.7	Stage 7	Certificate for Payment of Monies for Finishing Holdback
.8	Stage 8	Final Payment Certificate
.9	Stage 9	Warranty-Guarantee Period(s)

.2 All stages will be reviewed at first Coordination Site Meeting to ensure all parties understand their responsibilities.

.3 Substantial Performance Review: Provide a written request to Consultant for Substantial Performance review of Work. Such request shall be completed on the form provided at the end of this document which includes a reconciliation of compliance with money test given in Clause 2 (1) (b) of Construction Lien Act in addition to all documentation specified in Contract Documents.

.4 Certification of Substantial Performance: Prepare Certificate of Substantial Performance in a form required by Construction Lien Act. When issued attach a normal progress Certificate showing statement of account to date and sub-titled "SUBSTANTIAL PERFORMANCE". Wherever practicable, accompany it with Final Change Order, sub-titled "FINAL". Consolidate all expenditures from cash allowances.

.5 Defect and Deficiency:

.1 A defect is an item of Work required by Contract which has been installed but requires repair and/or replacement at a specific time.

.2 A deficiency is an item of Work required by Contract which has not been installed or put into operating condition.

.3 A warranty item is an item of Work, installed under Contract which manufacturer or installer agrees to maintain in, or restore to perfect condition for a specific period of time, after Owner's acceptance of Work as being substantially completed.

.4 When, in Consultant's opinion, Work under Contract is substantially complete and prior to final inspection by Owner, a preliminary inspection shall be made at which time all defects and deficiencies shall be listed, taking care to distinguish between preliminary and final inspections.

.6 Deficiency Inspection:

.1 Provide a written request to Consultant for deficiency inspection of Work. Ensure such request includes a statement by Contractor that Work to be reviewed by Consultant for deficiencies is, to best of his knowledge, in compliance with Contract Documents, reviewed Shop Drawings, samples and previously instructed corrections by Consultant have been corrected.

.2 Provide a schedule of planned deficiency inspections having regard to foregoing.

.7 Deficiency Lists:

.1 Neither Owner's representatives, nor Consultant will be responsible for issue of extensive lists of deficiencies. Contractor assumes prime responsibility for ensuring items shown on Drawings and described in Specifications are completely his. Any inspections to approve Certificates of Substantial Performance will be immediately canceled if it becomes obvious that extensive deficiencies are outstanding.

.2 Promptly correct deficiencies noted by Consultant. Do not proceed with installation of subsequent parts of Work until deficiencies have been corrected. Every effort shall be made to ensure both defects and deficiencies are Made Good prior to final inspection.

.3 During inspection, a decision will be made as to which elements must be completed at a later date due to uncontrollable circumstances such as weather, which defects must be rectified before building can be accepted and which defects are to be treated as warranty items.

.4 Make Good deficiencies before Contract is considered complete.

.8 Notification of Correction of Deficiencies: Advise Consultant in writing, upon completion of rectification of deficiencies noted by Consultant. Failure to provide such notification may be cause to withhold final payment.

.9 Documents:

.1 Within 21 Days of commencement of Work, Contractor shall make first submittal required by OAA/OGCA Document No. 100.

.2 Submit documents in accordance with requirements of Contract Documents.

.3 Submit required documents along with request for Certificate of Substantial Performance. Consultant's inspection for Substantial Performance is not required until such submittal is received.

.10 Final Inspection for Final Payment:

.1 Further to requirements of GC 5.4, final review of Work shall constitute inspection precedent to issuance of final certificate of payment.

.2 If there are any further deficiencies determined by this review, they shall be listed by Consultant and provided to Contractor. This list shall be recognized as final deficiency list for purposes of acceptance of Work under Contract.

.3 Such deficiencies shall be corrected by a date mutually agreed upon between Consultant and Contractor, unless a specific date is required by Contract and a re-inspection by Consultant shall be called for by Contractor following his own inspection to take place within 7 Days from date of request.

.4 Contractor shall thereafter submit his invoice for final payment.

.11 End of Warranty Period Inspection:

.1 At beginning of 12th month after Substantial Performance of Contract in accordance with GC12.3, Owner, Contractor and Consultant, along with key Subcontractors as designated by Consultant, carry out a complete inspection of building and its systems to determine which deficiencies are to be rectified under warranty.

.2 Prior to completion of warranty period, arrange with Consultant to carry out complete review of defects and deficiencies which have been observed during warranty period to determine which are to be corrected.

1.4 CLOSEOUT SUBMITTALS

.1 Certificate of Substantial Performance:

.1 Conform to Construction Lien Act and publish copy of Certificate of Substantial Performance once in a construction trade newspaper.

.2 Submit promptly copies of construction trade newspaper containing publication of copy of Certificate of Substantial Performance.

.2 Product Record Documents:

.1 Print one set of white prints of Contract Drawings at commencement of Work and maintain on site. Ensure all addendums are printed on coloured paper and pasted into the on the site copies.

.2 As Work progresses, clearly mark in a neat and legible form on Specifications and white prints significant changes and deviations from Contract Drawings and Specifications caused by site conditions, Additional Instructions and Change Orders. Changes and deviations marked on as-built record drawings and Specifications by reference to and other documents are not acceptable.

.3 Have items relating to mechanical and electrical work recorded by respective trade.

.4 Print lettering and numbers in size to match original. Lines may be drawn free hand provided they are neat and accurate. Add "AS-BUILT RECORD" at each drawing title block and on title page of Specifications.

.5 Record the following changes and deviations on record drawings:

.1 Depths of various elements of foundation in relationship to first floor level.

.2 Field changes of dimensions and/or materials.

.3 Issued site instructions and change orders.

.4 Other significant deviations and changes which are concealed in construction and cannot be identified by visual inspection.

.5 Access doors and panels.

.6 Inverts of services at key points within building, at points where entering and leaving building, and at property lines. Dimension services in relation to structure and building grid lines.

.7 Duct work, piping, conduit, mechanical and electrical equipment and associated work.

.8 Concealed piping, conduit, equipment and conveying systems, including such items provided for future use.

.6 Record following information on record Specifications:

.1 Products, materials and other items selected from those specified.

.2 Approved substitutions and accepted alternatives.

.3 Other approved changes and deviations to items specified.

.7 Have record drawing white prints and Specifications available for inspection at all times.

.8 10 Days prior to date of Substantial Performance; Submit redlined “record drawings” in digital PDF format for consultants review.

.3 Maintenance Instructions and Data Book: Provide Consultant with a digital copy of operating and maintenance instructions and data books for review, 10 Days prior to advising Consultant that Work is substantially performed which include:

.1 Table of Contents.

.2 Complete listing of Subcontractors' names, addresses and telephone numbers with notation as to which portions of Contract have been provided by them.

.3 Complete listing of materials, Products and equipment including serial numbers, manufacturer's names and sources of supply.

.4 Description of each system, with description of each major component of systems.

.5 Operation and installation instructions for each assembly, component and system.

.6 Complete cleaning and maintenance instructions for each finish, assembly, component and system, including warnings of harmful practices.

.7 Lists of spare parts for each assembly, component and system complete with names, addresses and telephone numbers of Suppliers.

.8 Operating curves of mechanical and electrical equipment.

.9 A lubrication schedule of all equipment.

.10 Page-size Valve Tag Schedule and Flow Diagrams.

.11 Water treatment procedures and tests.

.12 Final balancing reports for mechanical systems.

.13 Installation manual or installation instructions for each mechanical, electrical or architectural item, stamped and signed by Subcontractors submitting them.

.14 Record drawings of mechanical, electrical and special installations.

.15 Final reviewed Shop Drawings.

.16 Copies of all warranties, properly executed.

.17 Organize and label contents into applicable categories of work, parallel to Specification Sections and provide a Table of Contents.

.18 Use consistent terminology in books.

.19 Submit maintenance and operation instructions which are manufacturer's latest published editions at date of submission.

.20 Should any finish, Product or assembly be injured or damaged by faulty maintenance materials, practices not warned against in maintenance manual or by failure to provide proper maintenance manuals in time, rectify such damage or injury at no additional cost to Owner.

.21 Once consultants have approved the digital copy of the manual, provide 2 hard copy books consisting of 3-ring hard cover loose-leaf binders, indexed as to contents and identified on binding edges as "Maintenance Instructions and Data Book, for (Project name)". Ensure binders contain name of Contractor and date of Substantial Performance of the Work.

.4 Distribution System Diagrams: Prior to date of Substantial Performance, submit framed single line diagrams of electrical distribution systems.

1.5 DEMONSTRATIONS FOR OWNER'S PERSONNEL

.1 Provide qualified technicians to demonstrate operation and/or maintenance of systems to Owner's staff.

1.6 PRODUCT WARRANTIES

.1 Examine all Sections of the Specifications to ensure inclusion of Warranties specified.

.2 In addition to requirements of the General Conditions, Article "GC 12.3 WARRANTY", Contractor shall note extended warranty periods required by Contract Documents for certain Products, systems and assemblies as specified under their respective Sections.

.3 Spare Parts:

.1 Supply extra maintenance materials and/or spare parts and store in a locked room as directed by Owner.

.2 Suitably package maintenance materials in accordance with manufacturer's instructions and label to identify Product type, manufacturer, Product name, colour number, dye lot and quantity.

.3 Store maintenance materials, e.g., positioning, proper side up, etc., in accordance with manufacturer's recommendations.

END OF SECTION

Application for Certificate of Substantial Performance
(To be submitted on Contractor's Letterhead)

Date: _____

To: Lennox Architects Limited

Project: _____

We the undersigned state that the Contract dated _____ between ourselves and the Owner _____ is substantially performed and the performance of the balance of the Contract is in process. The total performance is scheduled for the _____ day of _____ 20_____

We further state that the amount of holdback monies due for the release and payment following the issue of the Certificate of Substantial Performance is

_____ and /100 Dollars

($_____)

We further state that the Status of Contract is as follows:

1.	Original Contract Amount	$ _____
2.	Authorized Changes:	
	Extras	$ _____
	Credits	$ _____
	Net Amount of Changes	**$** _____
3.	Current Contract Amount	$ _____
4.	Less value of incomplete work beyond this Contractor's Control (See attached Appendix for list of items with Costs and dates of completion for each item).	$ _____
	Total Contract Value for purposes of the Construction Lien Act.	$ _____
5.	The requirements for substantial performance as per the Construction Lien Act:	
6.	3% of the first $500,000.00	$ _____
	2% of the next $500,000.00	$ _____
	1% of the balance of item 5 above	$ _____
	Total	**$** _____

Application for Certificate of Substantial Performance (Cont'd)

7. The estimated value of uncompleted work including deficiencies but not including items in 4 above (see attached Appendix for list of items with amounts and dates of completion for each item).

Total $ _____

8. We enclose herewith one copy of List A of the required documentation together with all of the documentation outlined thereon.

We are presently assembling the documentation required by List B which we will submit to the Architect immediately on receipt of the Architect's Certificate of Substantial Performance. We recognize that unless this documentation is submitted prior to the date for release of holdback money, the Architect will recommend to the Owner that the holdback payment be withheld until all documentation is provided.

Please signify your acceptance and correctness of the above and return one copy to our office.

Contractor: _____

Per: _____

Date of Submission: _____

Accepted By:
Lennox Architects Limited

Per: _____

Date of Acceptance: _____

Application for Certificate of Substantial Performance (Cont'd)

List A

1. Operating Instructions
2. Maintenance Manuals
3. Record Drawings
4. Spare Parts
5. Spare Materials
6. Certified Site Plan

List B

1. Statutory Declaration from Contractor
2. Worker's Compensation Board letter of good standing from Contractor
3. Warranty from Contractor
4. Extended warranties as specified
5. Occupancy Certificate
6. Finalized list of all subcontractors and suppliers of material who performed work or supplied material to the project

Less Incomplete work <u>beyond</u> contractor's control

XXXXXXX	$ _____
XXXXXXX	$ _____
XXXXXXX	$ _____
XXXXXXX	$ _____
XXXXXXX	$ _____
Remain Allowance	$ _____
Remain Contingency	$ _____
Total	**$** _____

List of Balance to complete deficiencies (not including above items)

XXXXXXX	$ _____
XXXXXXX	$ _____
XXXXXXX	$ _____
Total	**$** _____

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Masonry units including, but not limited to, the following:

.1 Concrete block masonry;

.2 Reinforced concrete block masonry;

.3 Block lintels and other special units;

.4 Masonry mortar;

.5 Masonry reinforcing;

.6 Anchor and tie systems;

.7 Reinforcing steel bars and concrete fill to block lintels;

.8 Expansion joints and joint flashings;

.9 Control joints and preformed joint filler;

.10 Concrete fill for reinforced masonry;

.11 Installation of loose steel lintels;

.12 Supply and installation of anchor bolts for securing wood coping atop masonry.

.13 Building recesses to receive work of this contract ie. Washroom accessories, fire extinguisher cabinets, drinking fountains, force flow heaters and other work as shown or specified;

.14 Cleaning Masonry.

1.3 RELATED SECTIONS

.1 Section 01 35 16- Alteration Procedures;

.2 Section 05 55 00 – Metal Fabrications;

.3 Section 07 84 00 – Firestopping and Smoke Seals

.4 Section 07 92 00 - Sealants, except where specifically stated otherwise herein;

.5 Section 08 11 13 – Steel Doors and Frames

.6 Section 08 41 13 – Aluminum Framed Entrances

.7 Sleeves for mechanical and electrical works penetrating masonry walls or partitions.

1.4 WORK INSTALLED BUT SUPPLIED BY OTHERS

.1 Build into masonry elements inserts, anchors, bolts, sleeves and other items supplied by other Sections and which are required for installation and performance of work of other Sections.

.2 Install loose steel lintels required for support of masonry elements.

.3 Install steel door frames and access doors occurring in masonry elements.

.4 Install reinforcing steel and concrete fill into block lintels and reinforcing steel grouted into masonry walls as shown on the structural drawings.

1.5 QUALITY ASSURANCE

.1 Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers. Membership in good standing in OMCA.

.2 Meet requirements of CSA A370-14, CSA A371-14 and CSA S304-14.

.3 Masonry units used in partitions/walls designated to provide a fire separation shall be of thickness and material required to achieve required rating. Hollow masonry units used in fire separation shall have the necessary percentage of solid material to meet required rating. Concrete block used in fire separation shall be suitably identified to permit verification of fire resistance rating.

1.6 SUBMITTALS

.1 Prior to start of work submit product data and duplicate samples of all masonry accessories including horizontal reinforcement and masonry anchors.

.2 Submit drawings showing location of control joints.

.3 Mock- Ups:

.1 Construct sample panel of interior concrete block partition, including wall corner and door opening, approximately 3 m long x full height.

.2 Locate panels where directed by Consultant.

.3 Do not begin masonry work until panels are approved by Consultant. Approved panel shall represent minimum standard of quality for project masonry

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver and handle masonry units so as to prevent soiling and chipping.

.2 Store masonry units above and off ground on level platforms which permit air circulation under stacks.

.3 During storage, protect masonry units against moisture absorption, damage and staining.

.4 Do not store or locate materials, plant and equipment in areas which will obstruct access to work by others.

1.8 PROTECTION

.1 When work is not in progress, cover tops of completed masonry elements exposed to weather with non-staining weatherproof covers. Covers shall be at least 600 mm wider than masonry elements and shall be well secured against displacement.

.2 Protect finished work at corners, sills, projections and other areas likely to be damaged, with suitable coverings until completion of building.

.3 Adequately brace masonry walls and partitions to resist effects of wind and other lateral forces.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Provide uniformly distributed and continuous heating. Prevent stratification and cold spots.

.2 When outside temperature is below or likely to go below 5 degrees C provide heat to maintain temperature of materials and surrounding air at 5 degrees C or better during laying and for 72 hours thereafter. Submit for approval the proposed method of protecting masonry against low temperatures. Salamanders will not be permitted.

.3 Keep units completely free from ice and frost. Preheat mortar materials and mortar boards. Temperature of mortar to be between 21 degrees C and 48 degrees C. Protect mortar from frost. Do not use admixtures or antifreezes in mortar.

.4 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.

.5 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Performance: Design exterior envelope cavity walls based on Rain Screen Principle advocated by NRCC and provide for drainage of water entering envelope cavity wall system. Provide for compartments in long cavity wall and at corners to achieve appropriate pressure equalization in exterior envelope cavity wall design.

.2 Provide only stainless steel reinforcement for exterior envelope walls.

.3 Concrete Masonry Units:

.1 To requirements of CSA A165 Series-14:

.1 Standard weight: H/15/A/M and S/15/A/M.

.2 Lightweight: H/15/C/M and S/15/C/M .

.2 Acceptable manufacturers for block: Permacon, Simcoe Block, Boehmers, Richvale York , Day & Campbell or or other source approved by the Consultant.

.3 Units must be cured for at least 28 days before delivery and shall have a moisture content of not more than 30% of total absorption.

.4 Exposed concrete block units shall be uniform in size, free of perceptible warp or twist, without chipped, ragged or broken edges; have a uniform surface texture, free of cracks, blemishes or defects detrimental to appearance or performance.

.5 Where indicated provide solid and semi-solid (solid top) units.

.6 Provide manufacturer's catalogued special units such as bullnose, corner, end, lintel block and others as indicated.

.7 Where incorporated into existing block work provide masonry units matching existing block work.

.4 Metal Reinforcement and Anchors:

.1 Material: high tensile strength steel wire meeting ASTM A82, by Blok-Lok or Dur-O-Wall.

.2 Finish: hot dip galvanized after fabrication to ASTM A153, Class B.

.3 Horizontal reinforcement for interior walls and partitions: truss type with minimum 3.66 mm thick side and cross rods unless otherwise indicated; width 50 mm less than wall thickness; mill galvanized: BLOK-TRUS BL30.

.5 Anchors and Ties:

.1 Non-bearing walls and partitions to bearing walls: corrugated wall ties minimum 0.7 mm thick, 21 x 175 mm BLOK-LOK BLT7A.

.2 Masonry to concrete: Flexible wire tie, 4.76 mm thick, length to suit wall condition, and dovetail anchor slot: BLOK-LOK BLT8.

.3 Masonry to structural steel: Flexible, triangular 4.76 mm ties and weld-on column anchor straps: FLEX-O-LOK BLT9.

.6 Lateral Supports and Ties:

.1 Prime coated steel angles 75 mm x 75 mm x 200 mm long x 6 mm thick.

.2 Steel: CAN/CSA-G40.21-04, Grade 300W.

.3 Primer: CAN/CGSB-1.40-97.

.4 Fasteners: Expansion type concrete anchors, two per angle.

.5 Reinforcing bar positioners: Dur-O-Wal 1A 810.

.7 Premoulded Joint Filler: Non-fire rated locations: Type 704 fibreglass board by Owens Corning or Rockboard 40 by Roxul.

.8 Concrete block lintels:

.1 Reinforcing steel: CSA G30.18-09 (R2014).

.2 Cast-in-place concrete: CSA A23.1-14.

.9 Control Joint Filler: Emseal 25V Expanding Foam Sealant.

.10 Mortar:

.1 Water: potable and non-staining.

.2 Sand: CSA A82-56-M1976.

.3 Portland cement: CAN3-A5-03, Type 10.

.4 Masonry cement: CAN3-A8-03, Type H.

.5 Lime: ASTM C207, Type S.

.6 Colour pigment: Iron Oxide Pigment Harcros 'F' Series (4 lb - 6% loading) by Elementis (416-251-1161) or type recommended by mortar manufacturer. Colours selected by Consultant.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Lay masonry work in uniform manner. No one portion of any section of work shall rise more than 750 mm above general level. Do not lay more than 1500 mm in height of any wall in any working day.

.2 Unless otherwise noted on Drawings, all walls and partitions shall extend to the underside of the structural deck.

.3 Cut exposed masonry units with power driven table model masonry saw only. Ragged or chipped edges will not be permitted.

.4 Consult with other Sections to avoid cutting and patching. Co-operate in setting and aligning built-in items. Build in conduit and piping so that they are not exposed. Do not break masonry bond to accommodate concealed built-in items.

.5 Grout solid with mortar all spaces around built-in items.

.6 Build in metal nailing plugs, grounds, inserts, anchor bolts, bearing plates, loose and miscellaneous items of steel and iron, isolated beams, lintels and shelf angles, sleeves, blocking and items furnished by other Sections.

.7 Do not shift or tap masonry units after mortar has taken its initial set.

.8 At masonry openings less than 450 mm wide, unless otherwise detailed, use mild steel plates, minimum 6 mm thick, of width 25 mm less than supported masonry thickness and with minimum 100 mm end bearing each side.

.9 Construct structurally reinforced masonry elements in accordance with requirements indicated on structural drawings.

.10 When infilling new block with existing, masonry to be toothed into the existing block.

3.3 CHASES, SLEEVES, OPENINGS AND HOLES

.1 Chases, sleeves and openings shall be built in during erection of masonry work, and purpose-made chased units shall be built into proper position

.2 Openings in masonry work exceeding 450 mm shall be provided with lintels in accord with lintel schedule.

.3 Chasing of completed walls or formation of holes shall only be carried out with Consultant's prior approval, and then only with a tool designed to cleanly cut masonry units.

.4 Chases shall be plumb and shall be minimum of one unit length from jambs of openings.

.5 Horizontal or diagonal chases are not permitted

3.4 MASONRY BEARING

.1 Masonry bearing shall extend full thickness of wall.

.2 Unless otherwise indicated, provide at least 200 mm of bearing for lintels and beams.

.3 Bearings of block masonry walls: use minimum 2 courses of solid or grouted block units except where concrete bearing pads are required.

.4 Bearings in brick masonry walls: use solid face brick where exposed to view..

.5 Build masonry neatly around beam, and lintel bearings.

3.5 CONSTRUCTION JOINTS

.1 Where fresh masonry joins partially or totally set masonry, clean exposed surfaces of set masonry and remove loose mortar and foreign material prior to laying fresh masonry.

.2 If necessary to stop off a horizontal run of masonry, rack back one-half masonry unit length in each course. Toothing will not be permitted unless approved by the Consultant.

3.6 BLOCKWORK

.1 Blockwork shall be laid up in running bond except where shown otherwise. Unless otherwise indicated, blocks shall be of thickness required to produce total wythe thickness

.2 Do not wet blocks before laying.

.3 Units shall be laid with webs aligning one over the other in full bed of mortar over entire laying surface including webs.

.4 Exposed faces shall be full units laid out to minimize cutting with not less than 100 mm any at vertical edge or corner.

.5 Top course of block walls shall be laid with semi-solid blocks at door and window sills, at wall changes to brick and where shown. Top course of freestanding block walls shall be bullnosed all sides.

.6 Partitions which do not extend full height, to underside of structural deck, shall be capped with solid or semi-solid (solid top).

.7 Provide solid block roof parapets or fill hollow block with grout.

.8 Use solid block for at least two courses under all point bearing loads.

.9 Form exposed external block foundation corners with end units.

.10 Provide bullnose block at all exposed vertical and horizontal block corners. Where directed by Consultant provide square corner block at first course above floor; grind corner above base to match bullnose above. At head of exterior doors grind bottom inside corner of lintel block to provide bullnose.

.11 Provide minimum 400 mm solid or grouted block for jambs of openings and at ends of walls.

.12 Cut with power saw exposed units to accommodate flush mounted electrical outlets, grilles and other components. Leave maximum 5 mm clearance. Cover plates and flanges must cover cut edges.

.13 Blockwork scheduled to be left exposed or painted shall be laid and pointed with utmost care. Distribute units of varying colour and texture evenly to achieve homogeneous blend. Replace at no extra cost to Contract, block units which in the opinion of the Consultant are too contrasting in appearance for satisfactory blending.

.14 Take special care to prevent mortar or other substances from staining exposed block faces. Replace stained blocks as directed by the Consultant at no extra cost to Contract.

.15 Where new block is adjacent to existing block walls, new block to be keyed into existing and joints to align.

3.7 BLOCK LINTELS

.1 Build block lintels; install reinforcement and concrete fill. Unless otherwise detailed make lintels 200mm high.

.2 Lintels shall have minimum 200 mm bearing, with care taken in layout of wall to ensure that lintel jointing coincides with regular bond of wall.

.3 Provide building paper in joint at bearings and at vehicle joint at ends of block lintels to break bond.

3.8 JOINT WORK

.1 Make joints uniform and 10 mm thick unless otherwise shown on Drawings.

.2 Joints in exposed and painted surfaces, and in masonry behind wall mounted and built-in fixtures, shall be tooled when thumbprint hard with a 25 mm o.d. plastic tool to produce a concave joint..

.3 Joints in unparged masonry below grade shall be pointed tight with a trowel.

.4 Joints directly behind resilient base, rigid insulation, ceramic tile and gypsum board shall be struck flush.

3.9 ANCHORING, BONDING AND REINFORCING

.1 Anchor or bond walls and partitions at points where they intersect.

.2 Except where stack bond is required bond each wythe or masonry walls and partitions at corners by alternately bonding 50% of units of each wall and partition at corner intersection.

.3 Bond non-loadbearing walls and partitions to loadbearing walls with ties spaced at 400 mm o.c. vertically. Provide one tie for each 100 mm thickness, or part thereof, of wall or partition.

.4 Anchor masonry walls and partitions to concrete and steel elements with anchors spaced at 400 mm vertically.

.5 Unless otherwise indicated reinforce all walls and partitions with continuous horizontal metal reinforcement, installed at 400 mm o.c. vertically.

.6 At wall openings place continuous reinforcement in first and second mortar joints above and below openings. Additional reinforcement at openings shall extend 610 mm beyond both sides of openings.

.7 Install prefabricated corner assemblies at corners.

.8 Lap continuous reinforcement 150 mm at splices. Cut reinforcement at control joints.

.9 Provide lateral support angles at top of non-loadbearing masonry/walls partitions. Anchor angles to structural deck or beam at 10x partition/wall thickness (maximum 2 m o.c.) staggered each side of

3.10 CONTROL JOINTS

.1 Provide control joints at masonry walls supported by foundation walls at approximately 7.5 m o.c. and at masonry walls supported on framed slabs at approximately 4 m o.c., and where shown on Drawings. Confirm actual locations of control joints with Consultant before starting work.

.2 Provide control joints at intersection of bearing and nonbearing walls.

.3 Construct control joints as shown on Drawings. Unless otherwise shown make control joints 10 mm wide. Interrupt masonry reinforcement at control joints. Provide expanding foam sealant at control joint, at exterior and interior wythe.

.4 Control joints must be constructed during erection of masonry, and may not be sawcut later.

3.11 STEEL DOORS AND FRAMES

.1 Install steel frames in masonry walls. Build in frames rigid, true and plumb. Fill voids between frames and masonry with grout. Fill fixed centre mullions at double doors with grout.

.2 Brace frames solidly in position while being built in. Provide temporary horizontal wood spreader at mid-height of frames to ensure maintenance of required frame width until masonry work is completed. For frames over 1200 mm width provide temporary vertical support at centre of head.

.3 Construct structurally reinforced masonry elements in accordance with requirements indicated on structural drawings.

.4 Comply with installation requirements specified under Section 08 11 13.

3.12 MISCELLANEOUS

.1 Where non-loadbearing, non-fire rated partitions extend to underside of structure, terminate partitions as detailed. Where not detailed allow for structural deflection and fill space with premoulded joint filler. Refer to Section 07250 for firestopping requirements at fire rated partitions.

.2 Provide continuous 0.1 mm thick polyethylene or glass fibre reinforced kraft paper - asphalt laminate bond breaker at base of partitions and walls which bear on concrete slabs.

.3 Provide paper backed galvanized steel lath as required for support of grout and mortar fill within masonry elements.

.4 Install access doors occurring in masonry elements, required by Divisions 21 to 28. Install access doors plumb, level, properly aligned and securely anchored, in locations directed by Divisions 21 to 28. Remove all excess grout and masonry debris from shafts and chases accessible by means of access doors.

3.13 MORTAR

.1 Mix mortar in accordance with table 2 of CSA A179-04 except as specified herein.

.2 Place an experienced and competent person in direct charge of proportioning and mixing operations.

.3 Except where specified otherwise do not add admixtures of any kind to mixes.

.4 All mortar shall be mixed for a period of not less than 3 minutes and not more than 10 minutes.

.5 Provide all mortar by one of the following: Max-Mix, Jiffy, Forwells or King Products.

.6 Mix coloured mortar in colour selected by Consultant, in accordance with pigment manufacturer's recommendations. Make adjustments in colour mix as directed by Consultant.

.7 Time Limits and Retempering: Use and place mortar in final position within following time limits after mixing:

.1 Air Temp. above 26.5oC - 2 hours.

.2 Air Temp. below 26.5oC - 2.5 hours.

.8 Mortar Schedule:

.1 Exterior wythe of exterior walls: 1:1:6 cement lime mortar.

.2 At foundations walls and solid bearing courses: type M mortar.

.3 Bearing walls and interior wythe of exterior walls: type S mortar.

.4 Non-bearing interior partitions: type N mortar.

.5 Provide coloured mortar where indicated.

3.14 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

.2 Replace masonry units stained or chipped, or materials affected by inadequate protection.

3.15 REPAIR

.1 Repoint defective joints as follows: Cut back joints 13 mm taking care not to damage units. Remove dust and loose materials by brushing or by water jet. If water jet is used, allow excess water to drain before repointing

.2 Repoint with same mix and colour as original.

.3 Pack mortar tightly in thin layers and tool joint to match non-defective joints.

3.16 CLEANING

.1 Obtain cleaning materials in accordance with manufacturer's instructions and brick manufacturer's written instructions for cleaning and verify cleaning procedures outlined in CSA A371 with manufacturers. Follow brick manufacturer's written instructions for cleaning masonry. Test sample area, 10 m^2 (100 sq ft), to judge effectiveness of cleaning procedures and obtain Consultant's approval.

.2 Keep wall clean and free of mortar stains during laying. Allow mortar droppings which adhere to wall to dry out but not set. Then rub with small piece of masonry followed by brushing to remove all traces. On completion of masonry construction, after mortar is thoroughly set and cured, clean masonry thoroughly.

.3 Protect windows, trim and metal from cleaning agents.

.4 Remove mortar with wood paddles and scrapers before wetting. Saturate masonry with clean water and flush off loose mortar and dirt. Clean blockwork using water, scrubbing brushes and wood paddles only.

.5 Clean masonry to be left exposed, using procedures as outlined herein and, where this is inadequate, try following recommendations outlined in BIA's Technical Note No. 20, June 2006.

.6 Particular care should be taken when cleaning lighter coloured clay bricks even with non-acid based cleaning solutions. Dark red or brown residue resulting from cleaning operations when allowed to run down face of brick could streak and discolour exterior facing. Protect lighter coloured Products by masking them from run off or by taking measures recommended by brick manufacturers.

.7 Clean calcium silicate masonry units only with non acid based cleaning solutions.

.8 Should these methods prove inadequate consult masonry manufacturer before undertaking unusual cleaning procedures and obtain Consultant's prior consent.

.9 Clean adjacent surfaces completely, which have been soiled or otherwise marred.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide metal fabrications including but not limited to following:

.1 Miscellaneous metals and lintels;

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures

.2 Section 06 10 00 – Rough Carpentry

.3 Section 06 15 36 – Composite Plastic Lumber

.4 Section 09 91 00 – Painting

1.4 WORK SUPPLIED BUT NOT INSTALLED

.1 Supply following items for installation under other Sections of work: anchor bolts, bearing plates, sleeves and other inserts to be built into concrete and masonry elements and required for anchorage and support of metal fabrications.

.2 Supply other Sections with instructions, and if required, templates, necessary for accurate setting of inserts and components.

1.5 SUBMITTALS

.1 Shop Drawings:

.1 Visit site to confirm appropriate dimensions and site conditions prior to submission of shop drawings.

.2 Submit digital shop drawings to Consultant for review.

.3 Shop drawings to indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, accessories and other pertinent data.

.4 Shop drawings shall bear the seal and signature of the structural engineer, licensed in the Province of Ontario, responsible for the design.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle and store fabricated components to prevent permanent distortion, corrosion and damage.

.2 Handle and store metal materials at the job site in such a manner to prevent damage to other materials, to existing building or property.

1.7 QUALITY ASSURANCE

.1 Provide welding in accordance with CSA W59 performed by a fabricator and mechanics fully approved by the Canadian Welding Bureau.

.2 Upon completion of installation of ladders, stairs, platforms, pit covers, balustrades, bench brackets and railings submit certification by professional engineer responsible for design of these components, verifying that they have been installed in accordance with reviewed shop drawings.

.3 Sizes of structural members, shall be taken to be a minimum size and shall not be decreased without Consultants' approval.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Steel sections and plate: CSA-G40.20 and CSA-G40.21, Grade 300W.

.2 Square steel tube: CSA-G40.20 and CSA-G40.21, Grade 350W, Class H.

.3 Steel pipe: ASTM A53, Type E, Grade A.

.4 Sheet steel: hot dip galvanized, cold rolled, with stretcher level degree of flatness to ASTM A553; zinc coating designation Z275.

.5 Aluminium:

.1 Extrusions: ASTM B221-14 6063-T5 or T6.

.2 Sheet, plate: ASTM B209-14, 1100 or 3000 Series alloy, anodizing quality.

.6 Stainless Steel: ASTM A167, Type 304 alloy with exposed surfaces having No. 4 polished finish. Sizes as required to meet design requirements.

.7 Structural Aluminum: to CSA HA series - M, Type 6061-T6, clear anodized.

.8 Welded steel wire mesh: 5/5 50 x 50 mm at stair railings and guards and 3/3 75 x 75 mm elsewhere conforming to ASTM A510M by Gerard Daniel Worldwide, Canadian Division.

.9 Welding materials:

.1 Steel: CSA W59-18

.2 Aluminum: CSA W59.2-18

.10 Bituminous enamel: alkali resistant asphaltic coating.

.11 Supply bolts, nuts and washers conforming to ASTM A325M. Supply each type and size of bolt and nut of same manufacture and of same lot.

.12 Bolts: Heavy, hexagon head high strength structural bolts, of standard size, of lengths required for thickness of members joined and for type of connection.

.13 Nuts: Heavy hexagon semi-finished nuts.

.14 Washers: Flat and smooth hardened washers, quenched and tempered to suit applications and conforms to ASTM F844. Provide AISI Type 304 stainless steel washers at exterior locations.

.15 Hardened Steel Washers: To suit applications and conforms to ASTM F436M.

.16 Stainless Steel Bolts: To suit applications and conforms to ASTM F738M.

.17 Stainless Steel Nuts: To suit applications and conforms to ASTM F836M.

.18 Lock Washers: Helical spring type steel “lock” washers to suit applications and conforms to Federal specification FF-W-84. Provide AISI Type 304 stainless steel lock washers at exterior locations.

.19 Exterior Vandal Resistant Fasteners: AISI Type 304 stainless steel, dual pin type vandal resistant fasteners to suit applications and acceptable to Consultant.

.20 Security Fasteners: Button head "Torx® Plus R" screw tamper resistant #10, 25 mm long 2 per glass stop minimum stainless steel machine screws.

.21 Common or Ordinary Bolts and Anchor Bolts: Unfinished bolts conforming to ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Supply common bolts of lengths required to suit thickness of material being joined, but not projecting more than 6 mm beyond nut, without the use of washers. Supply anchor bolts of lengths noted, but projecting not less than 13 mm beyond nut unless otherwise noted.

.22 Dielectric Separator: Provide best grade, quick drying non-staining alkali resistant bituminous paint or epoxy resin solution or membrane type to acceptance of Consultant.

.23 Galvanized Primer Paint: Zinc rich conforming to CAN/CGSB-1.181 for new galvanized metal.

.24 High Performance Corrosion Protection for Perimeter Steel: 1 component, moisture cured, micaceous iron oxide/zinc filled primer, UL Classified in accordance with ANSI/UL 263 (ASTM E119), corrosion protection in accordance with ASTM B117, meeting Class B Slip Certification in accordance with American Institute of Steel Construction (AISC) requirements for slip critical bolted connections, tested in accordance with ASTM E736 for its suitability for application of primer over steel to receive sprayed fireproofing, “Series 394, PerimePrime” by Tnemec Company Incorporated; www.tnemec.com.

.25 Steel Pipe Handrails: Conforming to ASTM A53/A53M, Type "S", Schedule 40, Grade A steel pipe of sizes shown.

.26 Steel Pipe Bumpers: Conforming to ASTM A53/A53M, Schedule 80 steel pipe of sizes shown.

.27 Galvanizing: Hot dipped galvanizing with minimum zinc coating of 600 g/m^2.

.28 Galvanized Sheet Steel: Supply 0.91 mm (20 ga) core thickness commercial quality to ASTM A653/A653M, CS Type A, with Z275 (G90) zinc coating designation to ASTM A653/A653M.

.29 Expanded Steel Mesh: Flattened, expanded, carbon steel mesh of 10 msg gauge thickness, weighing minimum 51 kg/10 m^2 style 33 mm SWD x 81 mm LWD, 292 mm - No.9 by Gerard Daniel Worldwide, Canadian Division, Expanded Metal Corporation or Dramex International.

.30 Welded Steel Wire Mesh: 50 mm x 50 mm x 3.4 mm diameter, welded carbon steel wire mesh conforming to ASTM A510M by Gerard Daniel Worldwide, Canadian Division.

.31 Handrail Wall Brackets: In accordance with OBC requirements and to meet design requirements indicated on Drawings.

2.2 FABRICATION

.1 Fabricate components in the shop in largest size practicable to minimize field jointing.

.2 Fabricate components square, straight, true, free from warpage and other defects. Accurately cut, machine file and fit joints, corners, copes and mitres.

.3 Reinforce fabricated components to safely withstand expected loads.

.4 Make joints in built-up sections with hairline joints in least conspicuous locations and manner.

.5 Make allowance for thermal expansion and contraction when fabricating exterior work.

.6 Joints shall be welded unless otherwise indicated and unless details of construction do not permit welding. Exposed welds shall be continuous and shall be ground smooth.

.7 Close exposed open ends of tubular members with welded on steel plugs.

.8 Where work of other Sections is to be attached to work of this Section, prepare work by drilling and tapping holes, as required to facilitate installation of such other work.

.9 Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation by: drilling, countersinking and tapping holes, forming shapes and cutting to required sizes.

.10 Grind off mill stampings and fill recessed markings on steel components left exposed to view.

2.3 FINISHES

.1 Thoroughly clean steel of loose scale, rust, oil, dirt and other foreign matter. Suitably prepare steel surfaces by power tool cleaning to receive specified finishes.

.2 Grind smooth sharp projections.

.3 Remove oil and grease by solvent cleaning.

.4 Hot dip galvanize steel components after fabrication in accordance with requirements of CAN/CSA-G164-18, minimum coating weight 600 g/m^2.

.5 Clear anodized aluminum components AA M12 C22 A41.

.6 Apply coat of bituminous enamel to contact surfaces of metal components in contact with cementitious materials and dissimilar metals.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install components plumb, square, straight and true to line. Drill, cut and fit as necessary to attach this work to adjoining work.

.2 Provide temporary supports and bracing required to position components until they are permanently anchored in place.

.3 Securely anchor components in place; unless otherwise indicated, anchor components as follows:

.1 To concrete and solid masonry with expansion type anchor bolts.

.2 To hollow construction with toggle bolts.

.3 To thin metal with screws or bolts.

.4 To thick metal with bolts or by welding.

.5 To wood with bolts or lag screws.

.6 Fill space between railing members and sleeves with non-shrink grout.

.4 Provide all components required for anchoring. Make anchoring in concealed manner wherever possible. Make exposed fastenings, where approved by Consultant, neatly and of same material, colour, texture and finish as base metal on which they occur. Keep exposed fastenings evenly spaced.

.5 Dissimilar metals and metals in contact with cementitious elements shall have contact surfaces coated with bituminous paint or be isolated by other means as approved by Consultant.

.6 After installation, clean and refinish injured finishes, welds, bolt heads and nuts. Refinish with zinc rich paint or primer to match original finish.

.7 Remove protective coverings from stainless steel components prior to Substantial Performance or when directed by Consultant.

3.3 SITE QUALITY CONTROL

.1 Structural Inspection: Ensure a licensed engineer specified herein inspects work of this Section during erection/installation.

.2 Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.4 CLEANING

.1 On completion of installation, carefully clean metal work.

3.5 SCHEDULE

.1 Provide all metal fabrications required whether listed hereunder or not, unless clearly covered by another Section. Unless otherwise shown provide hot dip galvanized steel components.

.2 List of Components:

.1 Bench support brackets

.2 Vanity support brackets

.3 Cabinetwork brackets

.4 Loose lintels, plates, angles and other members required but not shown on structural drawings.

.5 Other metal fabrications required.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Rough Carpentry work including but not limited to following:

.1 Miscellaneous interior carpentry;

.2 Built up / blocking as required.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 06 20 00 – Finish Carpentry;

.3 Section 06 51 13 – Plastic Lumber;

.4 Section 06 41 00 – Cabinetwork.

1.4 REFERENCES

.1 Exposed Framing: Framing not concealed by other construction.

.2 CSA O80 Series-08 - Wood Preservation

.3 CSA O121-08 - Douglas Fir Plywood

.4 CAN/ULC-S102-07 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.5 QUALITY ASSURANCE

.1 Lumber shall bear the grading stamp of an agency certified by The Canadian Lumber Standards Administration Board.

.2 All lumber shall be sound, straight, dressed all sides and kiln dried, and moisture content at any time during shipment and storage shall not exceed 19%.

.3 Provide roof sheathing bearing the COFI grading stamp for identification.

.4 Provide "treated" and "fire treated" wood and plywood bearing the stamp of the Canadian Wood Preservers Bureau.

1.6 WORK SUPPLIED BUT NOT INSTALLED

.1 Supply to other Sections anchors, bolts, rough hardware and other items required to be built into work of other Sections to receive, accommodate, secure work of this Section.

.2 Provide other Sections with instructions to ensure accurate setting of built-in items.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Store lumber in a dry place and protect from dampness and damage.

.2 Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 – PRODUCTS

2.1 LUMBER

.1 Meet requirements of CSA-086-94 Strength Group D (spruce-pine-fir) and CAN/CSA-0141-05 and National Lumber Grading Authority (NLGA) Standard Grading Rules.

.2 Light Framing: Species Group D, Standard Grade.

.3 Studding: Species Group D, Stud Grade.

.4 Structural Light Framing: Species Group D, No. 1 Grade.

.5 Appearance Lumber: Species Group B, Appearance Grade.

.6 Hardwood Lumber: Of grades conforming to grading rules of U.S. National Hardwood Lumber Association, solid Yellow Birch, select or better.

.7 Concealed Framing Lumber: No. 2 White Pine, No. 2 Red Pine, or No. 1 Construction Eastern Spruce, Balsam Fir or Jack Pine, kiln dried, free from sap, shakes, splits, knots and other defects.

.8 Grounds, Nailing Strips and Blocking: No. 2 White Pine, No. 2 Red Pine, or No. 1 Construction Eastern Spruce, kiln dried, free from sap, shakes, splits, knots and other defects.

.9 Blocking, Copings, Nailers, Curbs: NLGA 122c "Standard".

2.2 PLYWOOD

.1 All locations except backboards: Canadian Softwood Plywood to CSA 0151-04 Unsanded Sheathing Grade.

.2 Backboards: Canadian Softwood Plywood to CSA 0151-04, Sanded grade, solid two sides, fire retardant pressure treated.

.3 Plywood, select grade, unsanded conforming to CSA O121.

2.3 WOOD TREATMENT

.1 Preservative pressure treated components: to CSA-080 Series-97, arsenic free, using copper and azole.

.2 Surface cut, bore and trim components to sizes required as much as possible prior to pressure treatment.

2.4 FIRE TREATED WOOD AND PLYWOOD

.1 Flame Spread: Max 25 in 30 minutes in accordance with CAN/ULC-S102.

.2 Provide fire treated wood kiln dried to max 19% moisture content.

.3 Provide fire treated material bearing the stamp of the Canadian Wood Preservers Bureau and the ULC stamp.

.4 Pressure treated lumber and plywood with fire retardant chemicals to meet an UL FR-5 rating with a surface-burning characteristics rating of 25 or less for flamespread, fuel contributed and smoke developed. Ensure each piece of fire retardant treated lumber and plywood bears a ULC label or imprint attesting to this rating.

.5 Fire Resistant Barrier: Non-toxic, water based latex fire resistant coating with proprietary fibers, 68% solids, each container or package bearing ULC label, “Firefree Ff88" by International Fire Resistant Systems, Inc.; www.phoenixthermal.com

2.5 FASTENERS AND CONNECTING HARDWARE:

.1 Nails: to CSA B111-1974, except where otherwise shown hot dip galvanized steel for exterior work including components located in exterior walls and roofs; bright finish steel in all other locations. Unless otherwise indicated use common spiral flathead nails. Provide stainless steel fasteners for preservative pressure treated wood.

.2 Bolts, nuts, washers: ASTM A307, hot dip galvanized steel.

.3 Connectors, anchors, brackets, spikes: hot dip galvanized structural quality steel.

.4 Screws: zinc, cadmium or chrome plated..

.5 Fasteners in contact with preservative pressure treated wood shall be stainless steel.

2.6 WOOD TREATMENT

.1 Preservative pressure treated components: to CSA-080 Series-97, arsenic free, using copper and azole.

.2 Fire retardant pressure treated components: to CSA-080 Series-97 for maximum flame spread of 25 and labelled by ULC.

.3 Surface cut, bore and trim components to sizes required as much as possible prior to pressure treatment.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 General:

.1 Properly frame together parts of the Work with members accurately cut to size, closely fitted, well spiked and erected in a substantial manner, plumb, level, square and true to dimension.

.2 Where other materials and components are to be applied directly over wood members recess heads of fastening devices below wood surfaces.

.3 Where work remains exposed to view, fasteners shall be uniformly and evenly spaced and neatly installed.

.4 Locate joints over bearing or supporting surfaces

.5 Provide running members full length wherever possible.

.6 Design for expansion and contraction of the materials.

.2 Nailers, Clocking, Copings, Grounds, Curbs

.1 Provide wood nailers, blocking, copings, strapping, bucks, grounds and other rough carpentry components to sizes and in locations required for satisfactory support of fabricated items and other work. Provide wood blocking at steel stud framed gypsum board partitions for support of wall mounted components.

.2 Unless otherwise indicated, provide minimum 38 mm thick materials. Grounds may be 21 mm thick material unless otherwise indicated.

.3 Provide built-up wood curbs for rooftop mounted equipment. Unless otherwise detailed, provide 90 mm thick curbs extending minimum 300 mm from top of roof membrane to top of curb.

.3 Anchors and Fasteners

.1 Provide rough hardware including nails, screws, bolts, washers, brackets, hangers, and fastening devices of all types.

.2 Unless otherwise indicated, attach wood members at maximum 600 mm o.c. as follows:

.1 To concrete and solid masonry with expansion or friction type anchor bolts.

.2 To hollow masonry with toggle bolts

.3 To heavy gauge metal with bolts.

.4 To light gauge metal with screws or bolts.

.5 To wood with nails, screws or bolts as required to ensure stability.

.3 Fasten wood copings to supporting masonry elements with 13 mm galvanized steel bolts minimum 300 mm long spaced maximum 600 mm o.c. Where width of coping plate exceeds 100 mm, stagger bolts off centre.

.4 Pressure Treated and Fire Rated Components

.1 Mix intumescent paint coating product to manufacturer's recommendations. Do not thin or strain. Apply primer and paint coating providing fire resistant barrier in accordance with manufacturer's recommendations to achieve requirements of authorities having jurisdiction. Apply at rate 3.2 m^2/l (125 sq ft/gal) to obtain dry film thickness of 0.25 mm (10 mils).

.2 Provide "fire treated" plywood.

.3 After cutting, drilling and fitting "treated" wood and plywood but before installation, apply 1 full coat of wood preservative to exposed surfaces, including ends of blocking, furring, nailers and rough carpentry.

.5 Backboards

.1 Where required by Division 26 00 00 and by telephone system supplier, provide minimum 19 mm thick fire retardant treated plywood backboards mounted on strapping if required.

.2 Size backboards to adequately accommodate equipment to be mounted. Secure boards with countersunk fasteners to supporting walls in manner which will carry equipment load without damaging wall.

3.3 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired to satisfaction to Consultant at no cost to Owner.

3.4 PROTECTION

.1 Protect rough carpentry from weather.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Composite Plastic Lumber work including but not limited to following:

.1 Benches;

.2 Other components identified accordingly.

1.3 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications;

.2 Section 06 10 00 – Rough Carpentry;

.3 Section 06 20 00 – Finish Carpentry;

.4 Section 06 41 00 – Cabinetwork;

1.4 SUBMITTALS

.1 Submit detailed and complete product data for all products used.

.2 Submit shop drawings, indicating all dimensions, component sizes, fabrication details, support spacing, attachment provisions and coordination requirements with adjacent work.

.3 Submit duplicate minimum 300 mm long samples of each colour and finish surfacing required.

.4 Submit manufacturer's instructions for care and maintenance of solid surface materials including repair instructions for inclusion in maintenance manual.

.5 Shop drawings for bench supports shall bear the seal and signature of the structural engineer, licensed in the Province of Ontario, responsible for the design.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver boards to site in bundles, in manufacturer’s original packaging and with identifying labels intact and legible.

.2 Store boards on a dry, flat and level surface and covered until required for installation.

1.7 WARRANTY

.1 At no cost to Owner replace any board that warps, rots, splits, cracks or splinters for 50 years from Substantial Performance.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Refer to Schedule A –List of Materials.

.2 Composite plastic lumber: 2 x 4 (50%) and 2 x 6 (50%) (nominal dimensions) square edged boards, made of thermoplastic polymer 100% recycled content: Ultraplast Wood Grain Finish or equivalent product by Perma-Deck Advantage + by Re-Plast (Cascades), colours: refer to Schedule A –List of Materials; meeting the following requirements:

Physical Properties	Method	Value
Flexural Properties: Flexural Strength Modulus of Elasticity	 ASTM D6109 ASTM D6109	 3,489 psi 167,146 psi
Compressive Properties: Compressive Strength Modulus of Elasticity	 ASTM D6108 ASTM D6108	 1,773 psi 117,835 psi
Coefficient Linear Thermal Expansion	ASTM D6341	0.0000896 in/in/ºC
Static Coefficient of Friction Rubber Shoe Sole	ASTM D2394	Longitudinal: 0.538 Transverse: 0.622
Kinetic Coefficient of Friction Rubber Shoe Sole	ASTM D2394	Longitudinal: 0.622 Transverse: 0.643
Density (Specific Gravity)	ASTM D6111	.035 lbs/cu in
Water Absorption	ASTM D1036	<0.01%
Screw Withdrawal #10, 2 ½”	ASTM D6117	1,158 lbs

.3 Fasteners: stainless steel screws, countersunk flat head type where exposed.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install bench boards to pattern indicated and in conformance with manufacturer's installation directions. Maximum miscellaneous supports spacing to be 600mm.

.2 Secure boards to supporting work in concealed manner unless shown otherwise.

.3 Cut, drill and rout boards using carbide tipped tools.

.4 Predrill 6 mm diameter fastener holes. Place fasteners not less than 20 mm from any board edge.

3.3 SITE QUALITY CONTROL

.1 Repair or replace damaged materials in a manner satisfactory to Consultant.

.2 Remove masking and excess adhesives and sealants. Clean exposed surfaces.

.3 Protect surfacing from damage of any kind, until Substantial Performance.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Finish Carpentry work including but not limited to following:

.1 Miscellaneous interior finish carpentry.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 06 10 00 – Rough Carpentry;

.3 Section 06 41 00 – Cabinetwork;

.4 Section 09 91 00 – Painting.

1.4 REFERENCES

.1 Exposed Framing: Framing not concealed by other construction.

.2	CSA O80 Series-08	- Wood Preservation
.3	CSA O121-08	- Douglas Fir Plywood
.4	CAN/ULC-S102-07	- Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.5 QUALITY ASSURANCE

.1 Reference Standards: unless otherwise specified, carry out finish carpentry work in accordance with requirements of "Quality Standards for Architectural Woodwork" (latest issue) of Architectural Woodwork Institute (AWI) and Architectural Woodwork Manufacturer's Association of Canada (AWMAC).

.2 Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and be a member of AWI/AWMAC/WI. Proof of credentials to be provided when requested by the Consultant.

1.6 SUBMITTALS

.1 Submit two samples of each type of solid wood and plywood used in exposed work scheduled to receive transparent finish.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16°C, and relative humidity 25% to 55%.

.2 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather.

.3 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent moisture gain of kiln dried materials.

1.8 PROTECTION

.1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.9 WARRANTY

.1 Warrant work of this Section for a period of 2 years against defects and/or deficiencies in accordance with General Conditions of the Contract. At no costs to the Owner, promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to opening of seams, warpage and extensive colour fading.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 General: Refer to Schedule A –List of Materials.

.2 Solid Wood:

.1 Unless otherwise indicated, provide AWI/AWMAC Premium Grade.

.2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules

.3 All wood shall be kiln dried to a maximum moisture content of 12% for exterior work and 6% to 8% for interior work

.4 Hardwood: provide 19mm Clear grade Solid Maple.

.5 Softwood: to CAN/CSA O141-05 (R2014), dressed all sides used in concealed locations only except where shown otherwise. Unless otherwise indicated use No. 1 White Pine at interior locations.

.3 Panel Materials

.1 Hardwood plywood: to CSA O115-M1982 (R2001), Type II Veneer: AWI/AWMAC AA Grade; use veneer core or multi-core plywood

.2 Softwood plywood: to CSA O151-17 Sanded Grade, Solid Two Sides. Use in concealed locations only; use veneer core or multi-core plywood only

.4 Fasteners and Adhesives

.1 Nails and staples: CSA B111-1974 (R2003), galvanized

.2 Screws: zinc, cadmium or chrome plated steel

.3 Adhesive: waterproof type as approved by Consultant.

.5 Linear Grilles

.1 Provide full window sill width continuous recessed extruded aluminium linear bar grilles (pencil proof) where indicated on drawings. Acceptable manufacturers: EH Price.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 FABRICATION

.1 General Requirements:

.1 Provide wood members free from bruises, blemishes, mineral marks, knots, shakes and other defects, except as specifically permitted by grade rules.

.2 Exposed joints and edges:

.1 Uniformly space exposed joints unless otherwise indicated.

.2 Edge grain shall not be visible; mitre external corners, house internal corners. Secure corners with corrugated metal fasteners. Glue mitred corners.

.3 All exposed edges of plywood shall have solid wood edging, pressure glued.

.3 Mechanical fasteners:

.1 Inconspicuously locate mechanical fasteners. Wherever possible conceal fastenings.

.2 Countersink nail heads.

.3 Unless otherwise indicated, countersink screw and bolt heads and fill holes with matching wood plugs.

.4 Cutting and fitting: make cutouts in work of this Section as required to accommodate work of other Sections.

.2 Standing & Running Trim:

.1 Fabricate trim and base of softwood where paint finish is designated and of hardwood where transparent finish is required.

.2 Length: standing trim shall be in one piece. Running trim shall be in longest practicable lengths.

.3 Thickness: unless otherwise indicated, minimum 19 mm.

.3 Rails, Slats, Caps, Base:

.1 Fabricate components to profiles shown and in longest practicable lengths.

.2 Slightly round exposed edges, sand smooth all surfaces.

.3 Unless otherwise indicated fabricate members of hard- wood. Use the same species of wood throughout, except where specifically indicated otherwise.

3.3 INSTALLATION

.1 Install finish carpentry components plumb, true and level and securely fasten in place. Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.2 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.3 Provide mechanical fastening devices such as nails, screws and bolts required for fastening wood components. Unless permitted provide concealed fastening of components.

.4 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.5 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.6 Install caps, rails, base, casings and trim in longest practicable lengths; accumulation of short pieces not permitted. No edge grain shall be visible; mitre corners. Slope cut intermediate joints.

.7 Provide interior wood trim where indicated and where required to complete work.

.8 Select components within any area to produce well blended, uniform appearance. Avoid use of components with starkly contrasting colours. Replace components which in Consultant's opinion are not of satisfactory appearance.

.9 Where it is necessary to cut, bore or otherwise alter pressure treated components in the field, treat cut surfaces with heavy coat of wood preservative.

3.4 FINISHING

.1 Sand finished interior wood surfaces thoroughly as required to produce uniformly smooth surface, always sanding in direction of grain run. Coarse grained sandpaper marks, hammer marks, or other similar imperfections in finished work are not acceptable.

3.5 SCHEDULE

.1 Unless specifically indicated otherwise, all finish carpentry components shall receive transparent stain and varnish finish by Section 09 91 00.

.2 Provide the following:

.1 Trim;

.2 Wood base (WD-1): JD Hodgson Elementary School

.3 Other finish carpentry components required.

3.6 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired to satisfaction to Consultant at no cost to Owner.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Cabinetwork including but not limited to following:

.1 Millwork;

.2 Miscellaneous cabinetwork as shown on drawings.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 06 10 00 – Rough Carpentry;

.3 Section 06 20 00 – Finish Carpentry;

.4 Section 06 61 16 – Solid Surfacing;

.5 Section 09 91 00 – Painting;

.6 Section 10 95 00 – Miscellaneous Specialties.

1.4 REFERENCES

.1 "Exposed" when referred to in this Section shall mean all parts than can be viewed and shall include interiors of cupboards, cabinets and counters, backs of doors, shelving, gables, drawers.

1.5 QUALITY ASSURANCE

.1 Reference Standards: unless otherwise specified, carry out finish carpentry work in accordance with requirements of "Quality Standards" (latest issue) of Architectural Woodwork Institute (AWI) and Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Premium Grade.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16°C, and relative humidity 25% to 55%.

.2 Cover plastic laminate faces at shop with heavy paper.

.3 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather.

.4 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.

.5 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.7 SUBMITTALS

.1 Submit detailed shop drawings for cabinetwork showing proposed assembly, connections, anchorage, materials, dimensions, thickness and finishes. Show locations, types and sizes of appliances, equipment and fixtures to be incorporated into cabinetwork. Coordinate with Divisions 22, 23, 26 and others as required.

.2 Submit samples of each type of solid wood and plywood used in exposed work, complete with transparent finish, prior to fabrication of cabinetwork.

.3 Construct a mock-up of one completed modular B5 open shelf unit and a B1 lower cupboard unit complete with cupboard doors and all lockable hardware. If sample approved, it can be utilized in final construction.

.4 Show locations, types and sizes of appliances, equipment and fixtures to be incorporated into cabinetwork.

1.8 WARRANTY

.1 At no cost to Board remedy any defects in work of this Section due to faulty materials and/or workmanship for a period of 2 years from date of Substantial Performance.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 General: Refer to Schedule A – List of Materials.

.2 Solid Wood:

.1 Unless otherwise indicated, provide AWI/AWMAC Premium Grade.

.2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.

.3 All wood shall be kiln dried to a maximum moisture content of 7%.

.4 Hardwood: plain sawn Maple for exposed locations.

.5 Softwood: to CAN/CSA 0141-05, dressed all sides used in concealed locations.

.3 Panel Materials:

.1 Melamine faced panels: melamine resin impregnated sheet, thermally fused to particleboard core; colours/textures selected by Consultant: Panval by Uniboard, Permalam by Flakeboard, or equivalent product by other manufacturer approved by Consultant; patterns and colours selected by Consultant.

.2 Hardwood plywood: to CSA 0115-M1982, Type II; face veneer AWI/AWMAC AA Grade, Sequence Matched Select Maple, for transparent finish.

.3 Softwood plywood: to CSA 0151-09 Sanded Grade, solid two sides. Use in concealed locations only, except as indicated.

.4 Particleboard: ANSI A208.1 minimum 700 kg/m^3 density.

.5 Medium density fibreboard (MDF): ANSI A208.2, density 750 kg/m^3.

.6 Medium density fibreboard, moisture resistant (MDFMR): ANSI A208.2

.4 Plastic Laminated Components:

.1 Plastic laminate facing sheet: ANSI/NEMA LD3-2005, grades HGS, VGS, HGP; colours, gloss and texture will be selected by Consultant; standard of acceptance: Nevamar, ARP.

.2 Backing sheet: BKL Grade by manufacturer of facing sheet.

.3 Core: particleboard or plywood.

.4 Laminating adhesive: CSA-0112 Series M1977.

.5 Core sealer: clear water resistant synthetic resin sealer.

.5 PVC Edging:

.1 3 mm thick “Woodgrain” or “Solid Colour” edging by Woodtape; colour and pattern to be selected by Consultant, to match melamine.

.6 Fasteners & Adhesive:

.1 Nails and staples: CSA B111-1974, galvanized.

.2 Screws: zinc, cadmium or chrome plated steel.

.3 Adhesive: waterproof type.

.7 Cabinet Hardware:

.1 Products listed below are a standard of acceptance. Products by other manufacturers, of equal quality and similar appearance may also be accepted subject to review and approval by Consultant.

.1 Hinges for 19 mm door Blum 91-650, 170^o with self-closing spring.

.2 Hinges for 38 mm door: Ives butt hinges, 4”x4” commercial medium grade.

.3 Door or drawer pull: GSH 302 x 100 mm CTC 7.5 mm o.d. brushed stainless steel.

.4 Drawer slides: full extension for 45 kg load by K&V or Accuride.

.5 Drawer locks: Olympus 078 or CompX National C8702 or Corbin CCL 02066; MK & KA by room.

.6 Cabinet locks: Olympus 078 or CompX National C8702 or Corbin CCL 02067; MK & KA by room.

.7 Automatic door catch (inactive door of locked pair): Hafele 245.58.754.

.8 Pilaster & clips: KV 255, 256.

.9 Hardware finish: Chrome or nickel plated.

.10 Casters for Kindergarten Toy Storage Cart: Model No. H7446SWB by Uline; 304 Stainless Steel frame Rubber Caster with Swivel with Brake, 4x 1/14".

.11 Tall Closet Door handles/locking hardware for M1 Teacher Closet at all schools and M2 Gymnasium Lockable Storage at Cardiff ES as follows:

.1 Refer to Section 08 71 00 Hardware for details.

.8 Access panel connectors: Invisible plug-type knock down connectors by Hafele.

2.2 Products

.1 Manufacturers:

.1 All casework of this Section to be provided by one of the following Manufacturers:

.1 Allwood Carpentry: (416) 398-1460, rdevappa@allwoodcarpentry.com

.2 CIF Lab Solutions: (905) 738-6537, sworrall@cifsolutions.com

.3 Harris Corporate Interiors: (905) 563-6111, dan@hciinc.ca

.4 Second Generation: (905) 738-1403, robert@2ndgen.ca

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 FABRICATION

.1 General Requirements:

.1 Exposed joints and edges:

.1 Uniformly space exposed joints unless otherwise indicated.

.2 No edge grain shall be visible; mitre external corners, house internal corners. Secure corners with corrugated metal fasteners. Glue mitred corners.

.3 All exposed edges of plywood and particle board shall have solid wood edging, minimum 3 mm thick, pressure glued.

.2 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.

.3 Cutting and fitting: make cutouts in work of this Section as required to accommodate work of other Sections.

.4 Make provisions in cabinetwork to accept built-in appliances, provided by others.

.2 Standing & Running Trim:

.1 Fabricate trim of hardwood.

.2 Length: standing trim shall be in one piece. Running trim shall be in longest practicable lengths.

.3 Thickness: unless otherwise indicated minimum 12 mm.

.3 Plastic Laminate Components:

.1 Unless otherwise specified herein comply with requirements of AWI/AWMAC "Quality Standards".

.2 Assembly: Bond plastic laminate to core with adhesive, under pressure.

.3 Core: unless otherwise indicated 19 mm thick veneer core plywood or 25mm thick particleboard.

.4 Balanced construction: plastic laminate covered components shall be of balanced construction, with plastic laminate on both faces of core. Seal core edges not covered with plastic laminate.

.5 Use largest practicable plastic laminate sheet size.

.6 Provide joints symmetrically; provide joints at corners and at changes in superficial areas; provide concealed draw bolt anchors at joints. All butt joints shall have a blind spline.

.7 Construct countertops postformed or selfedged as detailed on Drawings.

.8 Apply self-edged minimum 1.1 mm thick plastic laminate to exposed ends of countertops.

.9 Construct splashbacks minimum 100 mm high or higher where indicated. Do not return postformed splashback at ends except where specifically called for.

.10 Openings and cutouts:

.1 Radius internal corners at least 3 mm and chamfer edges.

.2 Where core edge is to remain exposed, cover with plastic laminate edging.

.3 Where core edge is to be concealed, seal with sealer.

.4 Cabinetwork:

.1 Except where otherwise detailed use flush overlaid construction. Tenon, dado, dowel or rabbet interior construction with all parts well glued. Shoulder mitre all exposed corners. Open ends or skeleton frames against walls are not permitted. Unless otherwise permitted by Consultant use unitized construction system for all components.

.2 Construct cabinetwork, interiors and exteriors, from melamine-faced particle board unless otherwise indicated. Finish exposed edges with PVC edging; finish both longitudinal edges of shelves (back and front). Construct counter tops as per Section 06 61 16 Solid Surfacing.

.3 Provide moisture resistant medium density fibreboard (MDFMR) for doors of cabinets with sinks.

.4 Provide the following minimum thicknesses:

.1 Doors: 19 mm.

.2 Doors Higher than 1300mm: 38mm.

.2 Drawer fronts: 19 mm.

.3 Gables: 19 mm.

.4 Cabinet backs (wall mounted): 19 mm.

.5 Cabinet backs (floor mounted): 19 mm.

.6 Shelves: 19 mm.

.7 Draw bodies: 10 mm

.5 Where doors are higher than 1300 mm provide solid core wood doors, 38mm thick, with solid wood face frame, faced to match adjacent surfaces, unless otherwise indicated.

.6 Rout gables for pilaster strips where adjustable shelving is required.

.7 Provide shelves of melamine faced 25 mm thick particleboard. Reinforce shelves where span exceeds 900 mm.

.8 Construct drawers with sides tongued into front and back housed into sides. Construct bottom housed into front and sides.

.9 Where shown provide solid core doors.

.10 Install cabinet hardware in accordance with hardware manufacturer's directions. Unless otherwise indicated provide each drawer and door with pull, each drawer with extension hardware and each door up to 900 mm high with 2 hinges, doors 900 to 1350 mm with 3 hinges, doors 1350 to 1800 mm with 4 hinges. Provide additional hinges if recommended by hinge manufacturer due to door size and weight. Provide locks at all doors and drawers; locks shall be keyed alike in each room.

.11 Cabinet bases shall be fabricated from preservative pressure treated plywood or lumber, separate from body of cabinets.

3.3 INSTALLATION

.1 Install cabinetwork components plumb, true and level and securely fasten in place. Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.2 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.3 Provide mechanical fastening devices such as nails, screws and bolts required for fastening wood components. Unless permitted provide concealed fastening of components.

.4 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.5 Install plastic laminate components using concealed fastening devices.

.6 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.7 Where cabinetwork abutts other building elements provide wood trim matching cabinetwork except where otherwise detailed.

.8 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable 19mm thick melamine panels to match the cabinetry secured with four brass screws.

.9 Install specialty items incorporated into cabinetwork in accordance with details shown and in conformance with respective manufacturer's recommendation.

.10 Check operation of all movable parts and, if necessary, adjust to ensure proper and smooth function.

3.4 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired to satisfaction to Consultant at no cost to Owner.

3.5 PROTECTION

.1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Solid Surfacing work including but not limited to following:

.1 Countertops;

.2 Sills.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 06 10 00 – Rough Carpentry;

.3 Section 06 20 00 – Finish Carpentry;

.4 Section 06 41 00 – Cabinetwork;

.5 Section 09 91 00 – Painting.

1.4 QUALITY ASSURANCE

.1 Fabricator Qualifications: Certified by material manufacturer; with minimum five years experience fabricating solid surfacing and having suitable machinery and tools required for fabrication.

1.5 SUBMITTALS

.1 Submit detailed and complete product data for all products used

.2 Submit shop drawings, indicating all dimensions, component sizes, cutouts, fabrication details, attachment provisions and coordination requirements with adjacent work.

.3 Submit duplicate minimum 150 mm x 150 mm samples of each colour and finish surfacing required.

.4 Submit manufacturer's instructions for care and maintenance of solid surface materials including repair instructions for inclusion in maintenance manual.

1.5 TOLERANCES

.1 Variation in component size: ± 3mm.

.2 Location of openings: ± 3mm from indicated location.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Do not deliver components to site until existing conditions are suitable for installation. Store materials indoors in protected location or as otherwise required by manufacturer prior to installation.

1.7 WARRANTY

.1 Provide manufacturer's written warranty against defects in materials and workmanship under normal usage, for a period of 10 years from Substantial Performance. Warranty shall provide for all material and labour to repair or replace defective materials.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Refer to Schedule A –List of Materials.

.2 Solid surfacing: Cast, non-porous filled material consisting of acrylic polymer, aluminum trihydrate filler and pigment, with through body colour (not coated, laminated or of composite construction), meeting ANSI Z124.3 or ANSI Z124.6, having physical and performance published by manufacturer:

.3 Adhesive: solid surfacing material manufacturer's standard one or two part adhesive kit, matching colour of solid surfacing.

.4 Sealant: solid surfacing material manufacturer's standard silicone, mould and mildew resistant, colour to match solid surfacing

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 FABRICATION

.1 Provide solid surface material tops where indicated. Comply with material manufacturer's fabrication directions.

.2 Fabricate components in shop as recommended by material manufacturer to sizes, thicknesses and profiles indicated and with all exposed surfaces and edges fully finished.

.3 Unless otherwise indicated provide 13 mm thick horizontal surfaces and 6 mm thick vertical surfaces.

.4 Locate intermediate joints where shown; if not shown fabricate solid surfacing panels in largest practicable size to minimize number of joints. Provide fully welded joints, reinforced, as recommended by surfacing manufacturer. Joints shall be inconspicuous in appearance and free of voids. Ensure that joined pieces are a perfect colour match. Prepare butting edges with a double fluted router to ensure a perfect fit. Reinforce deck joints as recommended by material manufacturer.

.5 Materials throughout project shall be from the same batch and shall bear labels with same batch number. Visually inspect materials to be used for adjacent pieces to assure acceptable colour match.

.6 Laminate multiple layers of material where required to achieve profile shown. Provide no-drip edge at vanity and counter tops with sinks.

.7 Exposed corners, unless otherwise shown, shall be bullnosed as directed by the Consultant.

.8 Make cutouts for work of other Sections. Reinforce cutouts and joints as recommended by material manufacturer.

.9 Finish component and cutout edges to a smooth uniform polished consistency.

3.3 INSTALLATION

.1 Install solid surfacing materials in accordance to manufacturer's recommendations.

.2 Install components plumb, level, square and securely supported, in accordance with reviewed shop drawings and manufacturer's directions. Apply sufficient quantity of adhesive to provide permanent and secure bond.

.3 Provide fully welded field joints, with joint appearance flush, tightfitting, level, neat and inconspicuous. Clamp or brace solid surfacing in position until adhesive has set. Reinforce field joints with solid surface strips to a minimum of 25 mm on either side of joint as recommended by surfacing manufacturer.

.4 Cut and finish component edges clean, with sharp returns and polished to match solid surfacing finish.

.5 Apply sealant at joints between solid surface components and adjacent work, between counter/vanity tops and backsplashes and where shown.

.6 If jobsite cutting, grinding, or polishing is required, use purpose made tools as recommended by manufacturer. Protect jobsite and surfaces against dust and water. Perform work away from installation site if possible.

.7 Allow gaps for expansion when installed between walls or other fixed conditions.

3.4 SITE QUALITY CONTROL

.1 Repair or replace damaged materials in a manner satisfactory to Consultant.

.2 Remove masking and excess adhesives and sealants. Clean exposed surfaces.

.3 Protect surfacing from damage of any kind, until Substantial Performance.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide firestopping and smoke seals including but not limited to following:

.1 Firestopping and smoke seals in accordance with Code requirements, at openings and around penetrations, at un-penetrated openings, at projecting and recessed items and at openings and joints within fire separations and assemblies having fire resistance rating, excluding those inside sealed mechanical and electrical assemblies (e.g. inside ducts, dampers, bus ducts, etc.).

.2 Firestopping and smoke seals in accordance with Code requirements, at openings and spaces at perimeter edge conditions, excluding those inside sealed mechanical and electrical assemblies (e.g. inside ducts, dampers, bus ducts, etc.)

.3 Firestopping and smoke seals in and around fire separations, including spaces around mechanical and electrical penetrations, at tops of fire walls, between slab edges and other gaps and penetrations at fire assemblies.

.4 Ensure Divisions 21, 22, 23, 26, 27 and 28 respectively are responsible for firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside electrical bus ducts). Ensure firestopping and smoke seals around outside of such mechanical and electrical assemblies where they penetrate fire-rated separations are part of work of this Section.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 04 20 00 – Masonry Units;

.3 Section 07 92 00 - Sealants;

.4 Section 09 21 16 – Gypsum Board.

1.4 REFERENCES

.1	CAN/ULC-S101-07	- Standard Methods of Fire Endurance Tests of Building Construction and Materials
.2	CAN/ULC-S102-07	- Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.3	ULC-S115-05	- Standard Method of Fire Tests of Firestop Systems

.4 ULC Guide No. 40 U19 - Firestop Systems

.5 ULC Guide No. 40 U19.13 - Firestop Systems Components

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Prior to commencement of sealing, arrange for Product manufacturer's knowledgeable representative to meet and discuss installation procedures and unique conditions at the Place of the Work, inspect substrate surfaces and recommend solutions to accommodate adverse conditions, periodically visit and verify installations before being concealed and report unsatisfactory conditions to Contractor, attend final inspection and to submit written certification that Products, systems and assemblies have been installed in accordance with manufacturer's requirements.

.2 Coordinate with trades involved and advise dates where work will take place throughout various areas of work.

1.6 SUBMITTALS

.1 Prior to start of work submit digital list of proposed firestopping and smoke seal materials together with suitable documentation to verify that specified requirements will be met. Provide the following information as applicable to this Project:

.1 ULC and/or cUL assembly number certification and material safety data sheets;

.2 Required temperature rise and flame rating;

.3 Hose stream rating (where applicable);

.4 Thickness;

.5 proposed installation methods;

.6 Material of firestopping and smoke seals, primers, reinforcements, damming materials, reinforcements and anchorages/fastenings;

.7 Size of Opening;

.8 Adjacent materials.

.2 Submit manufacturer's verification that installed firestopping and smoke seal materials comply with specified requirements.

.3 Closeout Submittals: Provide maintenance data for materials and prefabricated devices, providing descriptions sufficient for identification on site.

1.7 MOCK UPS

.1 At locations directed by Consultant prepare mock-ups of each type of firestopping/smoke seal required.

.2 Provide linear firestopping/smoke seal mock-ups minimum 1 m long. Provide mock-up of each type or penetration firestopping.

.3 Mock-ups may be incorporated into finished work if approved by Consultant.

1.8 QUALITY ASSURANCE

.1 Qualifications:

.1 Provide work of this Section executed by competent installers experienced, trained, licensed and approved, by material or system manufacturer for application of materials and systems being used having minimum 5 years experience in application of Products, systems and assemblies specified. Ensure firestopping systems conform to requirements of ULC-S115 tested assemblies that provide fire rating as shown.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Delivery:

.1 Deliver materials to site in manufacturer's sealed and labelled containers. Materials are subject to Consultant's inspection.

.2 Storage:

.1 Store materials inside building for 24 hours prior to use; store in area designated by Consultant. Protect from damage and environmental conditions detrimental to material.

.2 Comply with manufacturer's temperature, relative humidity and substrate moisture content for storage, mixing, application and curing of Products.

1.10 SITE CONDITIONS

.1 Comply with manufacturer's recommended requirements for temperature, relative humidity, moisture content and presence of any sealer or release agents on substrate during application and curing of materials. Ensure surfaces are dry and frost free.

.2 Maintain minimum temperature of 5 deg C (40 deg F) for minimum period of 1 week before application, during application and until application is fully cured.

.3 Ventilate areas in which firestopping is being applied. Protect water-soluble material from wetting until fully cured.

1.11 WARRANTY

.1 Warrant work of this Section against defects and deficiencies for period of 5 years in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no additional expense to Owner. Defects include but are not limited to cracking, breakdown of bond, failure to stay in place or bleeding

PART 2 – PRODUCTS

2.1 MANFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 A/D Fire Protection Systems Inc.; www.adfire.com

.2 GE Canada, Inc.; www.gesilicones.com

.3 Electrical Products Division/3M; www.3m.com

.4 Grace Construction Products; www.graceconstruction.com

.5 Instant Firestop Inc.

.6 Hilti (Canada) Corporation; www.ca.hilti.com

.7 Johns Manville, Fire Protection Systems; www.jm.com

.8 Tremco Canada; www.tremcosealants.com

2.2 SYSTEMS

.1 Firestopping and smoke seal systems shall be:

.1 Tested in accordance with CAN/ULC-S115-05.

.2 Listed by ULC or other fire testing agency approved by jurisdictional authorities.

.3 Capable of providing fire resistance rating not less than that required by surrounding assembly.

.4 Comply with F, T and H rating required.

.2 Firestopping and smoke seals for vertical fire separations shall meet ULC designation PJ, JF and HW as required for respective location.

2.3 MATERIALS

.1 Firestopping and smoke seal materials:

.1 Provide materials which are:

.1 PCB and asbestos-free;

.2 An easily identifiable colour, except where used in exposed location;

.3 Suitable for intended application;

.4 Compatible with adjacent materials.

.2 Provide elastomeric type materials at locations requiring future re-entry (such as cable) and at penetrations for ducts and other mechanical items requiring sound and vibration control.

.3 Sealant type materials shall be non-sagging for vertical surfaces and self-levelling for level floors.

.2 Primer: as recommended by firestopping material manufacturer for specific substrate and use.

.3 Damming and back-up materials, support and anchoring devices: non-combustible, in accordance with tested assembly and as recommended by manufacturer.

2.4 MIXING

.1 Mix materials at correct temperature and in accordance with manufacturer's directions.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 PREPERATION

.1 Remove combustible material and loose material detrimental to bond from edges of penetration. Clean, prime or otherwise prepare substrate material to manufacturer's recommendation.

.2 Do not apply firestop material to surfaces previously painted or treated with sealer, curing compound, water repellent to other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required..

.3 Verify openings, dimensions and surfaces conform to fire and smoke seal assembly.

.4 Protect adjacent surfaces from marring or damage.

.5 Prime surfaces in accordance with manufacturer's directions.

.6 Remove insulation from area of insulated pipe and duct where such pipes or ducts penetrate fire separation unless ULC certified assembly permits such insulation to remain within assembly..

.7 Provide temporary damming, forming, packing and bracing materials necessary to contain firestopping. Upon completion, remove forming and damming materials not required to remain as part of system.

.8 Examine sizes, anticipated movement and conditions of opening and penetration to establish correct system and depth of backup materials and of firestopping material required.

3.3 INSTALLATION

.1 Do not apply firestop material to surfaces previously painted or treated with sealer, curing compound, water repellent to other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required

.2 Seal penetrations through and gaps in fire rated separations in accordance with ULC listing for tested system selected.

.3 Apply firestopping materials in accordance with manufacturer's instructions and tested designs. Apply with sufficient pressure to properly fill and seal openings to ensure continuity and integrity of fire separation. Tool or trowel exposed surfaces as required.

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

.5 Unless otherwise indicated or permitted by Consultant recess firestopping and smoke seals in exposed locations to permit installation of decorative sealant by Section 07 92 00.

.6 Do not cover materials until full cure has taken place.

.7 Provide firestopping and smoke seal systems at following locations, without being limited to:

.1 At all openings, voids and penetrations through all floor slabs except openings within shafts constructed with a fire resistance rating and slabs on granular fill.

.2 At all openings, voids, control joints and penetrations through fire rated masonry, concrete and gypsum board walls, partitions and shaft walls.

.3 At all openings, voids and penetrations installed for future use through fire rated masonry, concrete and gypsum board walls, partitions and shaft walls.

.4 Between perimeter of all floor and roof slabs and exterior wall construction.

.5 Between curtainwall and adjacent assemblies.

.6 Between tops of all fire rated walls and partitions and underside of floor or roof slabs.

.7 At building expansion joints.

.8 Curing: cure materials in accordance with manufacturer's directions.

3.4 SITE QUALITY CONTROL

.1 Upon Consultant's request, manufacturer's representative shall inspect work of this Section and confirm in writing that it complies with specified requirements.

.2 Request Consultant's review of installed systems before they are covered by other work.

.3 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner

.4 Owner may arrange for inspection and testing of work of this Section by independent agency as directed by Consultant.

.5 Where work or materials fail to meet requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials.

3.5 CLEANING

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application to satisfaction of Consultant. Remove and or correct staining and discolouring of adjacent surfaces as directed.

.2 Remove temporary dams after initial set of firestopping and smoke seal materials where such materials are left exposed in finished areas and flame spread rating of such materials exceed a value of 25, in accordance with CAN/ULC-S102.

3.6 PROTECTION

.1 Fully protect walls, windows, floors and other surfaces around areas to be firestopped from marring or damage. Mask where necessary to avoid spillage on to adjoining surfaces. Mask areas adjacent to openings, where necessary to prevent contamination or marring of adjacent surface materials. Remove masking after seal has been completed and an initial set has been achieved. Remove stains on adjacent surfaces as required.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Provide sealants including but not limited to following exterior locations:

.1 Between dissimilar materials in exposed locations except where specifically indicated otherwise;

.2 Control joints in masonry elements;

.3 Joints between precast concrete elements and between precast concrete elements and adjacent work;

.4 Below door thresholds (double bead);

.5 At perimeter of door, screen and louvre frames;

.6 At penetrations through exterior building elements;

.7 Where indicated.

.2 Provide sealants including but not limited to following interior locations:

.1 Between dissimilar materials in exposed locations except where specifically indicated otherwise;

.2 Perimeter of exterior door, louvre and screen frames;

.3 Between interior door frames and wall where gap exceeds 1.5 mm or where gap is irregular;

.4 Control joints in masonry elements, and joints between bearing and non-bearing masonry walls;

.5 Building expansion joint, except where expansion joint covers are required;

.6 At ceramic tile control joints;

.7 Perimeter of firehose cabinets, access panels, and control panels;

.8 Between vanities/countertops and wall;

.9 Between interior door frame and flooring;

.10 Where indicated.

.3 At interior locations use acrylic emulsion sealant except:

.1 At floor control joints use self levelling polyurethane;

.2 At vanities/countertops and at ceramic wall tile control joints use silicone sealant;

.3 Where expected joint movement exceeds movement capability of acrylic emulsion sealant, use sealant specified for exterior use, as directed by Consultant.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 04 20 00 – Masonry Units;

.3 Section 06 10 00 – Rough Carpentry;

.4 Section 07 84 00 - Firestopping and Smoke Seals;

.5 Section 08 11 13 - Steel Doors and Frames;

.6 Section 09 21 16 – Gypsum Board.

1.4 REFERENCES

.1 Caulking = Sealant.

.2	ASTM C661-06(11)	-Standard Test Method for Indentation Hardness of Elastomeric-Type Sealant by Means of a Durometer
.3	ASTM C719-93(10)	- Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (HockmanCycle)
.4	ASTM C834-10	- Standard Specification for Latex Sealants
.5	ASTM C920-11	- Standard Specification for Elastomeric Joint Sealants
.6	ASTM C1021-08	-Standard Practice for Laboratories Engaged in Testing of Building Sealants
.7	ASTM C1248-08	- Standard Test Method for Staining of Porous Substrate by Joint Sealants

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Review Specification for work included under this Section and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of this Section.

1.6 SUBMITTALS

.1 Prior to start of work submit digital Product information from sealant manufacturer prior to commencement of work of this Section verifying:

.1 Selected sealant materials are from those specified;

.2 Composition and physical characteristics;

.3 Surface preparation requirements;

.4 Priming and application procedures;

.5 Suitability of sealants for purposes intended and joint design.

.6 Sealants compatibility with other materials and Products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, brick, stone, concrete, masonry, metals and metal finishes, ceramic tile, plastic laminates and paints

.7 Verify compatibility of new materials with existing, carry out adhesion testing, testing on gasket materials to verify no discoloration takes place when sealant is in contact with gasket and whether it is necessary to totally remove (i.e. grind off) existing sealing materials. Verify with manufacturer.

.2 Provide cured, colour samples of manufacturer's standard range of colours in each type of sealant and caulking compound for colour selection by Consultant. Submit samples of primer, bond breaker tape and joint backing material, if requested.

1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Provide work of this Section executed by competent installers who have a membership in good standing with SWRI and have minimum of 5 year’s experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.

.2 Upon Consultant's request arrange for sealant manufacturer's technical representative to visit the site, investigate conditions and make recommendations in connection with work of this Section.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Delivery:

.1 Deliver caulking and sealant materials to site in original, unopened containers with manufacturers’ labels and seals intact. Labels to identify manufacturer's name, brand name of Product, grade and type, application directions and shelf life or expiry date of Product.

.2 Storage:

.1 Store materials in a dry area having an ambient temperature within limitations recommended by material manufacturer.

.2 Do not use caulking and sealant materials that have been stored for period of time exceeding maximum recommended shelf life of materials.

1.9 SITE CONDITIONS

.1 Do not apply any sealant under adverse weather conditions, when joints to be sealed are damp, wet or frozen or when at ambient temperatures below 5 deg C. Maintain minimum temperature of application during application and for 8 hours after application. Consult manufacturer for specific instructions before proceeding and obtain Consultant's approval

.2 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated and until contaminants capable of interfering with adhesion are removed from joint substrates.

1.10 WARRANTY

.1 At no cost to Owner remedy any defects in work, including work of this and other Sections, due to faults in materials and workmanship provided under this Section appearing within a period of two (2) years from date of Substantial Performance.

PART 2 – PRODUCTS

2.1 MANFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 BASF Construction Chemicals, LLC; www.buildingsystems.basf.com

.2 CPD Construction Products; www.cpd.com

.3 Dow Corning; www.dowcorning.com

.4 Euclid Chemical Canada Ltd.; www.euclidchemical.com

.5 Momentive Performance Materials; www.momentive.com

.6 Sika Canada Inc.; www.sika.ca

.7 Tremco Canada; www.tremcosealants.com

.8 W.R. Meadows of Canada; www.wrmeadows.com

2.2 MATERIALS

.1 Sealant materials:

.1 Exterior sealant for vertical joints: two-part medium modulus silicone sealant with joint movement capability of ±50%; custom colour selected by Consultant: ASTM C920, Type S, Grade NS, Class 25, uses NT, G, A, 0: standard of acceptance: Dow Corning 790 Silicone Building Sealant.

.2 Interior sealant for vertical joints: one part acrylic latex with joint movement capability of ±7 ½%, paintable: ASTM C834 Type OP, Grade -18°C, standard of acceptance: Tremflex 834.

.3 Interior sealant for horizontal joints: multi-component, self levelling, chemically curing polyurethane: ASTM C920, Type M, Grade P, Class 25: Standard of acceptance: Tremco THC-900.

.4 Interior sealant for wet locations: mildew-resistant silicone formulated with fungicide: ASTM C920, Type S, Grade NS, Class 25, Uses NT, G, A: standard of acceptance: Dow Corning 786 Mildew Resistant Silicone Sealant.

.5 Colours: selected by Consultant from manufacturer's standard colours.

.2 Primers, thinners, cleaners: as recommended by sealant manufacturer, non-staining type.

.3 Premoulded backup for sealant: non-gassing closed cell foam rope, compressed 25% when in joint: Sof-Rod by Tremco, or Cera-Rod by W.R. Meadows.

.4 Bond breaker: closed cell polyethylene or vinyl foam tape, self-adhering one side.

.5 Performance:

.1 Provide exterior and interior elastomeric joint sealants establishing and maintaining water tight, water resistant and air tight continuous joint seals without staining or deteriorating joint substrates.

.2 Products with capability, when tested for adhesion and cohesion under maximum cyclic movement in accordance with ASTM C719, to withstand required percentage change in joint width existing at time of installation and remain in compliance with other requirements of ASTM C920 for uses indicated.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Examine joints for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealant performance. Ensure joints are suitable to accept and receive sealants.

.2 Verify joint surfaces are clean, sound, free of defects and dimensions are within sealant manufacturer's size requirements.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

.4 Do not apply sealant to masonry until mortar has cured.

.5 Preinstallation Testing: Before any sealing work is commenced, test materials for indications of staining or poor adhesion.

.6 Start of work implies acceptance of conditions.

3.2 PREPERATION

.1 Clean and prepare joints to be caulked to produce clean sound surfaces for sealant adhesion.

.2 Remove previous caulking, dust, oil, grease, water, frost, loose mortar and other foreign matter. Remove loose particles by blowing joint out with compressed air.

.3 Chemically clean non-porous surfaces such as metal and glass, taking care to wipe solvents dry with a clean cloth. Use solvents recommended by sealant manufacturer.

.4 Clean porous surfaces such as masonry, concrete and stone by mechanical abrading.

.5 Surfaces adjacent to joints to be primed and which may be stained by primer shall be masked with tape before primer is applied.

.6 Prime joints in accordance with sealant manufacturer's recommendations. Apply primer before installing premoulded backup.

.7 Install premoulded backup in joints 6 mm and more in width. Roll rope type backup into joint, do not stretch or braid. Install bond breaker in joints less than 6 mm in width.

.8 Protect adjacent surfaces from stains and contamination. Make good any damage caused.

3.3 INSTALLATION

.1 Do not apply firestop material to surfaces previously painted or treated with sealer, curing compound, Apply sealants under pressure using suitable equipment. Gun nozzle shall be of proper size to fit, and seal joint.

.2 Force sealant into joints in full bead, making certain that void free contact is made with sides of joint. Tool joints to produce a slightly concave surface.

.3 Caulking must appear as a concave recessed joint, free of ridges, wrinkles and embedded foreign matter. Caulking shall not spread or bulge beyond surfaces on each of joint.

.4 Apply sealants in accordance with following table:

Joint Width	Sealant Depth
5 mm	5 mm
10mm	5mm
15mm	7mm

20mm 10mm

.5 **No caulking joint, interior or exterior, shall exceed 13mm in total width.** Above that width, other measures to be utilized to seal/cover the joint as approved by consultant.

.6 Vent exterior joints as directed by Consultant.

3.4 SITE QUALITY CONTROL

.1 Independent inspection and testing company may be appointed and paid for by Owner to carry out inspection and testing as directed by Consultant.

.2 Inspect joints for complete fill, for absence of voids and for joint configuration complying with specified requirements. Record results in a manner acceptable to Consultant.

.3 Tests may include sampling of installed Product where adhesion, cohesion or reversion failure is suspected.

.4 Where work or materials fail to meet requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials

.5 Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

.6 Prior to commencement of sealing, arrange for sealant manufacturer's technical representative to visit the Place of the Work and inspect surfaces and joints to be sealed.

3.5 CLEANING

.1 Immediately clean adjacent surfaces which have been soiled and leave work in neat, clean condition. Remove excess materials, compounds smears or other soiling resulting from application of sealants. Use manufacturer recommended cleaners and solvents. Leave finished work in neat, clean condition with no evidence of spillovers onto adjacent surfaces

3.6 PROTECTION

.1 Provide approved, non-staining means of protection for completed joint sealant installations where required to protect work from mechanical, thermal, chemical and other damage by construction operations and traffic.

.2 Maintain protection securely in place until completion of Work. Remove protection when so directed by Consultant.

3.7 SCHEDULE

.1 Apply sealant at the following exterior locations:

.1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.

.2 Control joints in masonry elements.

.3 Below door thresholds (double bead).

.4 Penetrations through exterior building elements.

.5 Where indicated.

.2 Apply sealant at the following interior locations:

.1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.

.2 Perimeter of exterior and interior door and screen frames (both sides).

.3 Control joints in masonry elements, and joints between bearing and non-bearing masonry walls.

.4 Porcelain/Ceramic tile control joints.

.5 Perimeter of firehose/extinguisher cabinets, access and control panels.

.6 Between vanities/countertops and wall.

.7 Where shown.

.3 At interior locations use acrylic emulsion sealant except:

.1 At floor control joints use polyurethane sealant.

.2 At vanities/countertops and at ceramic wall tile control joints use silicone sealant.

.3 Where expected joint movement exceeds movement capability of sealant, use sealant specified for exterior locations as directed by Consultant.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

.1 Section Includes: Provide steel doors and frames including, but not limited to, the following:

.1 Hollow metals doors, frames, and transom panels;

.2 Preparation of hollow metal doors and frames for door hardware;

.3 Glazing Stops.

.4 Door Louvres.

1.2 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures

.2 Section 04 20 00 – Masonry Units

.3 Section 07 92 00 - Sealants

.4 Section 08 71 00 - Door Hardware

.5 Section 08 80 00 – Glass and Glazing

.6 Section 09 21 16 – Gypsum Board

.7 Section 09 91 00 – Painting

.8 Wiring and Conduit of electronic hardware in frame; Electrical Drawing

1.3 REFERENCE STANDARDS

.1	ANSI/UL 263-03(07)	- Fire Resistance Ratings
.2	ANSI A250.4-94	-Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors
.3	ANSI A250.10-98(11)	-Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
.4	ASTM A568/A568M-11b	-Standard Specification for Steel, Sheet, Carbon, Structrural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for:
.5	ASTM A653/A653M-11	-Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.6	ASTM C177-10	-Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
.7	ASTM C518-10	-Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
.8	ASTM E90-09	-Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
.9	ASTM E413-10	- Classification for Rating Sound Insulation
.10	CGSB 41-GP-19Ma	- Rigid Vinyl Extrusions for Windows and Doors
.11	CAN/CGSB-82.5-M88	- Insulated Steel Doors
.12	CSA W59-03(08)	- Welded Steel Construction (Metal Arc Welding)
.13	NAAMM-HMMA 840-07	-Guide Specification for Installation of Hollow Metal Doors and Frames
.14	NFPA 80-13	- Standard for Fire Doors and Other Opening Protectives
.15	NFPA 252-12	- Standard for Fire Tests of Door Assemblies
.16	NFPA 257-12	-Standard for Fire Tests of Window Assemblies
.17	CAN4-S104-M80(85)	- Standard Method for Fire Tests of Door Assemblies
.18	CAN4-S105-M85(92)	-Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104
.19	CAN4-S106-M80(85)	-Standard Method for Fire Test of Window and Glass Block Assemblies
.20	CAN/ULC-S702-09	- Standard for Mineral Fibre Thermal Insulation for Buildings

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Submit a schedule indicating each door and frame related to the Door and Frame Schedule.

.2 Coordinate with related work of other Sections including, but not limited to: door, frame, hardware and electrical.

1.5 SUBMITTALS

.1 Shop Drawings:

.1 Visit the site to confirm appropriate existing dimensions and site conditions prior to the submission of shop drawings.

.2 Submit digital door, frame and hardware shop drawings to Consultant for review.

.3 Shop drawings to indicate each type of frame, door, core, metal thicknesses and finishes, openings (glazed and/or louvred), fire ratings, location of exposed fasteners, cutouts, hardware blanking, reinforcing, tapping and drilling arrangements. Show large scale frame sections and anchoring details and any other pertinent data.

.4 Submit following test and evaluation reports:

.1 Steel door and frame assemblies supplied under this Section meet acceptance criteria of ANSI A250.10 and ANSI A250.4, Level "A".

.2 Insulated door cores supplied in exterior doors under this Section meet specified thermal resistance rating.

.3 Thermally broken frames meet or exceed CAN/CGSB-82.5-M.

.4 Acoustic door and frame assemblies provide the STC and sound TL values specified with the critical frequency range, as determined and scheduled by the Consultant.

.5 Ensure reports include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

.6 Submit in addition to fire label, certificate to substantiate design and construction of fire-rated screen and window assemblies, if required by Consultant or authorities having jurisdiction

.2 Progress Photographic Documentation:

.1 Contractor to provide to the Consultant a daily photographic documentation report for the progress of work at the following key stages:

.1 Removal of existing windows, screens and doors;

.2 Removal of vapour barrier and insulation;

.3 Installation of insulation;

.4 Installation of blue skin.

.2 Contactor's photographs are to be clear and of a scale that allows viewing of the specific conditions.

.3 Contractor to identify any unforeseen existing conditions discovered during the four stages of documentation when the photos are emailed.

.4 Contractor to provide a floor plan is to accompany the photos to identify the room name and day work completed.

1.6 QUALITY ASSURANCE

.1 Execute the work of this Section by a manufacturer who is a member of CSDMA Steel Doors and Frames.

.2 Coordination with hardware distributer prior to submission of shop drawings.

.3 Fire protection requirements: fire rated windows, doors and frames shall bear ULC or WHI label for required rating and shall be installed in accordance with NPPA 80 - Fire Doors and Windows, current edition. Provide temperature rise rated assemblies where required.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle and store fabricated components to prevent permanent distortion, corrosion and damage. Coordinate storage location with Owner.

.2 Remove wrappings from doors upon delivery to site and inspect for any damage. Replace any damaged or bent material immediately.

.3 Handle and store metal materials at the job site in such a manner to prevent damage to other materials, to existing building or property.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Acceptable Manufacturers:

.1 Ali-Porte Inc.

.2 Artek Door Ltd.

.3 Baron Metal

.4 Daybar Industries Ltd.

.5 Fleming Door Products

.6 Gensteel Doors

.7 Metal Door

.8 Shanahan’s Ltd.

.2 Sheet Steel: Commercial grade steel to ASTM A568/A568M, Class 1, hot-dip galvanized to ASTM A653/A653M, ZF120 (A40), known commercially as "Colourbond", "Satincoat", or "Galvanneal". Steel sheet thicknesses specified are base metal thicknesses prior to galvanizing.

.3 Door Cores:

.1 Interior Doors (non fire rated): Honeycomb - Structural small cell 25 mm maximum, kraft paper "honeycomb"; weight; 36 kg per ream (min), density; 16.5 kg/m^3 minimum, sanded to required thickness.

.2 Exterior Doors and interior doors separating conditioned and unconditioned spaces: Mineral wool insulation, density 24 kg/m^3 minimum consisting of durable fibrous material processed from rock, slag or glass, bound with deterioration resistant binders, CAN/ULC-S702, Type

.3 Fire Rated Doors: in accordance with fire test requirements.

.4 Reinforcing steel: CAN/CSA-G40.21-04 Grade 300W, hot dip galvanized to CAN/CSA-G164-M92.

.5 Exterior door frame and interior door frame separating conditioned and unconditioned space thermal break: non-conductive PVC or neoprene.

.6 Adhesives:

.1 Honeycomb Cores and Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.2 Polystyrene and Polyurethane Cores: Heat resistant, epoxy resin based, low viscosity, contact cement.

.3 Adhesive For Lock Seam Edges: 2 component, fire-resistant RRPC type.

.7 Finishing Materials:

.1 Touch up paint: zinc rich paint CAN/CGSB-1.181-99.

.2 Metal filler: two component epoxy type

.8 Door Louvres:

.1 Fire rated Louvres: 1900A Fire-Rated Air Louvre by Activar Inc. or equivalent product by EH Price; Finish Silver (SI).

2.2 FABRICATION

.1 Hollow Metal Window and Door Frames (and Transom Frames):

.1 Interior Frames: Minimum 1.5 mm thick (16 ga) steel

.2 Exterior Frames : Minimum 1.9 mm thick (14 ga) steel.

.3 Reinforcement for hardware:

.1 Surface Applied Hardware: Minimum 1.2 mm thick (18 ga) steel.

.2 Concealed Door Closer or Holder: Minimum 3.5 mm thick (10 ga) steel

.3 Butts and Pivots: 3.5 mm (10 ga) steel.

.4 Panic Bars: 3.5 mm (10 ga) steel.

.5 Flush Bolts, Locks and Strikes: 2.5 mm (12 ga) steel.

.6 Mortar Boxes: 1.0 mm (20 ga) steel.

.7 Surface Mounted Overhead Stops / Closers: 2.8mm steel.

.8 Lock and Strike: Minimum 1.5 mm thick (16 ga) steel.

.9 Hinge: Minimum 3.4 mm thick (10 ga) steel.

.4 Protect hardware reinforcements at frames located in masonry elements with 1.0 mm thick guard boxes.

.5 Hardware reinforcements shall be minimum 3.5 mm (10 ga) thick exclusive of frame thickness, cold-rolled commercial quality steel, regular galvannealed finish. Provide reinforcement at all hardware fastening points.

.6 Coordinate for removable hardware mullions where indicated: refer to Section 08 71 00 Door Hardware.

.7 Make provisions to accommodate automatic door openers where required. Coordinate with Electrical Division.

.8 Top and Bottom End Channels: Minimum 1.2 mm thick (18 ga) steel.

.9 Jamb Spreaders: Minimum 01.0 mm thick (20 ga) steel.

.10 Glazing Stops: Minimum 1.0 mm thick (20 ga) steel, formed, drilled and countersunk for fastenings.

.11 Assemble components with accurately cut joints. Mitre outside corner joints of frames. Weld joints on inside of profile; grind welds, flush and sand to smooth uniform surface. Tab connectors and partial or spot welding is not acceptable.

.12 Fit and assemble work in the shop wherever possible, eliminating field joints.

.13 Side light and transom framing shall be of same thickness metal as adjacent door frame.

.14 Drill interior door frames for rubber bumpers. Drill strike jamb of each single door frame for 3 bumpers. Drill head member of double door frames for 2 bumpers.

.15 Provide angle or channel door head reinforcement for doors wider than 915 mm.

.16 Provide adjustable base clips for anchorage to floor at bottom of each door jamb.

.17 Provide welded on metal drip at head of exterior doors.

.18 Exterior and interior door frames between conditioned and unconditioned space shall be thermally broken.

.19 For rated frames at doors and windows, provide Special Thermal Glazing Kits to accommodate installation of 25mm thick Fire Rated Glazing (FRG). Refer to screen/door types on the drawing for locations of rated frames. Location: JD Hodgson Elementary School.

.2 Hollow Metal Doors:

.1 Interior doors: Honeycomb core construction or between conditioned and unconditioned spaces shall be insulated. Skins shall be 1.2 mm thick (18 ga) steel. Join door faces at vertical door edges with tight-fitting mechanical interlock joint.

.2 Exterior doors: Reinforced hollow steel construction with all spaces filled with insulation. Skins shall be minimum 1.5 mm thick (16 ga) steel. Join door faces at vertical door edges by continuous weld, extending full height of door; grind, fill and dress smooth.

.3 Construct fire rated doors in accordance with fire test requirements. Double doors shall be labelled without need for mullions, astragals or coordinating devices. Doors with transom panels shall be labelled with rebated interlocking head condition.

.4 Provide all doors of seamless construction with no visible seams or joints on faces.

.5 Provide flush end closures made of steel at top edge of exterior doors and where required for attachment of hardware and weatherstripping.

.6 Hardware reinforcements shall be minimum 3.5 mm (10 ga) thick steel exclusive of door skin thickness. Provide reinforcement at all hardware fastening points.

.7 Surround openings in flush doors with minimum 1.2 mm thick (18 ga) steel edge channels, welded to both face sheets.

.8 Provide removable glazing stops of zinc coated steel channels mitred at corners, accurately fitted into position and fastened with oval headed, plated screws.

.9 Glazing stops at exterior doors shall be located on the interior side.

.10 Construct oversized doors to sizes indicated; frame and reinforce doors as required to maintain shape.

.11 All exterior and interior glazing between conditioned and unconditioned spaces should be prepped for 25mm thickness.

.12 All interior glazing, except for fire rated and interior glazing separating conditioned and unconditioned spaces should be prepped for 6mm thickness.

.13 All fire rated glazing should be prepped as required by fire rated glazing.

.3 Finishes:

.1 Fill seams, corner joints and other depressions with filler and sand smooth.

.2 Clean and remove all traces of oil, grease and other foreign substances to ensure proper bond of touch up after fabrication.

.3 Touch up damaged zinc coating with zinc rich paint.

.4 Insulate, where necessary to prevent electrolysis, metal surfaces in contact with dissimilar metals or cementitious materials.

.4 Exterior fire rated windows, doors, frames and louvres to have shop applied 4 coat painted finish (3 of the 4 coats to be shop applied): Fluoropolymer coating, PPG Duranar XLB Coating, Metalic colour to match clear anodized aluminum as selected by Consultant.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions, floor conditions in path of door swing and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install non rated frames and doors according to CSDMA and fire-rated frame and doors in accordance with NFPA 80.

.2 Allowable limit of distortion shall be 1.5 mm out of plumb at each jamb, measured on face of frame, resulting in maximum twist of frame of 3 mm measured from upper corner to lower diagonal corner.

.3 Anchorage of frames shall be by means of standard anchors. Where standard anchors cannot be used, provide special anchors to ensure proper installation. Method of anchorage shall not be visible when frames are installed.

.4 Provide minimum 3 anchors at each jamb. At frames exceeding 2150 mm in height provide one additional anchor for each additional 610 mm, or part thereof.

.5 Anchor intermediate vertical frame members to structure above as required to ensure stability. Where required, provide steel frame extensions. Provide flexible connection at structure to allow for deflection. Brace frames solidly in position while being built in.

.6 Seal openings between walls surfaces and frames around all edges.

.7 Install threshold saddles across bottom of exterior door frames.

.8 Remove steel shipping spreaders; install wood installation spreaders at sill and at third points of frame rabbet height to maintain constant frame width. Remove wood spreaders only after frames are securely anchored in place.

.9 Install hardware in accordance with hardware supplier's instructions.

.10 Install louvers, glazing and door silencers.

.11 Adjust operable parts to ensure proper operation.

.12 Finish doors and frames as per Section 09 90 00 Painting.

3.3 SITE QUALITY CONTROL

.1 Patch damaged shop primer. Remove rust, sand damaged and abraded surfaces and touch-up with zinc rich paint.

.2 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Supply and install aluminum doors, frames and entrances including, but not limited to, the following:

.1 Aluminum doors & frames;

.2 Vision glass and insulated metal infill panels;

.3 Preparation of aluminum doors and frames for door hardware;

.4 Aluminum trim, closures and cover plates;

.5 Sealants;

.6 Supply direct to other Sections anchors, inserts and items required to be built into work of other Sections.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 07 92 00 - Sealants, except where specifically stated otherwise herein;

.3 Section 08 71 00 - Door Hardware;

.4 Section 08 81 00 – Miscellaneous Glazing;

.5 Wiring and Conduit of electronic hardware in frame; Electrical Drawing.

1.4 WORK SUPPLIED BUT NOT INSTALLED

.1 Supply to other Sections anchors, inserts and items required to be built into work of other Sections.

.2 Ensure accurate setting of built-in items; where necessary provide templates, diagrams or other suitable means of instruction.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS

.1 Design door to withstand, without any detrimental effects to appearance and performance, wind loads and temperature range expected in geographical area of this project (OBC climatic information 50 year probability), unless specified otherwise.

.2 Design systems to accommodate without detrimental effects on appearance and performance of system.

.1 Positive and negative wind loads.

.2 Thermal expansion and contraction of systems components.

.3 Movement, deflection and creep of building structural frame.

.3 Limit deflection of component parts under maximum design load to 1/175 of span or less if required by glass manufacturer.

.4 Exterior screens:

.1 Structural performance shall be based on CSA 157-05 "Strength Design in Aluminum" and a maximum deflection of 1/175 of the span.

.2 Air infiltration shall not exceed 0.0003 m^3 / s-m^2 when tested in accordance with ASTM E283 at a pressure differential of 75 Pa.

.3 There shall be no water infiltration when tested in accordance with ASTM E331 with a pressure differential of 300 Pa.

.4 Thermally, the grid members shall have a condensation resistance equal to, or better than, the area along the bottom of a 25 mm thick sealed glass unit with standard metal spacer edge construction.

1.6 ADMINISTRATIVE REQUIREMENTS

.1 Coordinate with related work of other Sections including, but not limited to: door, frame, hardware and electrical. Be responsible to provide adequate reinforcing, clearances, rebates and brackets for hardware specified and for accurate installation of door and hardware on site.

1.7 SUBMITTALS

.1 Shop Drawings:

.1 Visit the site to confirm appropriate existing dimensions and site conditions prior to the submission of shop drawings. Notify the Consultant of any discrepancies prior to completing shop drawings.

.2 Submit digital door, frame and hardware shop drawings to Consultant for review. Shop drawings released to Consultant for review shall contain hardware trade's review stamp and acceptance signatures.

.3 Shop drawings to indicate relation to adjoining work and location, construction and back-up, joint sealant, interior structure and/or reinforcements, door and glazing modules, head and frame details, extrusion sections, glazing and glass stop details, thermal break sections and vinyl or neoprene mouldings and anchorage and assembly fixings. Materials used for every component must be clearly indicated on Shop Drawings.

.4 Shop drawings for screens required to be designed as guards to meet loading requirements in accordance with Part 4 of the Ontario Building Code, shall bear the seal of a structural engineer who is licensed in the Province of Ontario and responsible for the design. Engineering design shall include, but not limited to, framing, glazing, attachment of frame to building and all other structural components.

.2 Samples:

.1 Submit two sets of samples minimum 50mm x100mm of each type of metal finish specified.

.3 Closeout Documents:

.1 Provide operation and maintenance instructions for aluminum screens, doors and hardware.

1.8 QUALITY ASSURANCE

.1 Work of this Section shall be executed by fabricator and installer approved by manufacturer and with a minimum of 5 years' experience in the type of work specified herein, having adequate equipment and skill to expediently complete the work in an efficient manner. Only products from manufacturers listed will be accepted unless written approval is issued by the Consultant.

.2 Fabrication tolerances: overall height, width and diagonal dimensions of frames shall be within the following tolerances:

Dimension of 1.8 m and less: +/- 1.5 mm
Dimension more than 1.8 m: +/- 3 mm

.3 Caulking: comply with requirements of Section 07 92 00 except where specifically stated otherwise herein.

.4 Glass and glazing: comply with requirements of Section 08 81 00 except where specifically stated otherwise herein.

.5 Coordination and approval by the hardware distributer is required prior to submission of shop drawings.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle and store fabricated components to prevent permanent distortion, corrosion and damage. Coordinate storage location with Owner.

.2 Remove wrappings from doors upon delivery to site and inspect for any damage. Replace any damaged or bent material immediately.

.3 Handle and store metal materials at the job site in such a manner to prevent damage to other materials, to existing building or property.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Sealants are not to be installed when ambient temperature is less than 5 degrees C during and forty-eight hours after installation.

1.11 WARRANTY

.1 At no cost to the Owner, correct defective Work within a five (5) year period after Substantial Completion. For the purposes of this paragraph, defects shall include, but not limited to the following:

.1 Water infiltration in excess of requirements specified.

.2 Air infiltration / exfiltration in excess of requirements specified

.3 Deflection of system components in excess of requirements specified.

.4 Failure of joint seal.

.5 Cracked glass (except where caused by vandalism).

.6 Delamination, cracking, blistering, excessive fading of metal finishes.

.2 At no cost to the Owner, warrant aluminum doors against defects for a period of ten (10) years from the date of Substantial Completion.

.3 At no cost to Owner, replace factory sealed insulating window units should cracking of glass or any other breakdown or failure of glass units occur or should obstruction of vision develop due to dust or film forming on inner glass surfaces within a period of ten (10) years from date of Substantial Performance.

.4 Include coverage for complete system for failure to meet specified requirements.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 General:

.1 Material: Aluminum Association Alloy AA-6063-T5 for extruded shapes, commercial quality AA-1100-H14 aluminum sheet for formed shapes.

.2 Hardware: Doors complete with weatherstripping around frame and along bottom of door and aluminum sill. Style "V" push & pull handles in clear anodized aluminum. Prepare doors to templates provided by hardware supplier forbutt hinges, exposed overhead closer, lock cylinder and flushbolt.

.3 Closures, Cover Plates and Trim: Extruded aluminum and sheet stock formed or brake shaped to profiles shown on Drawings (minimum 3mm thick) and as required to finish around windows.

.4 Dielectric Separator: Provide best grade, quick drying non-staining alkali resistant bituminous paint or epoxy resin solution or membrane type to acceptance of Consultant.

.5 Screws, Bolts and Fasteners: Self tapping cadmium plated steel for aluminum to aluminum contact and stainless steel for aluminum to steel contact.

.6 Compressible Filler: Supply "Unifoam R1009" by Goodco Limited.

.7 Temporary Strips and Safety Markings: Supply 25 mm wide, light reflecting, easily removable, pressure sensitive tape applied over glass lites in doors.

.2 Products:

.1 Framing:

.1 Extruded aluminum sections;

.2 Thermal Break Material: Polyvinyl chloride, of semi-rigid durometer hardness of 80, plus or minus 5, located on external side of glass pane

.3 Size units to allow for structural deflection of surrounding construction;

.4 Fastenings shall be concealed;

.5 Glazing stops shall be snap-on-type, without exposed fasteners;

.6 Internal weep drainage system;

.7 Reinforce members as required to withstand loads and to maintain deflection within allowable limited;

.8 Closures, covers and trim shall be extruded or formed to profiles shown and unless

otherwise shown, minimum 3 mm thick;

.9 Acceptable Non-Fire Rated Systems as follows:

.1 Wide Stile Series 655 Framing by Windspec.

.2 Trifab 451T framing by Kawneer Co. of Canada Ltd.

.3 Flush Glaze BF3400 Series Insulframe framing by Alumicor Ltd.

.2 Doors:

.1 Construct doors of minimum 4.8 mm thick porthole extrusions, with all fastenings and connections concealed.

.2 Vertical edge profile: bevelled or rounded;

.3 Glazing stops shall be snap-on-type, without exposed fasteners;

.4 Door Weatherstripping: Material designed for easy removal and replacement when worn; silicone treated twin-tuft pile at jambs and heads and 2.4 mm white vinyl strips at toes, complete with adjustable fixing to ensure a full "wipe" of the thresholds below;

.5 Where doors are incorporated into window wall provide suitable subframes;

.6 Provide cutouts, recesses, mortising required for finish and operating hardware;

.7 Provide heavy duty reinforcing at all door and frame hardware fastening points;

.8 Internally reinforce framing members where work of other Sections is to be fastened thereto;

.9 Provide rails and transoms to sizes and profiles shown;

.10 Prepare doors / frames for automatic door operator; provide head member of sufficient size to accommodate operator;

.11 Acceptable Non-Fire Rated Systems as follows:

.1 500 HTP Doors by Windspec.

.2 AA425 Doors by Kawneer Co. of Canada Ltd.

.3 Thermaporte 7700 Doors by Alumicor Ltd.

.3 Flashings:

.1 Aluminum; 1.27 mm thick, secured with concealed fastening method.

.2 Finish: To match framing sections where exposed.

.3 Finish:

.1 Colour Anodic Coating: all exposed components, AAMA 611 , Class I, AA-M12C22A44.

.1 Colour: Clear Anodized.

.2 Location: Interior and exterior exposed aluminum surfaces.

.2 Apply one (1) coat of bituminous paint to concealed steel and aluminum surfaces in contact with cementitious or dissimilar materials.

.3 Shop and Touch-Up Primer for Steel Components: SSPC-Paint 25, zinc oxide alkyd primer.

.4 Touch-Up Primer for Galvanized Steel Surfaces: MPI #18, inorganic zinc-rich primer.

.5 Extent of Finish:

.1 Apply factory coating to all surfaces exposed at completed assemblies.

.2 Apply finish to surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

.3 Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

.4 Glass and Glazing:

.1 Setting blocks: Neoprene, Shore "A" Durometer hardness of 70 to 90 points; spacer shims, 40 to 50 points, as recommended by glass manufacturers.

.2 Glazing sealant: one part polysulphide meeting requirements of CAN/CGSB-19.13-M87 or as recommended by window and glass manufacturer.

.3 Glazing tape: preshimmed polyisobutylene: Polyshim Tape by Tremco.

.4 Glazing wedges and splines: solid extruded neoprene or EPDM having Shore "A" Durometer hardness of 50 to 70 points as recommended by window manufacturer.

.5 Tempered glass in all doors and windows: CAN/CGSB-12.1-M91, clear.

.6 Low emissivity glass (Low-E): Solarban 60, clear by PPG

.7 Insulating glass: factory sealed double glazed, to CAN/CGSB-12.8-97:

.1 Nominal thickness: 25 mm

.2 Glass: unless indicated otherwise, tempered glass, minimum 6 mm thick, inside and outside; low emissivity coating on No. 3 surface.

.3 Space between glass filled with Argon gas.

.5 Sealant:

.1 Multi-component conforming to ASTM C920, Type M, Grade NS for sealant to be incorporated between aluminum framing and adjacent structures. Colours to be selected by Consultant from standard colour selection. Acceptable products: Dow Corning 790.

.2 Supply non-hardening, non-skimming, non-sagging, non-bleeding polyisobutylene or partially vulcanized rubber base sealant for use in concealed-sealing of thin joints in metal work.

.3 Joint backing to be non-gassing foam rope, compressed minimum 25% installed. Acceptable product: Sof-Rod by Tremco.

2.2 FABRICATION

.1 Form sections true to detail, free from defects impairing appearance, strength and durability.

.2 Ensure frames are tubular extruded shapes with sharp, well defined corners.

.3 Ensure overall assembled profiles are as detailed on Drawings.

.4 Fabricate frames with continuous thermal breaks. Locate thermal break on exterior side of the glazing as detailed on Drawings and hold by snap-in methods without the use of any metallic fasteners which could reduce the effectiveness of the thermal barrier.

.5 Corners of formed work must be mitred and closely fitted. Apply back-up sealants designed for this purpose on inside of joints in aluminum work by this Section.

.6 Anchorages must be attached to warm side.

.7 Carry out welding with argon shielded electric arcs to ensure complete fusion of the metal.

.8 Ensure aluminum doors have bevelled glazing beads designed for neoprene glazing system; except at exterior doors with insulating lites, use glazing system compatible with secondary sealant of the glass unit.

.9 Equip doors with full weatherstripping at perimeter. Install weatherstripping throughout full length and width of doors at jambs and heads.

.10 Fabricate doors and frames complete with necessary internal reinforcements, cutouts, recesses, mortising or milling operations required for a rigid assembly and to accommodate door hardware. Ensure connections have adequate strength.

.11 Fabricate frames with joints accurately fitted and securely joined together in a manner to ensure tightly fitting joints. Internally caulk and seal corners of frames and joints exposed to water penetration using a material compatible to resist flow at the high surface summer temperatures to be experienced by the metal.

.12 Fabrication Tolerances:

.1 Maximum Variation from Plumb: 1.5 mm/m non-cumulative or 1.5 mm per 3 m1/16 inches per 10ft, whichever is less.

.2 Maximum Misalignment of Two Adjoining Members Abutting in Plane: 0.8 mm1/32 inch.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions, floor conditions in path of door swing and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

.3 Return any existing hardware not scheduled for reuse to Owner.

3.2 INSTALLATION

.1 Frames:

.1 Erect and secure framing plumb, square and level, free from warp, twist and superimposed loads.

.2 Anchor framing to supporting building elements; provide brackets, anchors and clips as required. All devises for anchoring shall have sufficient adjustment to permit correct and accurate alignment. After alignment rivet, weld or otherwise positively lock anchoring devices to prevent movement other than that required to accommodate expansion, contraction and deflection.

.3 Anchor intermediate vertical frame members to structure above as required. Where support for intermediate vertical frame members is not available directly above head, provide frame extensions to structure above. Provide flexible connection at structure to allow for movement.

.4 Provide necessary inserts to be built into work of other Sections as required for anchorage of framing.

.5 Set frame members in bedding compound to ensure watertight assembly.

.6 Metal to metal joints between abutting components shall be sealed weathertight.

.7 Use concealed fastenings and anchorages in all locations. Exposed fastenings, where unavoidable, must be clearly identified on shop drawings, and require Consultant's approval prior to fabrication of work.

.8 Install foam-in-place insulation in all voids around windows and door frames and as shown on drawings.

.2 Doors:

.1 Install doors plumb, square, level, free from warp, twist and superimposed loads.

.2 Secure work adequately and accurately to structure in required position, in a manner not restricting thermal movement.

.3 Provide compressible filler over aluminum work at locations shown on Drawings.

.4 Install doors complete with finish hardware supplied by hardware supplier, in accordance with templates supplied by same.

.5 After installation of hardware, have hardware supplier check operation of hardware. Do readjustments as required.

.6 Use aluminum or stainless steel screws, nuts, bolts, washers, rivets and other fastening devices, colour to match doors and frames where exposed to view

.7 Coordinate with Division 26 for required power connection and wiring to automatic door operator and controls.

.3 Covers, Closures and Trim:

.1 Provide aluminum covers, closures and trim as indicated and as required to provide complete and finished installation.

.2 Wherever possible, provide concealed fastenings.

.4 Glazing:

.1 Use extruded gaskets for door glazing and of type compatible with secondary sealant in insulating glass unit locations.

.2 Thoroughly wipe surfaces receiving glazing materials with a cloth dampened in xylol to assure a clean surface.

.3 Place setting blocks at quarter points from each corner, centre sealed unit in opening and press firmly against tape. Provide isolation tape at edges of laminated glass to prevent staining of interply plastic from glazing materials. Roll-in inside resilient extrusion.

.5 Sealants:

.1 Fill space between door and screen perimeter frames and adjacent construction with air barrier sealant. Apply sealant with suitable equipment, in accordance with manufacturer’s directions. Fill spaces completely, leaving no voids or gaps; trim excess material. Leave sufficient room for installation of interior and exterior sealant and back-up.

.2 Provide caulking between framing members and adjoining work and where required to render work of this Section weathertight. Seal joints in accordance with manufacturer's recommendations. Prime contact surfaces prior to installation of sealant.

3.3 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.4 CLEANING

.1 Maintain aluminum work in a clean condition throughout construction period, so it will be without deterioration or damage at time of acceptance. Select methods of cleaning which will promote achievement of uniform appearance and stabilized colours and textures for materials that weather or age with exposure.

.2 Immediately before time of Substantial Performance, clean aluminum work thoroughly, inside and out. Demonstrate proper cleaning methods to Owner during this final cleaning. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials of the work and submit 2 copies to Consultant.

.3 Remove protective covering and coating from aluminum surfaces, inside and out and clean surfaces, remove labels, stripes and protective devices and polish glass surfaces, immediately prior to final acceptance of the work by Consultant.

3.5 PROTECTION

.1 Protect the work of this Section from damage. Protect work of other trades resulting from the work of this Section.

.2 Provide at factory, strippable coatings on exposed surfaces of aluminum. Ensure coating and protective wrappings remain on surfaces through period other trades' works proceed on the building and removed by this trade on completion of building.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures

.2 Section 08 11 16 – Aluminum Doors and Frames

.3 Section 08 41 13 – Aluminum Framed Entrances & Storefronts

.4 Electrical Drawings – Power Requirements

1.3 REFERENCE STANDARDS

.1 CAN/ULC-S104-10 - Standard Method for Fire Tests of Door Assemblies.

.2 CAN/ULC-S132-07 - Standard for Emergency Exit and Emergency Fire Exit Hardware.

.3 CSDMA (Canadian Steel Door Manufacturers Association).

.4 DHI (Door and Hardware Institute Canada) - AHC and EHC certification programs.

.5 DHI (Door Hardware Institute) - A115 series.

.6 DHI - Recommended Locations for Architectural Hardware for Flush Wood Doors (1993).

.7 BHMA (Builders Hardware Manufacturers Association) - A156 Series Standards.

.8 NFPA 80 - Standard for Fire Doors and Other Opening Protectives, 2013 Edition.

.9 NFPA 252 - Fire Tests of Door Assemblies, 2012 Edition.

.10 UL 10B-2008 - Fire Tests of Door Assemblies (10th Edition).

.11 UL 305-2012 - Standard for Panic Hardware (6th Edition).

1.4 SUBMITTALS

.1 Shop Drawings:

.1 Upon consultant’s request, submit samples of finish hardware.

.2 Prepare and submit a digital copy of a detailed hardware schedule and manufactures catalogue cuts.

.3 Provide confirmation of locations and mounting heights of each hardware item.

.4 The hands of doors shall be shown on the hardware schedule.

.5 The degree of opening for doors with overhead holders, closers and other affected hardware shall be included in the Hardware Schedule for approval.

.6 Furnish other Sections with templates required for hardware preparation and installation.

1.5 CLOSEOUT SUBMITTALS

.1 Submit Operation and Maintenance data including; operating hardware, lubrication requirements and inspection procedures related to preventative maintenance.

1.6 QUALITY ASSURANCE

.1 Meet requirements of Ontario Building Code and other applicable regulations.

.2 Manufacturer to have a minimum of five (5) years successful experience in the fabrication of automatic doors of the type required for this project.

.3 Installer performing the work of this section must have a minimum of three (3) years' experience and approved by the hardware manufacturer.

.3 Upon completion of the finish hardware installation, hardware supplier's qualified representative shall inspect the work and shall certify in writing that all items and their installation are in accordance with the requirements of the Contract Documents and are functioning properly. This document shall be included in the maintenance materials.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver each hardware item packaged separately in individual containers with necessary screws, keys, instructions and installation templates.

.2 Mark each container with item number corresponding to number shown on hardware schedule with respective door number.

.3 Store hardware in dry, lockable area.

1.8 WARRANTY

.1 Provide a ten (10) year manufacturer warranty for auto door operators, door closers, lock sets and exit devices.

PART 2 – PRODUCTS

2.1 GENERAL

.1 Supply and install of door hardware is to be included in the contract as per the schedule included at the end of this Section.

.2 Hardware shall comply with requirements of jurisdictional authorities.

.3 Confirm all kick plate and threshold sizes before ordering them.

.4 Do not use wall stops on drywall.

.5 Exposed screws for installing hardware shall have Philips or Robertson heads.

.6 Confirm degree of swing for door holders and closers.

.7 Construction door Lock keying system to be BEST Cylinders colour coded core keyed alike; permanent cores will be provided by the Owner.

.8 All demolished hardware to be turned over to the Owner.

.9 Contractor to hire **360 Advanced Contracting** (Tel: 416-798-2228) to install all existing /new auto door operators & card readers. Plus 360 to relocate security key pad at JD Hodgson Entrance (refer to drawings).

.10 Panic hardware to include key lock with cylinders.

2.2 MATERIALS

.1 Refer to the attached hardware schedule at the end of this Section by Allegion Canada Inc.; www.allegion.com

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Prior to installation, hardware supplier to visit the site to verify that doors and frames are ready to receive work and dimensions are as indicated on approved Shop Drawings. Any discrepancies are to be identified to the Consultant prior to installation.

.2 For hardware installed on existing doors and/or frames, prior to submitting shop drawings, hardware supplier shall site verify that the new hardware is compatible with existing doors and frames. Any discrepancies shall be identified to the Consultant on the shop drawings.

3.2 INSTALLATION

.1 Meet requirements of DHI A115.1G-94. “Installation Guide for Doors and Hardware”.

.2 Install finish hardware in accordance with hardware supplier’s directions. Ensure that hardware is installed correctly. Issue instructions, if required, to related Sections.

.3 Contractor’s shop drawing approval by the Consultant of locations and mounting heights of finish hardware required prior to installation.

3.3 PROTECTION

.1 Upon completion of installation, protect hardware from potential damage due to adjacent work.

3.4 SCHEDULE

.1 Finishes:

ANSI	US	Description	Base Metal
626	US26D	Satin Chromium Plated Over Nickel	Brass, Bronze
627	US27	Satin Aluminum, Clear Coated	Aluminum
628	US28	Satin Aluminum, Clear Anodized	Aluminum
630	US32D	Satin Stainless Steel	Stain. Steel 300 Ser
652	US26D	Satin Chromium Plated Over Nickel	Steel
689	US28	Aluminum Painted	Any

Abbrev	Name
ADA	Adams Rite Manufacturing Co Assa Abloy Door Security Solutions
BES	Stanley Security Solutions Best Access Systems
CBH	Canadian Builders Hardware Mfg. Inc.
GLY	Glynn-Johnson Corp Allegion, PLC
HES	Hes Inc An Assa Abloy Group Company
HOR	Horton, Inc. Stack Door Division
IVE	H.B. Ives Allegion, PLC
KNC	K.N. Crowder Mfg. Inc.
LCN	LCN Commercial Division Allegion, PLC
SAR	Sargent Manufacturing Co Assa Abloy Door Security Solutions
SCH	Schlage Lock Company Allegion, PLC
TAH	Thomas Architectural Hardware K.M. Thomas Company Ltd.

.2 Manufacturers:

.3 Schedule:

.1 General:

.1 Contractor to provide cylinders and Construction cores. It is required to be BEST- COLOUR CODED Cylinders colour coded core keyed alike. Permanent cores will be provided by the Owner.

.2 Existing and new auto door operators and card readers are to be installed by **360 Advanced Contracting** (Tel: 416-798-2228) as part of this contract.

.3 Panic hardware to include key lock with cylinders.

.4 **JD Hodgson Elementary School Hardware Schedule:**

Hardware Group No. 01
For use on Door #(s):
X204
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	ELECTRIC STRIKE	6211 FSE CON 12/16/24/28 VAC/VDC		630	VON
1	EA	AUTO OPERATOR	S7100 C/W INTEGRAL ON/OFF BUTTON		628	HOR
2	EA	WIRLESS WAVE ACTUATOR	CM-333S-L1//42/R		630	CAM
2	EA	SURFACE MOUNT BOX	CM-69S		BLK	CAM
1	EA	DUAL RELAY RECEIVER	CM-RX99			CAM
1	EA	WIRELESS TRANSMITTER	CM-TX99			CAM
1	EA	WIRE HARNESS	CON-6W			SCH
1	EA	RELAY	CX-12			CAM
1	EA		BALANCE OF HARDWARE EXISTING TO REMAIN			UNK

NOTE: SITE MODIFY FRAME FOR ELECTTRIC STRIKE SPECIFIED AND DOOR TO ACCOMMODATE NEW HARDWARE. REMOVE CLOSER, PATCH AND REPAIR DOOR/FRAME TO MAKE GOOD.

Hardware Group No. 02
For use on Door #(s):
204A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 127X114MM		652	IVE
1	EA	VANDL STOREROOM LOCK	ND96BD RHO		626	SCH
1	EA	INTERFACE BOX	JB7		GRAY	VON
1	EA	PERMANENT CORE	BEST - BY OWNER		626	BES
1	EA	CONSTRUCTION CORE	BEST - COLOUR CODED			BES
1	EA	ELECTRIC STRIKE	6211 FS CON 12/16/24/28 VAC/VDC		630	VON
1	EA	OH STOP	90S		630	GLY
1	EA	AUTO OPERATOR	S7100 C/W INTEGRAL ON/OFF BUTTON		628	HOR
2	EA	WAVE ACTUATOR	CM-331S/42/R-SGLR		630	CAM
1	EA	AURA PUSH TO LOCK	CM-57GR/8		630	CAM
1	EA	EMERGENCY CALL KIT	CX-WEC10K2			CAM
1	EA	KICK PLATE	CBH 903 150 X SIZE TO SUIT		630	CBH
1	EA	ADVANCED LOGIC RELAY	CX-33			CAM
3	EA	SILENCER	SR64		GRY	IVE
1	EA	WIRE HARNESS	CON-6W			SCH
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	EA	POWER SUPPLY	PS902 900-8F 120/240 VAC		LGR	SCE

Hardware Group No. 03
For use on Door #(s):
208A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONTINUOUS HINGE	112XY	628	UNK
1	EA	EXIT DEVICE	16-70-LC-8804	630	SAR
2	EA	PERMANENT CORE	BEST - BY OWNER	626	BES
1	EA	CONST. RIM CYLINDER & CORE	BEST - COLOUR CODED	626	BES
1	EA	PULL PLATE	CBH 375 X CYLINDER HOLE	630	CBH
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP LONG TOP JAMB	689	LCN
1	EA	MOUNTING PLATE	4040XP-18G	689	LCN
1	SET	WEATHERSTRIP	BY ALUMINUM DOOR/FRAME MANUFACTURER	UNF	UNK
2	EA	DOOR SWEEP	BY ALUMINUM DOOR/FRAME MANUFACTURER	628	UNK
1	EA	THRESHOLD	BY ALUMINUM DOOR/FRAME MANUFACTURER	627	UNK
1	EA	DOOR CONTACT	679-05HM	BLK	SCE

NOTE: PANIC BAR LENGTH TO SUIT DOOR WIDTH.

Hardware Group No. 04
For use on Door #(s):
208B
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGES	5BB1 4.5 x4.5		652	IVE
1	EA	PASSAGE	ND105 RHO		626	SCH
1	EA	KICKPLATE	CBH 903 150mm x size to suite		630	CBH
1	EA	WALL STOP	CBH 140		630	CBH

Hardware Group No. 05
For use on Door #(s):
101A
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	HINGE	5BB1HW 127X114MM NRP		652	IVE
1	EA	FIRE KEYED REMOVABLE MULLION	12-70-L980S X 980C1		600	SAR
2	EA	FIRE EXIT DEVICE	12-70-8813-ETL		630	SAR
3	EA	PERMANENT CORE	BEST - BY OWNER		626	BES
3	EA	CONSTRUCTION CORE	BEST - COLOUR CODED		UNF	BES
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	KICK PLATE	CBH 903 150 X SIZE TO SUIT		630	CBH
1	EA	MULLION GASKETING	139N PSA X OPENING HEIGHT			ZER
1	EA	GASKETING	188SBK PSA X 1@HD / 2@JMB		BK	ZER

NOTE: EXISTING HARDWARE NOT RE-USED, TURN OVER TO OWNER.
NOTE: EXISTING DOOR CLOSERS CANNOT BE USED, UNITS INSTALLED ARE HOLD OPEN CLOSERS

Hardware Group No. 06
For use on Door #(s):
101B
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	HINGE	5BB1HW 127X114MM NRP		652	IVE
1	EA	ELECTRIC STRIKE	9500		630	HES
1	EA	FIRE KEYED REMOVABLE MULLION	12-70-L980S X 980C1		600	SAR
2	EA	FIRE EXIT DEVICE	12-70-8813-ETL		630	SAR
3	EA	PERMANENT CORE	BEST - BY OWNER		626	BES
3	EA	CONSTRUCTION CORE	BEST - COLOUR CODED		UNF	BES
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	AUTO OPERATOR & ACTUATORS	EXISTING TO BE REUSED		UNF	UNK
2	EA	KICK PLATE	CBH 903 150 X SIZE TO SUIT		630	CBH
1	EA	MULLION GASKETING	139N PSA X OPENING HEIGHT			ZER
1	EA	GASKETING	188SBK PSA X 1@HD / 2@JMB		BK	ZER

Hardware Group No. 07
For use on Door #(s):
136

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
5	EA	HINGE	5BB1HW 127X114MM		652	IVE
1	EA	ELECTRIC HINGE	5BB1HW 127X114MM CON TW8	✓	652	IVE
1	SET	CONST LATCHING BOLT	FB51P		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	VANDL CLASSROOM SEC	ND95BD RHO 14-042 XN12-035		626	SCH
1	EA	PERMANENT CORE	BEST - BY OWNER		626	BES
1	EA	CONSTRUCTION CORE	BEST - COLOUR CODED		UNF	BES
1	EA	ELECTRIC STRIKE	6223 FSE	✓	630	VON
1	EA	COORDINATOR	COR X FL		628	IVE
1	EA	MOUNTING BRACKET	MB1/MB2 MODEL TO SUIT FRAME PROFILE		689	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH ST-2648		689	LCN
1	EA	AUTO OPERATOR	4900LE C/W 3 POSITION SWITCH	✓	689	HOR
2	EA	ACTUATOR KIT	8310-3852WS	✓	630	LCN
1	EA	RECEIVER	8310-865	✓		LCN
2	EA	KICK PLATE	CBH 903 150 X SIZE TO SUIT		630	CBH
1	EA	GASKETING	188SBK PSA X 1@HD / 2@JMB		BK	ZER
1	EA	ASTRAGAL	BY HOLLOW METAL DOOR SUPPLIER		600	UNK

.5 **All schools with M1 & M2 Closets Hardware Schedule:**

Hardware Group No. 08
For use on Door #(s):
M1
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CLASSROOM LOCK	ALX70B RHO		626	SCH
2	EA	PERMANENT CORE	BEST - BY OWNER		626	BES
2	EA	CONSTRUCTION CORE	BEST - COLOUR CODED			BES
1	EA	HARDWARE	BALANCE BY MILLWORK SUPPLIER		UNF	UNK

Hardware Group No. 09
For use on Door #(s):
M2
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	SINGLE DUMMY TRIM	ALX170 RHO		626	SCH
1	EA	CLASSROOM LOCK	ALX70B RHO		626	SCH
1	EA	PERMANENT CORE	BEST - BY OWNER		626	BES
1	EA	CONSTRUCTION CORE	BEST - COLOUR CODED			BES
1	EA	HARDWARE	BALANCE BY MILLWORK SUPPLIER		UNF	UNK

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Supply and install glass and glazing including, but not limited to, the following:

.1 Hollow Metal Door, Window and Screen Glazing;

.2 Fire Rated Glazing;

.3 Sealants;

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 07 92 00 - Sealants, except where specifically stated otherwise herein;

.3 Section 08 41 13 - Aluminum Framed Entrances and Storefronts ;

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Review installation methods, procedures, time schedule and conditions under which work shall proceed including manufacturer's written instructions and coordination required with related work.

.2 Review and finalize construction schedule, verify availability of materials, experienced installer, equipment, and facilities needed to make progress and avoid delays.

1.5 SUBMITTALS

.1 Submit digital product data sheets on all glass types for approval prior to commencing work.

.2 Submit Manufacturer’s Certificate that certifies **fire rated glass and insulated glass** meets or exceeds specified requirements.

.3 Close Out: Provide operation and maintenance data indicating cleaning instructions for inclusion into Maintenance Manual.

1.6 QUALITY ASSURANCE

.1 Provide experienced installer who is trained and experienced in glass and glazing requirements of this Section including familiarization with standards specified herein and capable to instruct installation requirements of this Section.

.2 Every pane of glass shall be factory labelled and label shall remain in place until final cleaning. Safety, Tempered and Fire Rated glass shall have permanent identification.

.2 Caulking installer to be a specialized installer with a minimum of 5 years experience.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver glass and associated materials to site in original crates and containers with manufacturer's name and brand distinctly marked thereon and with glass labelled as to types. Do not remove labels on glass until after work is accepted by Consultant.

.2 Storage and Handling Requirements: Store materials within the building, in a clean, dry location, acceptable or as designated by Owner. Fully protect materials from damage of any kind until ready for use.

.3 Handle and store metal materials at the job site in such a manner to prevent damage to other materials, to existing building or property.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Do not perform glazing when temperature is less than 7 deg C or sash or frames are wet, damp or frosted.

1.9 WARRANTY

.1 At no cost to Owner, replace factory sealed insulating window units should cracking of glass or any other breakdown or failure of glass units occur or should obstruction of vision develop due to dust or film forming on inner glass surfaces within a period of ten (10) years from date of Substantial Performance.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Tempered Glass in all glazing (TGL / FSG): Clear transparent fully tempered glass conforming to CAN/CGSB-12.1- M90. 1, minimum 6 mm (1/4”) thick. Ensure surface compression is equal to or greater than 69 MPa (10 000 psi). Tempered glass identification must be sandblasted into glass and shall be visible after installation.

.2 Interior Fire Rated Glass 1 (FRG 1): clear 45 minute fire rated glass to CAN/ULC –S104, S106 tested, Glazing Quality; 19mm thickness; Fire rating identification must be sandblasted into glass and shall be visible after installation. Acceptable Manufacturer: Contraflam 45. Location: JD Hodgson ES.

.3 Interior Fire Rated Glass 2 (FRG 2): clear 60 minute fire rated glass to CAN/ULC-S101 tested. Glazing Quality; 25mm thickness; Fire rating identification must be sandblasted into glass and shall be visible after installation. Acceptable Manufacturer: Contraflam 60. Location: JD Hodgson ES.

.4 Exterior Insulated Fire Rated Glass 3 (FRG 3): clear 45 minute fire rated glass to CAN/ULC –S104, S106 tested, Glazing Quality; 32mm thickness; Fire rating identification must be sandblasted into glass and shall be visible after installation. Acceptable Manufacturer: Contraflam IGU 45. Location: Archie Stouffer E.S.

.5 Spandrel glass (BSP): Float glass heat strengthened or tempered (if recommended by glass manufacturer); backpainted with 2-coat fluoropolymer paint system: PPG Duranar DTG XL; colour selected by Consultant.

.6 Double glazed insulating units (all exterior glazing): factory sealed units meeting requirements of CGSB-12.8-M76, clear tempered float glass inside and grey tinted tempered glass outside, nominal thickness 25 mm, with warm edge spacer, space between glass filled with argon gas; low-E coating on No. 2 surface (max U-value 0.24): PPG Solarban 60, clear or equivalent product by other manufacturer approved by Consultant.

.7 GL Low emissivity (Low-E) glass; Solarban 60 clear by PPG. Tempered glass: CAN2-12.1-M79, fully tempered, and unless noted 6 mm thick.

.8 Silk Screened Simulated Acid Etch Glass (FSSG): fully tempered Prel-Design by Prelco. Colour to be opaque - White PC-9912. To be installed on No. 2 surface of insulated glazing unit

.9 Setting blocks: neoprene, Shore 'A' durometer hardness of 70 to 90 points; spacer shims, 40 to 50 points, as recommended by glass manufacturer.

.10 Glazing compound: Non-hardening modified oil type. Colour to match adjacent surfaces unless indicated otherwise.

.11 Glazing sealant: to ASTM C920-18: one part polysulphide or one part silicone.Colour to match adjacent surfaces unless indicated otherwise.

.12 Glazing tape: polyisobutylene tape; acceptable product: Tremco 440 tape. Glazing tape for fire-rated glass must be PVC.

.13 Glazing gasket: Tremco Vision Strip; colour selected by Consultant.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Ensure glass is not more than 4 mm (3/16") less than the rebate size in either dimension, with allowance for edge spacers, shims and setting blocks as required.

.3 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Thoroughly clean glass rebates and glass of dust, dirt, mortar and other foreign materials prior to glazing. Remove oils and grease with non-staining solvents such as Xycol or Methyl Ethyl Ketone solutions prior to installation.

.2 Do not glaze when ambient or surface temperature is less than 5oC. Ensure that glazing rabbets, stops and glass are dry, free of frost, grease, oil, dust, rust and other substances detrimental to adhesion of compounds and sealants.

.3 Provide clearance at perimeter edge of glass on all four sides, minimum equal to glass thickness. Accurately cut glass to fit openings, allowing for expansion in accordance with glass manufacturer's recommendations.

.4 Provide sealer space between face of glass and glazing stops of minimum 3 mm.

.5 Clean sealing surfaces at perimeter of glass and sealing surfaces of rabbets and stop beads before applying glazing tapes, gaskets and compounds. Use solvents and cleaning agents recommended by manufacturer of sealing materials.

.6 Install glazing tapes uniformly with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.

.7 Set glass on setting blocks, spaced as recommended by glass manufacturer. Provide at least one setting block at quarter points from each corner.

.8 Centre glass in glazing rabbet to maintain specified clearances at perimeter on all four sides. Maintain centred position of glass in rabbet and provide the required sealer thickness on both sides of glass.

.9 Use spacers and shims in accordance with glass manufacturer's recommendations.

.10 Carefully remove glazing stops and reinstall after glazing.

.11 Mark each pane of glass to indicate presence of glass.

.12 Interior Glazing: Apply glazing tape to permanent stop; centre glass in opening and set on setting blocks; apply glass and press against tape. Apply glazing tape to removable stops and install stops. Trim tape for neat appearance.

.13 Fire Rated Hollow Metal Windows, Doors and Screens: Set glass in fire rated metals windows, doors and screens on continuous setting block with 3 mm (1/8") gap between glazing stop glass and embed in glazing compound in accordance with NFPA 80 and OBC requirements. Strike and point exposed joints between metal and glass or install glass in accordance to ULC tested proprietary methods of installation.

3.3 SITE QUALITY CONTROL

.1 Ensure framing to be glazed is plumb, secure and permanently fixed in position.

.2 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

3.4 CLEANING

.1 Clean installed glass and metal frequently during construction. Avoid etching and staining glass and metal during construction.

.2 Remove sealant and compound droppings from finished surface.

.3 Remove markings and labels at time of final clean-up. Ensure final clean-up is carried out in accordance with glass and sealant manufacturer's recommendations to Consultant's satisfaction

3.5 PROTECTION

.1 Protect the work of this Section from damage. Protect work of other trades resulting from the work of this Section.

.2 Replace cracked, broken, or defective glass at no additional cost to Owner and to Consultant's satisfaction.

3.6 SCHEDULE

.1 Provide the following glass:

.1 Fire rated glass: fire rated components (refer to drawings and schedules).

.2 Insulating glass: all exterior glazing.

.3 Tempered glass: all windows, doors and screens, except where other type glass is required.

.4 Provide glass thickness as indicated. Where no thickness is indicated, provide 6 mm thick glass.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Gypsum Board work including but not limited to following:

.1 Gypsum board ceilings, partitions, bulkheads and soffits;

.2 Ceiling, bulkhead and soffit suspension system;

.3 Corner beads, casing beads, trim, control joints and corner reinforcement;

.4 Steel studs and furring channels;

.5 Taping and filling;

.6 Fire rated wall assemblies;

.7 Installation of doors supplied by other trades in gypsum board walls and ceilings as required.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 07 84 00 -Firestopping and Smoke Seals;

.3 Section 07 92 00 - Sealants;

.4 Section 09 91 00 – Painting;

.5 Supply of access doors – Division 21 to 28 incl.

1.4 REFERENCE STANDARDS

.1 Definition: Drywall = Gypsum board

.2 Interior metal framing and furring: comply with applicable requirements of ASTM C754-18 and ASTM C840-18 unless otherwise shown.

.3 Gypsum board application and finishing: comply with requirements of ASTM C840-18, unless otherwise shown.

.4 Gypsum board surfaces exposed to view shall meet Gypsum Association GA 214-10 Recommended Levels of Gypsum Board Finish “Level 4”.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate installation and cooperate with mechanical and electrical trades to accommodate mechanical electrical items and any other work required to be incorporated into or coordinated with ceiling and soffit systems.

.2 Cooperate and coordinate with Sections applying wet trades and trades installing mechanical and electrical services. Coordinate stud layout at partitions accommodating wall mounted fixtures by other trades.

1.6 SUBMITTALS

.1 Shop Drawings:

.1 Submit digital shop drawings showing design, construction, control joint layout, sound attenuating construction, adjacent construction, elevations, finishes and relevant details of furring, enclosures and partitions which require fire rating.

.2 Samples:

.1 Provide 300 mm long samples of corner beads, edge trims and insulating strip.

1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified.

1.8 FIRE PROTECTION REQUIREMENTS

.1 Provide fire rated gypsum board components and assemblies as indicated.

.2 Where firehose cabinets, electrical panels or other fixtures or equipment are recessed into fire rated gypsum board partitions, provide fire rated backing to maintain required fire rating.

.3 Protect recessed fixtures in fire rated gypsum board ceilings in accordance with fire rated assembly design report and/or as indicated.

.4 Gypsum bulkheads/partitions in ceiling spaces above fire rated glazed screens, doors or other elements shall have same fire rating as screens/doors over which they occur.

.5 Fire rated bulkheads are required in first floor ceiling spaces where construction changes from fire rated floor assembly to non-fire rated roof assembly. Carefully examine Drawings to determine locations.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Delivery:

.1 Deliver materials to site with manufacturer's original labels intact. Do not remove wrappings until ready for use

.2 Storage:

.1 No outside storage permitted. Store in clean, dry area, off ground. Provide adequate ventilation to avoid excess moisture, surface relative humidity and mould or fungal growth. Remove immediately any board showing signs of mould, mildew or fungal growth.

.2 Stack gypsum board flat on level and dry surface without overhanging boards. Prevent sagging and damage to edges, ends and surfaces. Protect bagged Products from moisture or wetting.

1.10 SITE CONDITIONS

.1 Do not install work of this Section in any area unless satisfied that work in place has dried out and that no further installation of materials requiring wetness, moisture or dampness is contemplated. Ensure relative humidity in area of work of this Section does not exceed 55% for duration of Project

.2 Ensure temperature of surrounding areas is min 13 deg C and max 21 deg C for 7 Days before and during application of gypsum board; maintain for 4 Days thereafter. Ensure heat is provided at appropriate time before work has started to bring surrounding and adjacent materials up to required temperature and maintained as specified. Avoid concentrated or irregular heating during drying by means of deflectors or protective screens.

.3 Ensure ventilation is provided for proper drying of joint filler and adhesive and to prevent excessive humidity. Do not force dry adhesives and joint treatment.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Bailey Metal Products Ltd.; www.bmp-group.com

.2 CertainTeed Corporation; www.certainteed.com

.3 CGC Inc; www.cgcinc.com

.4 Chicago Metallic; www.chicagometallic.com

.5 Georgia-Pacific Canada, Inc.; www.gpgypsum.com

.6 Gordon Incorporated; www.gordongrid.com

.7 Roll Formed Specialty; www.rollformed.com

.8 Trim-Tex Inc.; www.trim-tex.com

.9 Unifix Inc.; www.unfixinc.com

2.2 FRAMING

.1 Unless otherwise specified, provide framing members of minimum 0.5 mm core thickness steel hot dip galvanized (wipe coat) to ASTM A653.

.2 Studs, interior locations: channel shaped screw-on type: depth as indicated; with knurled supporting flanges at least 34 mm wide; with service pass-through holes at 610 mm o.c. in web. Provide minimum 0.9 mm thick studs where stud depth exceeds 92 mm or where abuse resistant board is used.

.3 Top and bottom runners: channel sections, 35 mm legs and service pass-through holes at 610 mm o.c. Depth to suit studs.

.4 Rough framing members: 38 x 13 x 1.2 mm and 19 x 13 x 1.2 mm galvanized steel channels.

.5 Furring and strapping members to receive gypsum board: 19 mm deep channel shaped section with outstanding flanges and 35 mm wide knurled supporting face.

.6 Corner beads: beaded angle with perforated flanges.

.7 Casing beads: channel shaped; beaded corners.

.8 Hangers: minimum 3 mm galvanized steel wire.

.9 Tie wire: minimum 1.5 mm soft annealed galvanized steel.

.10 Metal control joint section: bellows shaped section with perforated flanges.

.11 Reveal mouldings: extruded aluminum, profiles as indicated, by Fry, Pittcon or Gordon.

2.3 GYPSUM BOARD

.1 Exposed gypsum board for interior use: tapered edge: ASTM C1396.

.2 Unexposed gypsum board for interior use: backing board: ASTM C1396.

.3 Fire rated gypsum board: Type 'X' board: ASTM C1396.

.4 Abuse resistant gypsum board ASTM C1278: 16 mm thick, fire rated and non-fire rated: Fiberock VHI by CGC or equivalent product by CertainTeed.

.5 Gypsum sheathing: DensGlas Gold by Georgia Pacific or GlasRoc by Certainteed.

.6 Backer board for ceramic tile: ASTM C1178-18: Dens Shield by Georgia Pacific, or Aqua Tough by CGC, or equivalent product by CertainTeed.

.7 Water resistant gypsum board: glass fibre-reinforced, paperless face, moisture and mould resistant core, Type X where required: ASTM C1278/C1278M and Mold Resistance: ASTM D 3273.

2.4 CEMENTITIOUS BOARD

.1 Board for paint finish:

.1 Board: polymer modified, fibreglass mesh reinforced lightweight concrete board, 12 mm thick, tapered edges: PermaBase by Unifix.

.2 Joint tape: 75 mm wide alkali resistant fibreglass mesh tape: Unitape by Unifix.

.3 Base coat reinforcing: Uniroll by Unifix.

.4 Joint compound and base coat: acrylic based: Acryjoint by Unifix.

.2 Cement board for textured finish or backing for ceramic tile: Durock by CGC 16 mm thick, or equivalent product by other manufacturer approved by Consultant.

2.5 FASTENINGS AND FINISHING MATERIALS

.1 Drywall screws: self-drilling, self-tapping, case hardened. Use zinc, nickel or cadmium plated screws for fastening of cementitious board.

.2 Laminating adhesive: CGC Durabond 90 compound by CGC or similar by BPB.

.3 Joint tape: 50 mm perforated type.

.4 Joint filler and topping cement: casein, vinyl or latex base, slow setting: ASTM C475/C475M,.

2.6 ACOUSTICAL MATERIALS

.1 Acoustic Insulation inside partitions and above ceilings: AFB by Roxul or equivalent product by Fibrex.

.2 Caulking: to CAN/CGSB-19.21-M87: Acoustical Sealant by Tremco, or CGC Acoustical Sealant.

.3 Steel deck closures: Emseal 25V Expanding Foam Sealant sized and shaped to fit flutes.

2.7 THERMAL BREAK

.1 Adhesive face rubberized cork 3 mm thick or self adhesive closed cell neoprene sponge tape "Permastik" 122X by Jacobs and Thompson Ltd., or foamed vinyl tape "Arnofoam" by Arno Adhesive Tape Inc.

2.8 ACCESS PANELS

.1 Access Panels for Items Other Than Mechanical and Electrical: “N/W Series, Flush Non-Rated Access Panels” by Nystrom Building Products; www.nystrom.com or “DW-5040" by Acudor Products Inc.; www.acudoracornltd.com, sized to suit requirements of other Sections, but minimum size 406 mm x 406 mm (16" x 16") with drywall bead frame and key operated cylinder lock.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 METAL FRAMING

.1 General:

.1 Framing and furring indicated is schematic and shall not be considered exact or complete. Location and spacing of members, bracing, supports and securement shall be in accord with referenced standards as required to provide complete and finished work.

.2 Make provision for supporting recessed and surface mounted fixtures and equipment. Provide additional framing, supports and stiffeners as required.

.3 Neatly frame around recessed fixtures and openings

.4 Examine mechanical and electrical drawings and coordinate with Divisions to determine openings required.

.2 Partitions:

.1 Unless specified or shown otherwise, extend steel studs to underside of structural slab above.

.2 All steel studs shall be spaced at 400 mm maximum, except where indicated otherwise. At curved walls/partitions space studs closer so as to maintain uniform curvature.

.3 Install runner channels at top and bottom of partition and secure to supporting building elements at maximum 610 mm o.c..

.4 At partition corners extend one runner channel to end of corner and butt other runner channel; allow clearance for gypsum board thickness; do not mitre runner channels.

.5 Install steel studs vertically; fix studs to runner channels by crimping or screwing on both sides of stud.

.6 Install additional studs as detailed and required at partition intersections, openings and terminations at dissimilar materials. Place studs not more than 50 mm from abutting walls, openings and each side of corners.

.7 Stiffen partitions over 2400 mm in height at maximum 1500 mm with at least one 19 mm horizontal bracing channel extending full length of partition.

.8 Stiffen partitions over 2400 mm in height at maximum 1500 mm with at least one 19 mm horizontal bracing channel extending full length of partition.

.3 Ceilings and Soffits:

.1 Erect suspension and furring system level with a maximum tolerance of +3 mm over a 3000mm length.

.2 Suspension system shall support ceiling assemblies, with maximum deflection of L/360, L being span between supports.

.3 Hangers for suspended ceilings shall support grillage independent of walls, columns, pipe and ducts. Space hangers at maximum 1220 mm o.c. along rough furring members and not more than 150 mm from ends. Do not place hangers in front of access panels.

.4 Space rough furring members at maximum 915 mm and not more than 150 mm from perimeter walls.

.5 Space furring channels transverse to runner channels at maximum 610 mm o.c. except at exterior soffits, and secure to each support with clip or saddle tie with 2 loops of tie wire. Install furring channels so as not to contact perimeter walls.

.6 Where ductwork, piping and other elements within ceiling spaces interfere with direct suspension of ceiling from structure, install additional framing securely fastened to main structure to accommodate proper hanging of ceiling.

.7 At exterior soffits suspend soffit framing with metal studs and brace system to withstand positive and negative wind pressures without detrimental effects. Fasten furring members to surrounding walls. Space primary furring channels at max. 610 mm o.c. Provide Z-shaped furring members at max. 400 mm o.c. Use minimum 1.2 mm thick framing members.

.4 Bulkheads, Covers, Furring:

.1 Frame to profiles shown, rigid, square, true to line and securely fastened to supporting building elements.

.2 Space furring members to receive gypsum board at maximum 610 mm o.c.

.3 Provide rough framing and bracing members as required to ensure stability and accuracy of work.

.4 Where indicated, provide resilient furring channels, spaced at maximum 600 mm o.c.

3.3 GYPSUM BOARD INSTALLATION

.1 Unless otherwise specified, erect gypsum board vertically or horizontally, whichever results in fewer end joints.

.2 Locate board end joints over supporting members.

.3 Cut and fit gypsum board as required to accommodate other work.

.4 Unless otherwise shown or specified, extend gypsum board on both sides of partitions to underside of structural deck above. Fasten gypsum board to studs, not to top channel. Allow for 13 mm deflection.

.5 Do not install gypsum board until wood blocking or other back-up components are installed. Remove and reinstall gypsum board at no extra cost to Contract where this requirements is not complied with..

.6 Provide corner beads at external corners.

.7 Provide casing beads around openings and where gypsum board abuts dissimilar material and construction.

.8 Fasten gypsum board to supports with screws spaced at maximum 305 mm o.c..

.9 Install gypsum sheathing horizontally at outside of exterior wall steel studs. Fasten each board at each stud with minimum 3 screws.

.10 Adhesive bonded gypsum board; apply 13 x 13 mm ribbons of laminating adhesive to back side of board, parallel to long dimension; space adhesive ribbons at max.150 mm o.c. temporarily brace boards until complete adhesive bond develops.

.11 Where double layer is required screw fasten second layer through first into steel framing. Select screws of suitable length to ensure positive fastening. Offset joints in second layer.

3.4 GYPSUM BOARD FINISHING

.1 Tape and fill exposed joints, fastener heads, edges, corners, to produce an acceptable surface ready for decoration.

.2 Conceal exposed flanges of corner beads, casing beads and other trim sections with at least 3 coats of cement, feathered out minimum 200 mm.

.3 Fill depressions at fastener head with cement, then apply 2 additional coats of cement to produce smooth, level surface.

.4 Treat joints using 3 coat method as follows:

.1 Apply thin uniform layer of cement and embed joint tape.

.2 Immediately apply thin skim coat of cement over tape and allow to dry.

.3 Apply 2 additional coats of cement. Allow first coat to dry before applying second coat.

.5 Sand each coat of topping cement with fine sandpaper as required to produce smooth surface. Do not sand paper face of gypsum board.

.6 Finish concealed fastener heads at fire rated gypsum board elements in manner specified for exposed work.

.7 Finish concealed joints at fire rated and at acoustically insulated gypsum board elements in manner specified for exposed work..

3.5 CONTROL AND RELIEF JOINTS

.1 Control Joint:

.1 Provide control joints where shown and at maximum 10 m o.c.

.2 Break continuity of gypsum board and framing system at control joints; install continuous metal control joint section.

.2 Relief Joints:

.1 Provide relief joints where shown and where gypsum board assemblies abut dissimilar construction.

.2 Stop gypsum board 6 mm from abutting construction at dissimilar building elements, unless otherwise indicated.

.3 Where gypsum board comes into contact with window frames or exterior door/screen frames install thermal break. Adhere self-sticking tape to casing bead and compress during installation of gypsum board.

.4 Where indicated, install reveal mouldings. Provide reveal moulding where ceilings meet curved wall surface.

3.6 SOUND CONTROL

.1 Partitions:

.1 Provide acoustical insulation in gypsum board partitions as indicated. Unless otherwise noted provide 50 mm thick insulation. Extend acoustical insulation over full height of partition, including portions located above ceiling.

.2 Provide acoustical caulking at all partitions scheduled to receive acoustical insulation as follows:

.1 At perimeter of partitions.

.2 Around objects penetrating partition.

.3 Provide 2 bead caulking system around horizontal and vertical perimeters. Apply continuous sealant beads at each side of horizontal runner tracks and vertical end studs, between gypsum board and adjacent construction.

.4 Caulk around objects such as electrical outlets, light switches, electrical and mechanical panels and boxes, grilles, and other objects penetrating. Caulk behind metal control joint sections.

.5 Where acoustically insulated partitions meet steel deck running perpendicularly to partition, provide steel deck closures.

3.7 DOOR FRAMES / ACCESS DOORS

.1 Install access doors when required by Mechanical and Electrical equipment. Build doors into gypsum board elements flush and parallel to walls and securely fastened.

3.8 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired to satisfaction to Consultant at no cost to Owner.

3.9 CLEANING

.1 Clean off beads, casings, joint cement droppings and similar items and remove surplus materials and rubbish on completion and as directed

3.10 SCHEDULE OF FINISHES

.1 Use Type 'X' gypsum board at fire rated elements.

.2 Use exterior gypsum sheathing at outside of exterior wall steel studs.

.3 Use abuse resistant gypsum board where indicated.

.4 Use water proof gypsum board in wet areas.

.5 Unless otherwise specified or shown, provide 16 mm thick standard gypsum board.

.6 Repair existing surfaces where work is scheduled and/or where existing finish is damaged by alteration work.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Ceramic and Porcelain tile work including but not limited to following:

.1 Floor tile, base and fittings;

.2 Wall tile;

.3 Waterproofing membrane;

.4 Mortar;

.5 Stain resistant floor grout;

.6 Caulking tile control joints;

.7 Caulking penetrations through wall and floor tile.

1.2 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 07 92 00 – Sealants;

1.3 SUBMITTALS

.1 Shop Drawings:

.1 Submit digital shop drawing list of mortar mixes, waterproof membrane and grout to be utilized.

.2 If requested by the consultant, submit digital shop drawing of tile joint layout.

.3 If requested by the consultant, provide a floor and/or wall tile mock up on site at location as directed by the consultant. Once approved, it will serve as a quality reference standard for the balance of the project.

.2 Samples: Submit two 300mm x 300mm samples of each type of tile and grout specified.

.3 Close Out Documents:

.1 Submit manufacturer's recommended maintenance procedures and materials for inclusion into

operation and maintenance manuals.

.2 Provide Owner with one sealed carton of each type tile used. Clearly identify each package and store where directed. Obtain receipt and submit copy to Consultant.

1.4 QUALITY ASSURANCE

.1 Provide work of this Section executed by competent installers who is a member in good standing with TTMAC and has a minimum of 5 years experience in application of Products, systems and assemblies specified. Perform tile work using skilled mechanics trained and experienced in work of this complexity. Install waterproofing system using an applicator approved by system manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Delivery:

.1 Coordinate deliveries to comply with construction progress schedule and arrange for above ground, under cover storage location with Owner before materials are delivered to site.

.2 Deliver tile in a manner to avoid chipping, breakage, staining and any other damage.

.3 Deliver packaged materials in their original bags and containers clearly identified.

.2 Storage:

.1 Store and handle tile in a manner to avoid chipping, breakage, staining and any other damage.

.2 Store packaged materials in their original bags and containers clearly identified. Keep containers sealed and labels intact unit time of use. Prevent damage or contamination to materials by water, moisture, freezing, excessive heat, foreign matter or other causes. If materials have frozen, do not stir liquids or mix materials until they are completely thawed.

.3 Provide secure heated and dry storage facilities on site. Maintain temperatures in storage area between 15 deg C and 30 deg C.

1.7 SITE CONDITIONS

.1 Do not perform work of this Section at temperature below 12 deg C when using portland cement mortars or dry set mortars, latex portland mortars or bond coat. Maintain temperature between 12 deg C and 32 deg C.

.2 Observe manufacturer's recommended working temperatures for installation of adhesives and grouts.

.3 Close doors and windows and turn off direct forced ventilation systems and apparatus. Turn off radiant floor heating systems and protect work area from direct draft, sun and heat exposure during installation and for at least 72 hours after completion

.4 Do not perform work of this Section when either substrate and/or ambient temperatures are below 10 deg C or above 35 deg C. Maintain temperature in tiled areas within these temperature limits during installation and for 7 Days after completion of the Work unless otherwise indicated in the Product instructions and/or in ANSI A108 Installation Standard Procedure requirements.

1.8 WARRANTY

.1 Warrant work of this Section for a period of 3 years against defects, excessive wear and loss of adhesion including replacement of defective tiling, materials, labour costs for demolition of defective work, accessories and installation systems at Owner's convenience. Cracks arising from normal shrinkage and/or expansion of concrete are not considered as structural failure. Hairline cracks in grout joints which result from these causes are considered normal and warranty is not voided as a result of these minor defects.

.2 Warrant waterproofing work of this Section against defects of workmanship and materials and against any actual leakage, for a period of 5 years. Leakage due to structural failure of concrete is excepted.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Centura; www.centura.ca

.2 Daltile Inc.; www.daltile.com

.3 Flextile Ltd.; www.flextile.net

.4 Laticrete International, Inc.; www.laticrete.com

.5 Mapei Corporation; www.mapei.ca

.6 Olympia Tile International Inc.; www.olympiatile.com

.2 Use proprietary Products in full compliance with manufacturer's recommendations. As far as possible obtain Product from single manufacturer ensuring compatibility with adjacent components while maintaining quality.

2.2 MATERIALS

.1 Ceramic Wall tile (CT): Refer to Schedule A - List of Materials.

.2 Porcelain Floor tile (PCT): Refer to Schedule A - List of Materials.

.3 Products by Laticrete listed herein are specified to establish a standard of acceptance. Equivalent products, subject to Consultant's review, by Mapei is also acceptable.

.4 Water: clean and non-staining.

.5 Portland cement: CSA A3000-18.

.6 Sand: CSA A82.56-M1976.

.7 Waterproof membrane: single component liquid rubber polymer: Laticrete Hydro Ban.

.8 Reinforcing: 50 x 50 x 1.6 mm hot dip galvanized steel wire mesh.

.9 Thick bed mortar: high strength latex-portland cement mix: Laticrete 226/3701/8510.

.10 Thin set mortar: latex-portland cement mix: Laticrete 211/4237.

.11 High strength mortar: 100% solids epoxy adhesive: Latapoxy 300.

.12 Organic adhesive: latex adhesive to ANSI A136.1: Laticrete 15 Multi-Mastic.

.13 Floor grout: epoxy grout: Spectral Lock Pro Grout by Laticrete; colours selected by Consultant.

.14 Wall grout: unsanded dry set, coloured: Laticrete 600 Series/1776; colours selected by Consultant.

.15 Control joints: Schlüter DILEX-BWB, height to suit tile thickness, colour selected by Consultant.

.16 Transition trim: stainless steel profile: Schlüter Reno-U, height to suit.

.17 Wall finish edge protection at all corners: stainless steel profile: Schluter Rondec, full height of tile.

.18 Cleaning compound: TTMAC 1001

2.3 MIXES

.1 Mortar and grout: mix using suitable mechanical mixers in accordance with material manufacturer's directions.

.2 Place liquid into mixer, start mixer and add dry material. Mix only long enough to wet out batch; do not overmix. Dump mixed material from mixer promptly and clean out mixer with water after each batch.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify existing conditions and finishes are ready to receive specified tile work. Ensure backings are structurally sound, level, and plumb within required tolerances. Notify Consultant in writing of unacceptable substrate conditions.

.2 Ensure compatibility of adhesives, waterproofing, reinforcing and fillers with adjacent substrate and component coming in contact with these Products.

.3 Ensure waterproofing and adhesive manufacturers; examine substrate conditions, verify conditions are suitable for installation prior to commencement and review application procedures. If requested submit written report.

.4 Preinstallation Testing: Perform calcium chloride test in accordance with requirements of ASTM F1869 immediately prior to tiling for moisture on concrete floors around perimeter of areas, at columns and where moisture may be anticipated. Conduct 3 tests for first 93 m^2 (1000 sq ft) and 1 additional test for every 93 m^2 (1000 sq ft) of flooring. Ensure moisture emission from concrete floor does not exceed 1.36 kg/93 m^2 (3 lbs/1000 sq ft) in 24 hours unless otherwise stated in flooring Product instructions

and limitations. Do not proceed with installation until moisture problem has been corrected. Provide results to Consultant prior to commencement of installation.

.5 Prior to installation, set aside for further inspection and replacement on a tile for tile basis by tile or dimension stone Supplier, sub-standard tiles, fractured tiles or tiles with chipped corners, pinholes or voids that are unusable for cuts. Ensure this Subcontractor replaces at his own expense, sub-standard and/or pre-damaged tiles once installed.

.6 Carefully select, set-aside and shade-mix tiles and/or dimension stones to a homogeneous blend throughout. During installation, provide supplementary lighting equipment if necessary to easily identify shade differences, which could normally be very slight and provide a standard even aesthetic blend effect. This is best achieved by using a strong floodlight or spotlight fitted to a movable pole stand immediately over Work area.

.7 Before setting, examine tile backs for possible dust or other contaminants. If necessary, use a slightly damp towel and wipe tile backs to remove any such dust or contaminant residue.

.8 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Provide tiling in accordance with TTMAC's current "Specification Guide 09 30 00 Tile Installation Manual" unless specified otherwise.

.2 Lay out tile so field or patterns are centered on wall and floor areas, or conform architectural details so no tile less than 1/2 size occurs. No cut tiles are allowed at finished ceiling level. Align joints in walls, bases and floors. Provide uniform joint widths throughout.

.3 Prior to installation ensure back of each tile is free of contaminants. Distribute production run variations evenly, maintaining continuity of appearance. When necessary, wipe the back face of stone or tile with a damp towel or cloth to remove dust and residual contaminants.

.4 Arrange accessories in tile work so they are spaced evenly, centered with joints and set true with proper and adequate projection conforming to manufacturer's recommendations.

.5 Make sure tile has adequate solid backing. Ensure corner and edges are fully supported by bonding material. Avoid slippage. Ensure tile installation has a minimum of 95% bond coverage by backbuttering or other approved technique.

.6 Fit tile units around corners, fitments, fixtures, drains and other built-in-objects to maintain uniform joint appearance. Cut, drill and set anchors, bolts for fastening fixtures and fittings in tile work. Make cut edges smooth, even and free from chipping. Do not split tile.

.7 Grout colour of tile to be selected by Consultant. Fill joints.

.8 Porcelain Tile:

.1 Bond porcelain tile to all substrates with high strength mortar. Bond other tile to substrate in accordance with mortar / adhesive manufacturer's directions and as follows:

.1 All locations except where indicated otherwise: thin set mortar.

.2 Gypsum board substrate: organic adhesive.

.3 Cement board substrate: high strength mortar.

.3 Finished work shall be level, plumb, or sloped as shown, true, square and free of defective, chipped, broken, discoloured or blemished tiles. Maximum allowable finished surface variation shall be 3 mm in 3 m when measured, in any direction, with a 3 m straight edge.

.4 Lay out tile patterns symmetrically within each area and to patterns shown. Unless otherwise indicated or directed provide stacked pattern.

.5 Joints shall be parallel, uniform, neat, straight, square and completely filled. Provide joint width as directed by Consultant.

.6 Fit tile accurately against and around interruptions, penetrations and abutting dissimilar surfaces. Wherever possible, drill holes for penetrating elements to ensure neat fitting.

.7 Provide accent patterns as shown, or if not shown, as directed by Consultant.

.8 Provide tile manufacturer's standard trim pieces at changes in direction and at terminations. Unless otherwise indicated provide the following corner and edge conditions:

.1 Internal horizontal corners: coved.

.2 External vertical and horizontal corners and edges: 100mm deep bull nosed

.8 Expansion and Control Joints:

.1 Carry existing movement joints all the way through from substrate surface layer including tiling surface. Ensure control and expansion joints are kept free of setting materials.

.2 Install control joints where tiling abuts restraining surfaces, around perimeter of work (and or panel) and at base of columns and curbs.

.3 Install and space expansion and control joints in accordance with following:

.1 Interior: 4878 mm to 6098 mm in each direction with minimum joint width of 6 mm.

.2 Interior exposed to direct sunlight or moisture: 2439 mm to 3659 mm in each direction with minimum joint width of 6 mm.

.3 Exterior - normal: 2439 mm to 3659 mm in each direction with minimum joint width of 9 mm.

.4 Exterior - excessive: 2439 mm to 3049 mm in each direction with minimum joint width of 13 mm.

.4 Caution: Under no circumstances cut in control joints after tiling has been installed. Install tiling up to movement joint and stop. If required, cut tiling and resume setting from opposite side of the joint. Before continuing, rake joint clean.

.5 Install an approved compressible bead and specified sealant to caulk expansion and control joints. Follow sealant manufacturer’s installation instructions or install preformed proprietary brand control joint profiles as specified

.9 Waterproof membrane:

.1 At all locations with floor drains and where indicated at other areas, provide waterproofing membrane below/behind ceramic tile. Follow manufacturer's directions for surface preparation, installation and protection.

.2 Pre-treat cracks, joints, coves, floor/wall transitions and drain flanges with a liberal coat of waterproofing, in accordance with membrane manufacturer’s directions.

.3 Carry waterproofing membrane up and over curbs and up surrounding walls, minimum 150 mm high, but in no case shall membrane be visible in finished work.

.4 Apply membrane liberally, minimum 0.508 mm (20 mils) dry film. Allow 5 Day cure time. Protect installed membrane from contact with water for at least 2 hours after final cure (21 ºC and 50% RH).

.5 Conduct hydrostatic water pressure test minimum 24 hours. No water loss allowed, except due to evaporation.

.6 Repair and retest if required.

.7 Provide minimum 1.6 mm (1/16") levelling bed to surfaces to receive waterproof membrane, in accordance with manufacturer's instructions.

.8 Provide ramped levelling bed beneath finish flooring adjacent to ceramic tile, for minimum 600 mm strip, to achieve flush finished surfaces at finished flooring transition.

.10 Grouting:

.1 Where tiling or stone tiling is installed with normal setting thin-set mortar, grout no sooner than 24 hours after installation.

.2 Where tiling or stone tiling is installed with fast-setting mortar system, grout no sooner than 3 to 4 hours after installation.

.3 Where tiling or stone tiling is installed with reactive epoxy mortars and adhesives, grout no sooner than 24 hours after installation.

.4 Where tiling or stone tiling is installed with reactive polyurethane adhesive, grout no sooner than 24 hours after installation.

.5 Install epoxy grouts in accordance with Product instructions and ANSI Al08.6.

.6 Install chemical resistant furan resin mortar and grout only for setting and grouting pre-waxed chemical resistant floor tile or paving brick. Proceed in accordance with Product instructions and ANSI A108.8.

.7 Install unsanded cement grout in accordance with Product instructions and ANSI A108.10.

.8 Install sanded cement grout in accordance with Product instructions and ANSI A108.10.

.9 Install fast-setting sanded ‘HCT’ cement grout in accordance with Product instructions and ANSI A108.10

3.8 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired to satisfaction to Consultant at no cost to Owner.

.2 Have manufacturer's representative visit site at commencement of tile work to give proper direction and thereafter at regular interval to ensure proper workmanship.

3.9 CLEANING

.1 Remove grout and mortar residue immediately while work progresses and before materials harden on tiling surface.

.2 Clean tiling completely leaving no apparent cement laitance on the surface. Do not acid wash especially where pigmented grouts are specified.

.3 Clean adjacent surfaces that have been soiled or otherwise marred, to completely remove evidence of materials causing same.

.4 Upon completion, remove protective coverings and clean down finished work of this Section leaving it in a correct condition according to industry standards. Correct defective jointing and grouting and other non-conformities.

3.10 PROTECTION

.1 Protect other parts of work from spatters, stains or damage.

.2 Remove and replace with new materials, sections of work that have become stained, soiled, broken, chipped or otherwise damaged.

.3 Protect finished work from weather, freezing and complete water immersion for periods of at least 72 hours to 14 Days after completion of the Work depending on setting and grouting materials used. Follow Product instructions for requirements.

.4 Walls: Protect walls from impact, vibration and hammering on adjacent and opposite walls for periods of at least 24 hours to 7 Days after installation depending on setting and grouting materials used. Follow Product instructions for requirements.

.5 Floors: Protect floors from foot traffic for at least 4 hours to 48 hours after installation depending on the setting and grouting materials used. In all cases prohibit heavy commercial and equipment traffic for at least 48 hours to 7 Days depending on setting and grouting materials used. Follow product instructions for requirements.

.6 Fabricated Faced Panels: Do not disturb or move panels for at least 7 Days or 72 hours with fast-setting mortar system and allow setting mortar to cure for at least 7 Days to 28 Days before shipping and installing panels on site depending on setting and grouting materials used. Follow product instructions for requirements.

.7 Since temperature and humidity conditions during and after installation affect final curing time of cement based and epoxy materials, allow for extended periods of cure and protection when ambient and/or substrate temperatures drop below 15 deg C (60 deg F) and/or when relative humidity is higher than 70%.

.8 Protect finished work from damage by other trades and general abuse until Substantial Performance of the Work and acceptance

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Acoustic Panel Ceilings work including but not limited to following:

.1 Ceiling suspension systems;

.2 Lay-in acoustic ceiling panels;

1.2 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 09 21 16 – Gypsum Board;

1.3 REFERENCES

.1	ASTM C635/C635M-12	- Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
.2	ASTM C636/C636M-08	- Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
.3	CAN/CGSB-92.1-M89	- Sound Absorptive Prefabricated Acoustical Units
.4	CAN/ULC-S101-07	- Standard Methods of Fire Endurance Tests of Building Construction and Materials
.5	CAN/ULC-S102-07	- Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.6	CAN/ULC-S114-05	- Standard Method of Test for Determination of Non-Combustibility in Building Materials
.7	CAN/ULC-S702-09	- Standard for Mineral Fibre Thermal Insulation for Buildings

1.4 SUBMITTALS

.1 If requested by the Consultant, submit statement from suspension system manufacturer verifying that suspension system will support light fixtures within deflection criteria contained in referenced standards.

.2 Samples: submit two samples of each type of acoustical panel specified; size: 300 mm x 300 mm. Upon Consultant's request submit samples of suspension system components.

.3 Maintenance materials: provide Owner with two sealed cartons of each type panel used. Obtain receipt and submit copy to Consultant.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery:

.1 Deliver materials in original packages, containers and bundles, bearing brand and manufacturer's name and ULC or cUL labels.

.2 Storage:

.1 Store materials in a covered area, off ground, on flat, smooth, dry surfaces. Protect from moisture. Remove damaged or deteriorated materials from site.

1.7 SITE CONDITIONS

.1 Continuously maintain rooms or areas scheduled to receive acoustical treatment at not less than 21 deg C and at occupancy humidity, at least 3 Days prior to installation and 3 Days after work is completed. Schedule work to eliminate risk of damage to these materials due to adverse environmental conditions in rooms or areas when and after work is installed.

.2 Ensure that work to be concealed by ceiling systems has been installed, tested, inspected and approved before starting work.

.3 Co-ordinate with Mechanical and Elecatrical divisions for work to be built into work of this Section.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Armstrong World Industries Canada Ltd.; www.armstrong.com

.2 Bailey Metal Products Ltd.: www.bmp-group.com

.3 CertainTeed Ceilings; www.certainteed.com

.4 CGC Inc.; www.cgcinc.com

.5 Chicago Metallic Corporation; www.chicagometallic.com

2.2 MATERIALS

.1 Acoustic Panels (ACT): 610 x 1220 x 16 mm thick, square edged mineral fibre board, colour: white: match existing panels.

.3 Suspension system: exposed non-fire rated grid system: Georgian by Armstrong or equivalent by CGC, or Bailey.

.4 Accessories: splicers and fasteners, as required to provide complete and finished work; manufacturer's standard types.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Lay out ceilings in accordance with reflected ceiling plans and symmetrical within each area to obtain uniform borders. Where layout is not shown install ceilings as directed by Consultant.

.2 Finished work shall be plumb, level and square with adjoining work.

.3 Suspend ceilings directly from structural members or from carrying channels supported from structural members. Do not fasten hangers to ducts, pipes, conduits.

.4 Erect suspension systems level with a maximum tolerance of 3 mm over 3 m length.

.5 Install main tees in accord with module size. Suspend at maximum 1220 mm o.c.

.6 Install cross tees perpendicular to main tees in accord with module size. Interlock with main tees.

.7 Hangers for suspended ceilings shall support grillage independently of walls, columns, pipes and ducts. Space hangers at maximum 1220 mm o.c. along supporting grillage and not more than 150 mm from ends. Do not place hangers in front of access panels.

.8 Make provisions for carrying fixtures occurring on and in suspended ceilings. Install additional hangers and reinforcing to ensure that loads being carried do not compromise integrity of system. Frame around fixtures and openings as required.

.9 Where ductwork, piping and other elements within ceiling spaces interfere with direct suspension of ceiling from structure, install additional framing securely fastened to main structure to accommodate proper hanging of ceiling.

.10 Exposed members shall be as long in length as practical to minimize joints. Distribute joints to prevent clustering in one area. Joints shall be made square, tight and flush so that exposed faces of intersecting members are on same plane.

.11 Joints in suspension system members shall be reinforced with splines or other suitable methods.

.12 Install perimeter moulding at abutting vertical surfaces.

.13 Where work of other Sections is fastened to acoustical ceilings, reinforce suspension system and/ or acoustical panels in manner acceptable to Consultant.

.14 Install panels so that work is clean and unmarked.

.15 Neatly cut and fit panels as required to suit ceiling layout and to accommodate other work.

.16 Recessed items shall replace or be centred on panel unless otherwise indicated.

3.8 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired to satisfaction to Consultant at no cost to Owner.

.2 Existing ceiling tiles damaged due to the work to be replaced with matching tiles at no cost to Owner.

3.9 CLEANING

.1 Clean exposed surfaces of acoustical panel ceilings, including trim and edge mouldings. Comply with manufacturer's written instructions for cleaning and touch-up of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned or repaired to permanently eliminate evidence of damage.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide resilient flooring work including but not limited to following:

.1 Vinyl composition tile;

.2 Safety Sheet Flooring & Cove base;

.3 Resilient base;

.4 Rubber Stair Nosing.

1.2 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures.

1.3 REFERENCES

.1	ASTM F1066-04	- Standard Specification for Vinyl Composition Floor Tile;
.2	ASTM F710-08	- Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
.3	ASTM F1861-08	- Standard Specification for Resilient Wall Base

1.4 SUBMITTALS

.1 Submit manufacturer's full range of colour samples of each type of flooring and base material specified.

.2 Submit maintenance instructions with recommended maintenance methods and procedures, for all flooring materials, for inclusion into maintenance manual.

.3 Provide Owner with 1m x full length of sheet flooring & three boxes of each VCT tiles. Obtain receipt.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Fabricator Qualifications: Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery:

.1 Deliver materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact.

.2 Storage:

.1 Store materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact. Store materials in a warm, dry area for at least 48 hours prior to installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Safety Sheet Flooring & Cove Base (SFT/Cove): Altro; www.altrofloors.com

.2 Vinyl Composite Tile & Rubber Base (VCT/RB): Armstrong World Industries Canada Ltd.; www.armstrong.com or equivalent by Johnsonite.

.3 Rubber Nosing (RN): Tarkett; www.tarkett.com

.4 Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

2.2 MATERIALS

.1 Material colours and patterns: Refer to Schedule A – List of Materials and drawings.

.2 Safety Sheet Flooring (SFT-1): Altro Reliance 25;

.1 Cove base (SFT-2).

.2 Vinyl welding rod: Altro weld rod.

.3 Gulley edge: Vinyl Altro Gulley Edge.

.4 Cap strip: Altro C-8 Cap Strip

.3 Vinyl composite tile (VCT): 300 x 300 mm to ASTM F1066, Class 2, 3 mm thick by Armstrong

.1 Resilient base (RB): 3 mm thick x 100 mm high, rubber base coved. Colour: Black.

.2 Vinyl reducing strips tapered, to suit thickness of flooring, colours selected by Consultant: Johnsonite RRS.

.4 Rubber Nosing (RN): Square nosing, no lip on tread, Tarkett Profile VDL xx-sq. Refer to Schedule A list of Materials.

.5 Door Thresholds: CT-45 by KN Crowder. Located where new flooring occurs at an existing door. Site verification of size and locations required.

.6 Primers, fillers, adhesives, sub-floor filler and levellers: as recommended by flooring material manufacturer.

.7 Cementitious underlayment: as recommended by flooring material manufacturer.

.8 Cleaning and finishing materials: As recommended by flooring material manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Surfaces to receive resilient flooring shall be dry, true, even and smooth, and free of paint, grease and oil. Surfaces to receive resilient base shall be even, smooth free of gaps, holes and depressions.

.2 Ensure moisture content of substrate is 12% or less. Perform moisture tests on concrete substrates where moisture content is uncertain. Perform tests in minimum ambient temperature of 18°C. Do not install materials until test results are satisfactory.

.3 Start of installation shall imply acceptance of conditions.

3.2 PREPARATION

.1 Level depressions, cracks and joints in subfloor with non-shrinking type filler compatible with bonding adhesive.

.2 If recommended by adhesive or tile manufacturer, prime substrates. Apply primer in accordance with manufacturer's directions.

.3 Where new flooring is installed over existing floors, prepare existing surfaces as required to ensure satisfactory installation conditions. Remove existing flooring, strip, wash, etch, grind or otherwise treat existing substrates as required to completely remove existing substances which would adversely affect installation of new flooring.

3.3 UNDERLAYMENT

.1 Where resilient flooring abuts other flooring of different thickness, provide cementitious underlayment allowing for smooth and level transition between finished floor surfaces.

.2 Mix, apply and finish underlayment in accordance with manufacturer's recommendations.

3.4 INSTALLATION

.1 Install resilient flooring materials in accordance with material manufacturer's current printed directions. Keep a copy of manufacturers installation manual on site during execution of work.

.2 Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints. Extend flooring into recesses and closets.

.3 Locate change to different floor finish or colour centred under doors, except where multicoloured floor patterns are required.

.4 Install door thresholds where required to transition existing flooring to new flooring at existing doors.

.5 Provide vinyl reducer strip fully bonded to floor where floor covering terminates exposing edge of floor.

.6 Lay out each area to be tiled symmetrically square with axis of room to provide perimeter tiles as least one half tile in width.

.7 Distribute tiles having varying shades or pattern evenly over floor area to obtain uniform effect. - Abrupt variations will not be permitted. Tile joints shall be flush, uniform, in moderate contact and in straight lines.

.8 Install tile with joints staggered half tile in one direction and with tile pattern running as directed by the Consultant.

.9 Immediately after installation, roll entire floor tile to ensure adhesion in accordance with tile and adhesive manufacturer's recommendations.

.10 Adhesive apply cove base to vertical surfaces so that gaps do not occur behind base, so that front lip of base cove bears firmly and uniformly on floor surfaces and so that good and permanent bond is produced between base and surface to which it is applied.

.11 Use full length pieces where practicable; accumulated short lengths not permitted. Backscore and wrap base around external corners; do not use preformed corners; mitre inside corners; butt intermediate joints flush without gaps.

3.5 CLEANING

.1 Remove adhesive from surface of flooring, base and wall surfaces as work progresses.

.2 Safety flooring shall be washed with a mild detergent and vacuumed dry. Do not seal or wax safety flooring.

.3 Do not wash newly laid floor covering for minimum 7 Days after installation to allow adhesive to set and dry.

3.6 PROTECTION

.1 Protect this work and work of other trades at all times.

.2 Protect newly laid flooring from construction traffic for a period of 7 Days to allow flooring to bond firmly. Then thoroughly clean surfaces in accordance to manufacturer's directions using cleaners as recommended by material manufacturer.

.3 Provide and maintain necessary protection of finished resilient flooring and bases. Replace damaged resilient flooring and bases with new materials without cost to Owner

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:
- .1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.
- .2 Division 1 requirements and documents referred to therein.

1.2 RELATED WORK

.1 Gypsum Board: Division 09 21 16

.2 Colour coding of concealed mechanical and electrical services: Divisions 21 to 28

1.3 ACCEPTABLE MANUFACTURERS

.1 Unless otherwise specified, materials shall be manufactured and supplied by one of the following:

- .1 Benjamin-Moore
- .2 Dulux Paints
- .3 Para Paints
- .4 Pittsburgh Paints
- .5 Pratt & Lambert
- .6 Sherwin-Williams

1.4 LIST OF MATERIALS, SAMPLES

.1 List of Materials:

- .1 Before ordering materials, submit written request in form acceptable to Consultant, for approval of paint materials. List each of the materials proposed and surfaces to be covered. State manufacturer's name and brand name of materials.
- .2 List of materials shall be endorsed by manufacturer as being the best material for the applicable condition.
- .3 Do not order material or commence work until list of materials is approved by Consultant.

.2 Samples:

- .1 Submit two 200 mm x 250 mm colour draw-downs of each paint colour coated with manufacturer's paint system to confirm colour match with colour chips supplied by Consultant.
- .2 Submit sample of natural and stained finishes on each species and grade of wood to receive such finishes.
- .3 Prepare full size samples showing each type of door finish.
- .4 Prepare sample panels of wall and ceiling paint system as directed by Consultant.

.3 Maintenance Materials:

.1 Upon completion of work provide one sealed and properly identified 1 gallon can of each type and colour paint used on this project.

.2 Only top coating paints used in building interior are required.

.3 Submit complete colour schedule listing paint colours, name and product code numbers, prior to Substantial performance.

1.5 PRODUCT HANDLING

.1 Deliver paint materials to site in sealed original labelled containers bearing manufacturer's name, brand name, type of paint and colour designation.

.2 Store materials in strict accordance with manufacturer's recommendations.

.3 Do not store paints, stains, varnishes, rags, or equipment inside building. maintain separate workshop/storage shed for duration of work by this Section.

1.6 JOB CONDITIONS

.1 Environmental Conditions:

.1 Maintain temperature to receive coatings between 15°C and 25°C for at least 24 hours before, during application and until coatings have cured after application.

.2 Adequately ventilate areas where coatings are being applied. Maintain a reasonably dust-free atmosphere for duration of work.

.2 Protection:

.1 Protect adjacent surfaces not scheduled to receive coatings from damage.

.2 Remove electrical plates, surface hardware, fittings and fastenings prior to painting operations. These items shall be carefully stored, cleaned and replaced on completion of work in each area. No solvent shall be used to clean hardware that will remove permanent lacquer finish on these items.

.3 Mask labels and specification plates occurring on equipment to be painted.

.4 Post "wet coating" signs while work is in progress and while coatings are curing.

.3 Work Schedule:

.1 Unless otherwise permitted, apply coatings only after all other Sections have completed their work.

.2 Coordinate work of this Section with that of Section 07 92 00 and review order of installation with Consultant where sealants are installed adjacent to painted surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Materials shall be "top line quality" products and shall be supplied by a single manufacturer except for specialty products not available from paint manufacturer.

.2 Provide paints with zero VOC content.

.3 Paints shall be factory mixed unless otherwise specified, except any coating in paste or powder form, or to be field-catalyzed shall be field-mixed in accordance with manufacturer's directions.

.4 Primers shall be as specified by manufacturer and fully compatible with finish coats.

.5 Stains shall be of the rapid dry, alkyd base type or pigment oil type.

.6 Varnishes shall be synthetic type.

.7 Shellac shall be pure white gum in pure grain alcohol.

.8 Thinners, cleaners: as recommended by paint manufacturer.

2.2 FINISHES

.1 Paint colours: refer to General List of Materials.

.2 Confirm gloss levels for all surfaces with Consultant before starting work. Unless otherwise indicated, allow for the following:

.1 Ceilings: flat
.2 Walls: eggshell
.3 Trim, doors, frames: semi-gloss
.4 All other surfaces: semi-gloss

.3 In existing buildings, confirm existing gloss levels for all repainted surfaces and match accordingly.

PART 3 - EXECUTION

3.1 CONDITIONS OF SUBSTRATES

.1 Sound, non-dusting, and free of grease, oil, dirt, and other matter detrimental to adhesion and appearance of coatings.

.2 Temperature: minimum 13°C.

.3 Moisture content: maximum 12%. Test for moisture content using moisture meter.

.4 Alkalinity: test cementitious substrates for alkalinity. Use method recommended by coating manufacturer.

3.2 PREPARATION OF SUBSTRATES

.1 All substrates: clean as required to produce an acceptable surface. If wood, metal or any other surface to be finished cannot be put in proper condition for finishing by cleaning, sanding and filling as specified, notify Consultant in writing or assume responsibility for an rectify any unsatisfactory finish resulting.

.2 Galvanized steel: coat with etching cleaner and rinse (MPI #25)

.3 Unit masonry and concrete: fill minor cracks, holes and fissures with non-shrink filler and smooth to a flush surface. Texture filled areas to match surrounding surface.

.4 Gypsum board: fill minor cracks, holes and imperfections with patching plaster; allow to dry and sand smooth; sand taped joints and remove dust.

.5 Alkaline surfaces: wash and neutralize using proper type of solution compatible with paint to be used.

3.3 APPLICATION OF COATINGS

.1 Apply paint by brush or roller, except on wood and metal surfaces where paint shall be applied by brush only.

.2 Spray painting may be permitted where deemed advantageous and shall be subject to Consultant's approval. When spray painting is permitted, use only airless spray guns. Consultant may prohibit use of spray painting at any time for such reasons as carelessness, poor masking or protective measures, drifting paint fog, disturbance to other trades or failure to obtain a uniform satisfactory finish.

.3 Applied and cured coatings shall be uniform in thickness, sheen, colour and texture and free of brush or roller marks, sags, crawls and other defects detrimental to appearance and performance.

.4 Regardless of the number of coats specified for any surface, apply sufficient paint to completely cover and hide substrate and to produce a solid uniform appearance.

.5 Thoroughly mix materials before application. Use same brand of paint for primer, intermediate and finish coats.

.6 Where two or more coats of same paint are to be applied, undercoats shall be tinted in lighter shades of final coat to differentiate from final coat.

.7 Touch up suction spots after application of first coat. Sand lightly between coats with fine sandpaper.

.8 Each coat of finish shall be dry and hard before succeeding coats are applied with a minimum of 24 hours between coats, unless manufacturer's instructions state otherwise. Do not proceed with any coat until the last preceding coat is approved by the Consultant.

3.4 PATCHING/TOUCH-UP

.1 Prior to takeover of project by Owner, inspect work of this Section and touch-up or refinish damaged finishes and finishes unsatisfactory to Consultant

3.5 SCHEDULE OF FINISHES

.1 General Requirements:

.1 Paint exposed surfaces of building materials, services and equipment, except those which are prefinished in factory and except those which are located in areas designed as not requiring painting.

.2 Comply with the following requirements except in areas designated as not requiring painting.

.1 Paint behind surface mounted fixtures on walls and ceilings with full coats of paint.

.2 Paint walls behind wall mounted heating units with full coats of paint.

.3 Paint inside surfaces of light coves white.

.4 Finish tops of doors, trim, projections and other work as specified for surrounding work whether above site lines or not.

.5 Finish edges of doors to match face of door. Refinish edges of doors after fitting.

.6 Finish drawers on all sides, inside and outside. Unless otherwise indicated finish drawers with two coats of varnish.

.7 Paint tops, bottoms and edges of shelves with full specified coats, whether exposed to view or not.

.8 Paint interior of ducts at grilles and diffusers with two coats of flat black paint, so that duct interior is not visible when grilles and diffusers are installed.

.9 Paint exposed piping, ducts and conduits in colours matching background wall or ceiling colours, unless otherwise directed by the Consultant. Ducts in mechanical rooms require only one finish coat in addition to primer. Other exposed ductwork to receive two finish coats.

.3 Where finishing formula for surfaces requiring painting is not included hereunder, follow recommendations of MPI Architectural Painting Specification Manual, latest issue.

.2 Interior Finishing:

.1 Concrete and concrete block:
2 coats block filler
1 coat primer, latex or PVA based
2 coats acrylic latex

.2 Metal, prime painted:
Spot prime with alkyd metal primer
2 coats acrylic latex

.3 Metal, zinc coated:
1 coat galvanized primer
2 coats acrylic latex

.4 Woodwork, painted:
1 coat water based enamel undercoat
2 coats acrylic latex

.5 Woodwork, stained and varnished (transparent finish):
1 coat stain
1 coat sanding sealer, sand lightly
1 coat waterbased polyurethane varnish, gloss
1 coat waterbased or polyurethane varnish, satin

.6 Gypsum board:
1 coat drywall primer
2 coats acrylic latex

.7 Cementitious wood fibre acoustic panels:
2 coat alkali resistant latex

.8 Exposed piping, wrapped:
1 coat block filler
2 coats acrylic latex

.9 Exposed piping and conduit, unwrapped:
1 coat latex metal primer
2 coats acrylic latex

.10 Exposed ductwork, insulated:
1 coat block filler and primer
2 coats acrylic latex

.3 Exterior Finishing:

.1 Metal, zinc coated (hot dip galvanized):
1 coat epoxy primer
2 coats aliphatic polyurethane

.2 Metal, zinc coated (inorganic zinc rich primer):
1 coat epoxy primer
2 coats aliphatic polyurethane

.3 Wood:
3 coats solid colour stain

3.6 EXISTING SURFACES

.1 Repaint existing surfaces where they are scheduled to be painted or where finish is damaged by alteration work. Extend new paint finish over full height and/or width of area affected, to a straight line in location determined by Consultant.

.2 All existing surfaces to be repainted shall receive as many coats of new paint, as required to hide existing finish.

.3 Materials used for repainting shall be of similar quality to those specified for new work, but in each case shall be compatible with finishes to which they are applied.

.4 Where compatibility of new coating with existing surface is uncertain, apply test patch of approximately 0.5 m² and check for results.

.5 Prepare existing surfaces to be repainted as follows:

.1 Clean as required to remove dirt, dust, oil, grease, loose paint, rust and any other foreign matter which would prevent proper bonding of new finish.

.2 Peeled chipped, scratched and otherwise damaged surfaces shall be filled, sanded and repaired as required to provide consistent surface with texture matching that of adjacent area.

.3 Sand glossy surfaces to uniform dull texture.

.4 Treat bare areas as specified for new work.

.6 Prior to repainting existing surfaces request Consultant's review and acceptance of prepared substrates, existing surfaces repainted without Consultant's review and acceptance may have to be prepared again as directed by Consultant and repainted at no extra cost.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide Tackboards, Whiteboards and Markerboards as indicated on drawings and schedules.

1.3 RELATED SECTIONS

.1 Section 01 35 16 - Alteration Procedures;

.2 Section 06 41 00 – Cabinetwork;

.3 Section 09 91 00 – Painting.

1.4 SUBMITTALS

.1 Submit detailed shop drawings showing fabrication and erection requirements, materials, dimensions and finishes.

.2 Submit markerboard maintenance instructions for inclusion into maintenance manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver boards to site in properly packed crates. Store materials in dry area within building.

1.6 WARRANTY

.1 At no cost to Owner replace markerboards and chalkboards showing any manufacturing defects which would impair proper use of board for 10 years from date of Substantial Performance.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Refer to Schedule A –List of Materials and drawings for quantities and locations.

.2 Fixed boards: by ASI Visual Display Products, or equivalent product by Global.

2.2 TACKBOARDS

.1 ASI Series 9800; 6 mm thick natural cork, fine grain, factory-laminated to 6 mm thick particleboard.

2.3 MARKERBOARDS AND CHALKBOARDS

.1 ASI Series 9800; 12.7 mm thick porcelain enamelled board with minimum 0.75 mm thick steel writing surface laminated to 11 mm impregnated fibreboard core and 0.48 mm thick stretcher levelled zinc coated steel back sheet.

.2 Porcelain enamel finish shall meet requirements of Porcelain Enamel Institute Standard S104.

2.4 TRIM

.1 Material: Extruded aluminum sections, 6063-T5 alloy.

.2 Perimeter trim: 19mm, square corners

.3 Divider strip

.4 2" Maprail above each markerboard and chalkboard: 2 map hooks per 1.2 m length

.5 Bottom flat marker rail below each markerboard and chalkboard.

2.5 FINISHES

.1 Markerboards: White 29 High Gloss by ASI

.2 Chalkboards: Black 11 Ultra Matt by ASI

.3 Tackboards: Natural Cork.

.4 Trim: Clear etched and anodized; 19mm wide flat frame with square corners.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 FABRICATION

.1 Trim joints shall be hairline type, neat and tight; mitre corners.

3.3 INSTALLATION

.1 Install boards in accordance with manufacturer's printed instructions.

.2 Install boards plumb, square, in true plane and fasten securely to supporting work.

.3 Accurately cut, machine and fit to form tight, flush hairline joints and connections at trim and rails. Mitre corners. Cap ends of rails with cast aluminum end fittings.

.4 All fastenings shall be concealed.

.5 Ensure that where boards are joined the joint is uniform, neat and tight, and the boards are properly aligned. Provide continuous steel spline.

.6 Upon completion of work, clean down and remove stains. Leave installation perfectly clean.

.7 Affix a label to upper right hand corner of each chalkboard / markerboard unit, stating manufacturer's recommended care and maintenance instructions.

.8 Upon completion of installation, cover chalkboard / markerboard and tackboard surfaces with temporary protective coverings as recommended by board manufacturer and leave in place until completion of all work or until directed by Consultant to be removed.

3.4 SITE QUALITY CONTROL

.1 Repair or replace damaged materials in a manner satisfactory to Consultant.

.2 Remove masking and excess adhesives and sealants. Clean exposed surfaces.

.3 Protect surfacing from damage of any kind, until Substantial Performance.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide high density polyethylene partitions (HDPE) including but not limited to following:

.1 HDPE toilet partitions and doors;

.2 Barrier free type of hardware;

.3 Anchors, brackets and fasteners.

1.3 RELATED SECTIONS

.1 10 28 13 – Washroom Accessories;

1.4 SUBMITTALS

.1 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.

.2 Submit duplicate minimum 50 X 100 mm samples of full range of available high density polyethylene colors.

.3 Submit detailed shop drawings. Clearly indicate fabrication details, plans, elevations, hardware, and installation details.

.4 Submit manufacturer's maintenance instructions for inclusion into operation and maintenance manual.

1.5 QUALITY ASSURANCE

.1 Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in sequence to meet installation schedule. Provide protection from marring or other damage.

.2 Carefully unload materials; handle and store in a manner to prevent damage. Remove unsatisfactory materials and replace to Consultant's satisfaction at no cost to Owner.

1.7 WARRANTY

.1 Provide manufacturer's standard extended written warranty covering all plastic components and all hardware against breakage, corrosion and delamination.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Scranton;

.2 Equivalent product by other manufacturer approved by the Consultant.

2.2 MATERIALS

.1 Refer to Schedule A List of Materials.

.2 Doors, panels, pilasters and screens: solid high density polyethylene (HDPE), waterproof, non-absorbent, with anti-graffiti resistant textured surface; colours selected by consultant.

.3 Fabricate panels and doors 1400 mm high and pilasters 2080 mm high. Hardware and accessories: solid polyethylene or stainless steel to ASTM A240-18 or ASTM A666-15, 300 Series; finish ASNI #4 Brushed.

.4 Fasteners & trim: stainless steel.

.5 Exposed edges shall be machined to a radius of 6 mm; exposed surfaces shall be free of saw marks.

2.3 FABRICATION

.1 Doors, panels and pilasters:

.1 Fabricate doors, panels and pilasters from high-density polyethylene (HDPE), minimum 25 mm thick and nominally 2007 mm high doors with filler panels above and full height 2700 mmm high panels/pilasters with all edges finished. Refer to architectural elevation drawings for details.

.2 Exposed edges shall be machined to a radius of 4.8 mm; exposed surfaces shall be free of saw marks.

.3 Provide shiplap edge.

.4 Full height stainless steel privacy channels to eliminate gaps at both the hinge and the lock side of doors.

.2 Headrail:

.1 Rails: anti-grip profile stainless steel

.2 Headrail brackets: minimum 1.2mm thick stainless steel

.3 Secure rails to top of pilasters and to brackets by through-bolting with one way stainless steel sex bolts.

.3 Brackets and Trim:

.1 Brackets: continuous, solid colour plastic, through-bolted to panels and pilaster with one-way stainless steel sex bolts.

.2 Pilaster shoes: solid colour plastic, secured to floor with plastic anchors and stainless steel screws.

.3 Full height stainless steel privacy channels to eliminate gaps.

.4 Door Hardware:

.1 Provide each door with the following hardware made of heavy duty stainless steel and using tamper resistant stainless steel fasteners:

.1 Hinges: continuous spring loaded type adjustable to hold doors open at any angles up to 90º (minimum hold open to be 30º to prevent slamming doors) with emergency access by lifting door.

.2 Latch and keeper: surface-mounted slide latch with flat rubber-faced combination door with open (green) and occupied (red) indicator.

.3 Door latch housing: heavy aluminum extrusion surface mounted and through bolted to door with one-way stainless steel sex bolts; finish: clear anodized; slide bolt and button shall be heavy aluminum with black anodized finish

.4 Provide wall bumper where door abuts wall. Mount with stainless steel through-bolts.

.5 Door pull. D-pull on inside of inswing doors (screws not be exposed on side without handle). Provide pulls on both sides of outswing doors.

.6 Edging and security strips on either side.

.5 Urinal Screens:

.1 Fabricate urinal screens to sizes shown: if not shown, provide 450mm deep x 1200mm high screens.

.2 Secure screens to wall with continuous solid colour plastic wall brackets.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install partitions and compartment doors plumb and square, securely anchored to wall.

.2 Install full height stainless steel privacy channels. Full privacy to be provided at the vertical edges of doors and walls in all change cubicles.

.3 Attach door hardware securely to solid masonry walls with predrilled concrete anchors to hollow walls using toggle bolts.

.4 Secure wall brackets to walls at maximum 300 mm o.c. for full length of bracket.

.5 Adjust and align hardware for easy, proper function. Set door open position at 30° to front.

3.3 SITE QUALITY CONTROL

.1 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide washroom accessories as indicated on the drawings.

1.3 RELATED SECTIONS

.1 Section 10 19 13 – High Density Polyethylene Partitions;

.2 Division 26 – Hand Dryers.

1.4 SUBMITTALS

.1 Submit manufacturer's catalogue cut of each component required.

.2 Submit a washroom accessories schedule indicating all accessories required, on a room by room basis, showing model number, finish and mounting height.

1.5 WARRANTY

.1 At no cost to Owner, replace mirrors should defects in silvering occur within a period of five (5) years from date of Substantial Performance.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

.1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

.1 Bobrick

.2 Bradley

.3 Frost

.4 ASI

.5 Equivalent product by other manufacturer approved by the Consultant.

2.2 FABRICATION

.1 Fabricate work true to dimensions, square and plumb.

.2 Thickness of metal shall be adequate for the various conditions, and intended uses.

.3 Finished work shall be free from warping, open seams, weld marks, rattles and other defects. Drilling shall be reamed and exposed edges finished smooth.

.4 Fastenings shall be concealed or theft proof type where possible. Exposed fastenings shall be neatly executed and shall be of the same material and finish as the base metal on which they occur.

.5 Stainless steel accessories to be grade 316.

2.3 WASHROOM ACCESSORIES

.1 Refer to Architectural Drawings and Schedule C Washroom Accessories.

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install components at locations shown. Where location is not given install as directed by Consultant. Install Owner supplied accessories.

.2 Fastenings shall be non-corrosive type.

.3 Provide mounting and anchorage devices to be built into walls and other construction elements as required to securely anchor components in place.

.4 Securely anchor components in place. Method of fastenings shall ensure that components will be capable of withstanding expected loads without movement.

.5 Install mirrors with concealed wall hangers and lock in place with theftproof screws.

.6 Insulate accessory surfaces to prevent electrolysis due to contact with dissimilar metal surfaces. Use bituminous paint or other approved means.

3.3 CLEANING AND ADJUSTING

.1 Upon completion of work or when directed, remove all traces of protective coatings or paper.

.2 Test mechanisms, hinges, locks and latches and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read and conform to:

.1 CCDC 2 - 2008, Stipulated Price Contract as amended in the Contract Documents.

.2 Division 1 requirements and documents referred to therein.

1.2 SUMMARY

.1 Section Includes: Provide classroom control panels, teacher's closet coat rods, kindergarten shelf/hooks and custodian mop hooks as indicated on the drawings.

1.3 RELATED SECTIONS

.1 Section 06 41 00 – Cabinetwork

.2 Division 23 & 26 – HVAC and Electrical.

1.4 SUBMITTALS

.1 Submit brochures of equipment clearly showing model number, dimensions, tolerances, all installation accessories and fasteners.

.2 Submit detailed shop drawings for the control panels complete with coordination of mechanical and electrical devices scheduled to be installed in the unit.

.3 Upon Consultant's request, submit samples of all units complete with fastenings, for approval by Consultant and do not supply units to site until approval is obtained.

PART 2 – PRODUCTS

2.1 CONTROL PANELS

.1 Classroom Control Panels (CP): CCP-16-04-kk Classmate 406mm wide x 102mm deep by Interspec Systems Limited.

.2 Location: Various schools. Refer to drawings for quantities and locations.

.3 Units to be full height from 200mm off floor to underside of ceiling panels.

.4 Frame: Structurally sound 6063 T5 Alloy satin anodized aluminum frame, .08mm thick.

.5 Removable Face panels: High pressure plastic laminate faced panels of lightweight particle core and a .5mm plastic laminate backing sheet. Colour to be selected by consultant to match new millwork cabinetry.

.6 Units to be complete with 1104 backboxes fabricated from heavy duty gauge satin coat steel with suitable barriers and continuous knockouts. Clear, smooth facias shall be prepunched to accept detailed components.

.7 Recessed phone tubs shall be constructed of .05 satin anodized aluminum.

.8 All panels shall be vandal resistant and removable with special tools for service access.

.9 Panels to have all openings, mounting hardware, etc. for services as required for installation of mechanical and electrical by divisions 23 and 26.

2.2 TEACHER'S CLOSET RODS

.1 Steel Round Closet Rods: Chrome, 32mm diameter, 1.mm thick, 18 gauge by Richelieu. Rod length to suit site verified closet dimension.

.2 Mounting hardware: Closed, screw, Model # 2212512140 by Richelieu.

.3 Location: Various schools. Refer to drawings for quantities and locations.

2.3 KINDERGARTEN COAT RACKS

.1 Kindergarten Coat Racks: Student Line Coat Racks Model # STL1001 by ASI.

.2 Units finished with high performance electro statically applied powder coating. Rack finish STL Gray.

.3 Impact resistant ABS hooks; spaced 152mm on centre per linear 305mm of coat rack. Hook colours to be selected by Consultant from full line of available colours.

.4 Location: Various schools. Refer to drawings for quantities and locations.

2.4 MOP & BROOM HOLDER

.1 Custodian Room Mop & Broom Holder: Global Industrial Model #T9F640938, Aluminum construction, 69mm long, 5 prongs, gray/black/yellow.

.2 Location: Cardiff Elementary School Custodian Room.

.3 Quantity: 3 units

2.5 BUMPERS FOR KINDERGARTEN TOY CART

.1 Cart Corner Guards, Themoplastic Rubber Corner Guard CB-3 4-5/16"x4-5/16" by Global Industrial.

.2 Locations (refer to drawings):
.1 Cardiff Elementary School and JD Hodgson ES, Millwork Unit K5
.2 Monck PS and Riverside PS, Millwork Unit K4

PART 3 – EXECUTION

3.1 EXAMINATION

.1 Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

.2 Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

.1 Install components at locations shown. Where location is not given install as directed by Consultant. Install Owner supplied accessories.

.2 Install components in accordance with manufacturer's directions in locations indicated.

.3 Coordinate installation with work of other sections providing adjacent construction as required to achieve the conditions shown.

.4 Coordinate installation of control panels with Division 23 and 26.

.4 Securely fasten components level and plumb. Mounting heights, where applicable, as shown; where not shown, as directed by Consultant.

3.3 CLEANING AND ADJUSTING

.1 Upon completion of work or when directed, remove all traces of protective coatings or paper.

.2 Test mechanisms, hinges, locks and latches and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

END OF SECTION

HL ENGINEERING

MECHANICAL SPECIFICATIONS

FOR PROJECT:

TLDSB MILLWORKS 2021

HL PROJECT NO.: 20070
RE-ISSUED FOR TENDER
NOVEMBER 15, 2021

HL ENGINEERING LTD
14721 WOODBINE AVE.,
STOUFFVILLE, ON
L4A 2G7
TEL: 905-713-0003

CONTENTS

Part 1 General

1.1 RELATED INSTRUCTIONS

.1 Division 00, General Requirements is part of this Section and shall apply as if repeated here.

.2 Unless specified otherwise, this Section shall apply to all Sections of Mechanical Divisions, 21, 22, 23, & 25. The Mechanical Contractor's scope shall include Divisions 21, 22, 23, & 25.

.3 Conform to the conditions stated in the Contract Documents.

.4 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

1.2 INTENT AND SCOPE OF WORK

.1 The Work shall include all labour, materials, tools, equipment, services and incidentals, etc., necessary to provide the complete systems.

.2 The intent of these specifications is to provide complete systems that are ready for operation, and while no attempt has been made to detail or list each individual part required.

.3 Sections of these Specifications are not intended to delegate functions nor to delegate Work and supply to any specific trade.

.4 The Specifications are integral with the Drawings which accompany them. Neither is to be used alone. Any item or subject omitted from one, but included in the other is properly specified.

.5 Wherever differences occur in the Contract Documents, the maximum conditions will govern and be allowed for in the Contract Price. The item to be incorporated will be at the option of the Consultant.

1.3 DEFINITIONS

.1 Where used, words "Mechanical" or "Mechanical Work", "Mechanical Divisions", "Mechanical Systems" shall include all Work in Divisions of 21, 22, 23 and 25.

.2 Where used, words "Section" and "Division" shall also include other Subcontractors engaged on Site to perform work to make the building and Site complete in all respects.

.3 Where used, the word "Product" shall mean the material, equipment, component, machinery, or fixture forming the completed Work.

.4 Where used, the word "supply" shall mean to include all labour, materials and services to furnish to the Site in the location required or directed complete with accessory parts, but is not intended to include installation.

.5 Where used, the word "install" shall mean to include all labour, materials and services to secure in place Products, including receiving, unloading, transporting, storage, uncrating,

installing, connecting and performance of such testing and finish Work as is compatible with the degree of installation specified complete ready for use.

.6 Where used, the word "provide" shall mean to supply and install as each is described above.

.7 Where used, the word "commission" shall mean to start-up and initial operation of Products as required to demonstrate satisfactory operation of Products and the entire system including calibration of any instrumentation.

.8 Where used, the word "Work" shall mean the total construction required by the Contract Documents and includes all labour, Products and services.

.9 Where used, wordings such as "approved, to approval, as directed, permitted, permission, accepted, acceptance, report to", shall mean "approved, directed, permitted, accepted, report to", by the Consultant.

1.4 STANDARDS AND REGULATIONS

.1 Conform to latest version of the applicable standards and regulations, including Federal, Provincial and Municipal laws, By-laws, regulations, Codes and Standards and the requirements of other authorities having jurisdiction in the area where the Work is to be performed. Minor changes required by an authority having jurisdiction shall be carried out without change to the Contract Price. Standards established by the Drawings and Specifications shall not be reduced by applicable codes or regulations.

.2 Comply with the latest editions and all amendments of the following standards and regulations. Where conflicts in requirements occur, the higher standards shall apply.

- .1 Canadian Standards Association (CSA) Standards
- .2 Underwriter's Laboratories of Canada (ULC) Standards
- .3 Canadian Underwriters Association (CUA) Standards
- .4 Ontario Building Code (OBC)
- .5 Ontario Fire Code (OFC)
- .6 National Building Code of Canada (NBCC)
- .7 National Fire Code of Canada (NFCC)
- .8 National Fire Protection Association (NFPA) Standards
- .9 American Society of Heating Refrigeration & Air Conditioning Engineers (ASHRAE) Handbook
- .10 American Society of Heating Refrigeration & Air Conditioning Engineers (ASHRAE) Standards
- .11 Air Conditioning, Heating and Refrigeration Institute (AHRI) Standards
- .12 Sheet Meal & Air Conditioning Contractors National Association (SMACNA) Standards
- .13 Air Movement and Control Association (AMCA) Standards
- .14 Canadian Heating, Ventilating and Air Conditioning Code
- .15 National Plumbing Code of Canada (NBCC)
- .16 Ontario Plumbing Code Part 7
- .17 Sections 41 and 42 regarding provision of sewers and water mains, Ontario Regulation 54/76 of the Ontario Water Resources Act

.18 All standards and regulations mentioned in other Sections of this Division

1.5 TENDERS AND FORMS

.1 State separate prices in the Bid Form for the Work indicated in the Contract Documents. Prices shall include the complete cost of the Work, i.e. all equipment, wiring, material, labour, incidentals, profit, overhead, etc, excluding taxes. It shall be the Owner's option to delete from the Contract any of the Work indicated at the prices stated.

.2 Cash allowances shall be carried in the Contract for the Work indicated, including all equipment, wiring, material, labour, incidentals, profit, overhead, etc, excluding taxes. If the actual cost is less than the Cash Allowance, the remainder shall be reverted to the Owner. If the actual cost exceeds the Cash Allowances, the Owner will reimburse the extra amount.

1.6 PERMITS AND FEES

.1 Apply for, obtain, and pay for permits, licenses, certificates, connection charges, tests and inspections required for the work and/or by authorities having jurisdiction. Include any premiums applicable due to requirements for after office hour inspections.

.2 Submit all required documentation to the authorities for their approval and comments before starting any Work. Provide all additional drawings, details or information as may be required. Comply with any changes requested by Authorities as part of the Contract, but notify the Consultant immediately of such changes.

1.7 EXAMINATION OF SITE AND CONDITIONS

.1 Examine the Site and local conditions prior to tender submission.

.2 Examine carefully all Drawings and complete Specifications to ensure that Work and equipment will satisfy Site conditions and performance requirements as shown. The Drawings do not show all Site conditions and existing equipment. The Contract Price shall cover all existing Site conditions.

.3 No allowance will be made later for any expense incurred through failure to make these examinations or to report any such discrepancies and omissions in writing, five Working Days prior to tender closing.

.4 Examine the work of Other Contractors and report at once any defect or interference affecting the work, its completion or warranty.

.5 Submission of a tender confirms that the Contract Documents and Site conditions are completely understood and accepted without qualifications unless exceptions are specifically indicated in the Bid Form.

1.8 CONTRACT DOCUMENTS

.1 The Contract Drawings of this Division are performance drawings and indicate the scope and general arrangement of the Work. They are diagrammatic except where specific details are given.

.2 They shall be read in conjunction with Architectural, Structural, Electrical and all other Division Drawings of the Contract.

.3 Obtain accurate dimensions from the architectural and structural Drawings, or by Site measurement. Locations and elevations of services are approximate and must be verified before construction is undertaken.

.4 Equipment dimensions are based on the first or top named manufacturer. Dimensions of items by other listed manufacturers shall not exceed variable space with necessary allowance for service and maintenance.

.5 Make necessary change to runs of piping, ductwork and raceways to accommodate structural conditions. Location of pipes, ductwork, raceways and equipment may be altered without additional charge or expense to Owner providing such change is made before installation of items involved. Such changes will be authorized by ratified site instructions and shall be recorded on Record Set of Drawings.

.6 The general location and route to be followed by pipes and ductwork is indicated on Drawings. Install these items to conserve headroom and interfere as little as possible with the free use of space through which they pass.

1.9 SHOP DRAWINGS

.1 Prepare and submit shop drawings of all Products in accordance with Division 1-General Requirements as specified herein and in each Section of this Division.

.2 PDF files are acceptable.

.3 Shop drawings shall have a minimum 210 mm x 285 mm (8-1/2” x 11”) clear space on the front sheet, suitable for stamping. The cover sheet shall include the project name, Contractor’s name and Product description. Where multiple Products are submitted in one binding, include an index of all equipment as the front sheet.

.4 Assume full responsibility for submission of shop drawings. Allow a minimum of 10 Working Days for the Consultant review.

.5 The Consultant will only review shop drawings bearing the Mechanical Division and Contractor's stamps of approval.

.6 Submit shop drawings showing the following:

.1 Contract name
.2 Contract number
.3 Manufacturer's name and model number
.4 Supplier's name
.5 Approval agencies
.6 Shipping and working weight
.7 Performance characteristics
.8 Dimensions, including required clearances
.9 Power characteristics
.10 Bill of materials and finishes
.11 Time required to fabricate and deliver
.12 All variations from Contract Documents

.13 Construction and field connection details

.14 Installation requirements

.7 The review shall not relieve the Contractor of its responsibility to provide Products in accordance with the design intent and Contract Documents.

.8 Manufacturer's printed data sheets for standard items are acceptable providing pertinent characteristics are identified and relate to specified items.

.9 Each shop drawing shall be checked and stamped as being correct, by trade purchasing item, and by the Contractor, before drawing is submitted.

.10 Verify and check dimensions to ensure proper installation of equipment in available space and without interference to the Work of other Divisions.

.11 Where requested, submit samples of Products for review and approval.

.12 Do not have equipment delivered to the Site until a shop drawing for the item has been reviewed.

1.10 EXISTING, INTERFERENCE AND DETAIL DRAWINGS

.1 Submit complete existing mechanical system drawings prior to construction work.

.2 Existing drawings shall show complete and accurate existing system conditions, location of all devices and equipment, piping, ductwork and raceways.

.3 Prepare Existing, Interference and Details Drawings in conjunction with all parties and trades concerned showing sleeves and openings and passage of piping, ductwork and raceways through building structure.

.4 Prepare fully dimensioned detail drawings of Products and services in service and ceiling spaces, and all other critical locations. Coordinate the Work with all other Divisions. Base drawings on reviewed shop drawings and indicate all details pertaining to access, clearances, sleeves, inserts, curbs, equipment bases, anchors, special hangers, weights on all load points, electrical connections, and elevations of pipes, ducts and conduits. Include location of access doors provided under this Division.

.5 Ensure that clearances required by jurisdictional authorities are indicated on the interference drawings.

.6 The Owner will not consider any extra cost as a result of the Contractor’s failure to prepare proper drawings. Submit drawings two (2) weeks after receipt of the Notice to Commence the Work.

1.11 RECORD DRAWINGS

.1 Maintain at least 2 sets of documents at the start of Contract Work and clearly mark on same as the Work progresses, changes and deviations from Work shown so that on completion the Owner will have records of the exact location (dimensioned) of ducts, piping, services and equipment and a record of material and equipment changes.

.2 The Contractor shall ensure that as-built information is accurately recorded and shall check same. As-Built drawings shall be reviewed at each Site meeting.

.3 Prepare record drawings showing the following:

.1 All buried piping runs are to be shown complete with dimension from building lines.

.2 Inverts of all services entering and leaving the building and at property lines

.3 Dimensions of underground services in relation to property lines at key points of every run

.4 Elevations of underground services in relation to ground floor level of the building

.5 Location of all services embedding in the structure, utilizing grid line references

.6 Dimensioned locations of all services left for future work

.7 All changes to the Work due to Change Orders and Site Instructions

.8 All changes to the Work during construction

.9 All changes to structural and architectural elements that affect the backgrounds of this record set

.10 Location and designation of all electrically supervised valves, flow switches and pressure switches

.11 Location and designation of all items requiring access or service in a hidden location

.12 Location of all access doors provided

.13 All changes and revisions to Specifications, details and equipment schedules

.14 All homerun conduits, junction boxes for complete electrical systems

.4 Upon completion of the Work, prior to the Substantial Performance inspection, the Contractor shall neatly transfer recorded information and make a final As-Built submission for review in the following form:

.1 One (1) copy of clean, legible prints

.2 One (1) copy of ACAD2010 format drawings, files shall retain all setting (layers, line types, scales colors, etc) used in the Contract drawing

.5 After Record Drawings have been reviewed, revise if necessary. Deliver drawings in the form of Autocad disk and three (3) sets of prints taken from those disks to the Owner. Where original design ACAD files to be obtained from HL, a cost of $500.00 plus HST will apply. **Refer to the request form in Section 01 33 00 Submittals.**

1.12 OPERATION AND MAINTENANCE MANUAL

.1 The Contractor will be responsible for collecting and organizing three (3) copies of all data, operating instructions, maintenance and trouble-shooting instructions, parts lists, parts diagrams, evidence of all tests and certifications, complete reviewed shop drawings, etc. and assembling them in neat manuals in hard cover. Identify cover “Operation and Maintenance Manual for NAME OF THE PROJECT”. Manuals shall be separated with dividers in logical sections and volumes.

.2 The Contractor shall also collect from Subcontractors and Suppliers all Guarantees/Warranties specified in the Contract Documents. Check that starting date (date of Total Performance of the Work) and extent of each guarantee/warranty are clearly

indicated. Check also that all guarantees/warranties indicate the Supplier's Name or Subcontractor's Name as appropriate together with contact phone number. Assemble neatly in labelled section of each manual.

.3 Prior to requesting the Substantial Performing inspection, submit one (1) copy for review. Make all corrections as requested and forward the corrected two (2) copies to the Owner.

.4 Each book shall contain the following as minimum:

.1 Manufacturer's literature, parts list, approved shop drawing, and name and address of closest service organization and spare parts source, for each item of equipment

.2 Voltage and ampere rating for each item of electrical equipment, Note: Suitably fold shop drawings larger than 8 1/2" x 11" and place in a manila envelope, 3-hole punched, for inclusion in book

.3 Description of system

.4 Schematic drawings for electrical, ventilating, heating and plumbing systems

.5 Mount one set of schematic drawings in a glazed frame in the mechanical room

.6 Description of summer operations

.7 Description of winter operations

.8 Controls including diagrams

.9 Maintenance and oil schedule

.10 Type of oil and grease to be used on each piece of equipment

.11 Method of operation for each piece of equipment, and list of equipment with replacement parts, part number, suppliers, addresses etc

.12 Valve Charts

.13 Air and Water Balancing Reports

.14 Contractor warranty and equipment extended warranties

1.13 SCHEDULING

.1 Comply with the construction schedule. Conform to phasing of Work if applicable. Conform to interim and final completion dates.

.2 Coordinate with general construction schedule.

.3 Submit a bar chart schedule showing the start and completion dates for each activity based on a critical path analysis of the Work.

.4 Include in the schedule for Mechanical Work done by others.

1.14 ALTERNATES AND SUBSTITUTIONS

.1 Substitute Products will only be considered when tendered Products become unobtainable. State in the tender the proposed substitute and amount added or deducted.

.2 It is the responsibility of the Contractor to ensure "Substitute Products" fit the space allotted and provides the performance specified in the Contract Documents.

.3 If Products manufactured and/or specified by a manufacturer named as equivalent are used in lieu of the manufacturer specified, the Contractor shall be responsible for ensuring that

the substituted Product is equivalent in performance and operating characteristics to the specified Product, and, it shall be understood that all costs for additional space, larger power feeders and changes to associated or adjacent Work will be borne by the Contractor offering the substitution. In addition, in Equipment Rooms where Products named as equivalent is used in lieu of specified Products and the dimensions of such Products differs from the specified Products, prepare and submit for approval, accurately dimensioned layouts of rooms affected.

1.15 VALUATION OF CHANGES

.1 For each change submit a complete itemized breakdown of labour and material.

.2 Only the net difference between an extra and a credit will be subject to overhead and profit mark up.

.3 Material shall be valued at current trade prices incorporating all discounts and labour rates. Overhead and profit shall be as shown in the Tender Form.

1.16 WORKMANSHIP

.1 Workmanship and method of installation shall conform to best standards and practice and be performed to approval. Work shall be done by tradesmen skilled in the type of work to be performed. Where required by local or other By-laws and Regulations, tradesmen shall be licensed in their trade. Install all Work and equipment according to the manufacturer's printed directions.

1.17 INSTALLATION REQUIREMENTS

.1 Coordinate the Work of this Division with the Work of all other Divisions. Inform the Subcontractors for the Work of other Divisions of the locations of openings, chases, sleeves, supports, services, connections, etc., to be incorporated into the Work.

.2 Check the locations of all expansion/building joints and ensure that all electrical installations, are at or crossing these locations, are as detailed and as required to compensate for the possible movement at the joint.

.3 Confirm the exact location of outlets, fixtures and connections. Check architectural details and elevations for more requirements. Confirm location of connection points for equipment supplied under other Divisions or by the Owner.

.4 Install neatly all equipment and apparatus to allow free access for maintenance, adjustment and eventual replacement.

.5 Install metering and/or sensing devices to provide accurate and reliable sampling of quantities being measured. Install instruments to permit easy observation.

.6 Provide suitable shielding and physical protection for devices.

.7 Install all Products and services in accordance with the manufacturer's requirements and/or recommendations.

.8 Provide all supports, hangers and fasteners. Secure all Products and services so as not to impose undue stresses on the structure and systems.

.9 Ensure that the load onto structures does not exceed the maximum loading per square meter (foot) as shown on structural Drawings or as directed.

.10 Do not use explosive activated tools.

.11 Install services and equipment which are to be concealed, as close as possible to building structure so that necessary furring can be kept to minimum dimensions.

.12 Locate wall and ceiling diffusers in exact accordance with dimensions furnished by the ceiling installer, wall finish installer, masonry installer and Consultant. Make any necessary adjustments in duct branches to allow diffusers to coincide with ceiling and wall patterns.

1.18 FIELD REVIEW

.1 The Owner and Consultant shall have access to the Site at all times for review of the Work during construction.

.2 Arrange for review of Products during manufacturing.

.3 Provide all gauges, instruments and other necessary measuring equipment required for review of the Work.

.4 Maintain a complete set of Contract Documents at all times for field reference.

.5 Correct any deficiencies as they are reported during the performance of the Work.

1.19 TEMPORARY SERVICES

.1 Provide temporary office, workshop and tools and material storage space for the Work and assume responsibility for any loss or damage thereto. Buildings erected for this purpose shall conform in appearance to those erected for similar purposes under other Divisions of the Specifications.

.2 Provide scaffolding and shoring necessary for the Work of this Division. Scaffolding and shoring shall be adequate to protect the workmen according to Provincial and Local Regulations.

.3 Provide rigging and mill-wrighting, labour and equipment necessary for the Work of this Division. Employ only workmen well experienced and skilled in such trades for this portion of the Work.

.4 Provide hoisting machinery, operators, labour and materials necessary to lift and place equipment supplied under this Division.

.5 The permanent systems or any part thereof shall not be used during construction for construction purposes, unless so permitted in advance by the Owner, in writing.

1.20 PROTECTION AND CLEANING

.1 Securely plug or cap open ends of piping, ductwork, raceways or equipment to prevent entry of dirt, dust, debris, water, snow or ice.

.2 Equipment stored on Site shall be protected from weather and kept dry and clean at all times. Take care to avoid corrosion of metal parts.

.3 Protect all finished and unfinished Work of this and other Divisions from damage due to carrying out of this Work.

.4 Make good any damage caused directly or indirectly to walls, floors, ceilings, woodwork, brickwork, finishes, etc.

.5 Clean all polished, painted and plated Work. Remove all debris, surplus material and tools.

.6 Carry out additional cleaning operations of systems as specified in other Sections of this Division and as Division 1 requires.

1.21 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling.

.3 Divert unused wiring and metal materials to a metal recycling facility, or place in appropriate on-site bins for recycling.

1.22 MOCK-UPS AND TRIAL USAGE

.1 Provide mock-ups in accordance with the conditions stated in the Contract Documents and Division 1 of the Specifications.

.2 Trial usage of any equipment or materials shall not be construed as evidence of acceptance of same and no claim for damage shall be made for injury to, or breaking of, any part of such Work which may be so used.

1.23 COMMISSIONING, TESTING AND DEMONSTRATION

.1 Be responsible for commissioning of all Work provided under this Division.

.2 Operating equipment and systems shall be tested in presence of Owner or Owner's commissioning group (and the sub-consultant at their option) to demonstrate compliance with specified requirements in the Contract Documents.

.3 Contractor shall notify the Consultant, in writing, fourteen (14) days prior to tests scheduled under requirement of this Section.

.4 Testing shall be conducted under specified design operating conditions as required in the Contract Documents or other conditions as accepted by the sub-consultant.

.5 All elements of the systems shall be tested to demonstrate that total systems satisfy all requirements of the Contract Documents. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each sub-system, followed by entire system, followed by inter-connections of other major systems.

.6 All Special testing materials and equipment shall be provided by the appropriate Subcontractor, as determined by the Contractor.

.7 The Contractor shall be responsible for completing and submitting start-up and pre-functional performance testing reports.

.8 If acceptable performance cannot be achieved, the necessary corrective measures shall be carried out promptly.

.9 Demonstrate to the Owner and Consultant the operation of all systems when commissioning has been completed. Demonstration will include the following:

.1 Operation of all equipment and systems under each mode of operation

.2 Operation of all automatic control

.3 Location of and operation of all access panels

.4 Noise levels of all mechanical equipment and terminal devices under maximum operating conditions

.10 At the completion of commissioning, testing, balancing and demonstration submit the following to the Consultant:

.1 Letter certifying that all work specified is complete, clean and operational in accordance with the Contract Documents

.2 As-built documents

.3 All inspection authorities approvals

.11 Provide a sequence of operation for seasonal switch-over (heating/cooling) of systems indicating valves to be normally open or closed.

.12 If field tests show deficient equipment, independent test of the equipment may be requested by Consultant. If the equipment does not conform to Specifications be responsible for all tests, corrective action and retesting and balancing.

1.24 INSPECTION

.1 Arrange for inspection of all Work by the authorities having jurisdiction. Upon completion of the Work furnish final unconditional certificates of approval by the inspection authorities.

.2 Application for final review will be considered when the Work has been completed and written declarations submitted that all commissioning, testing adjustment, set up and documentation is complete. Final review shall be done when:

.1 All reported deficiencies have been corrected.

.2 All systems have been balanced, tested, commissioned and are operational.

.3 The Owner has been instructed in the operation and maintenance of all equipment.

.4 All reports have been submitted and reviewed.

.5 All maintenance manuals have been submitted and reviewed.

.6 All tags and nameplates are in place and all data submitted and reviewed.

.7 Cleaning up is finished in all respects.

.8 All certificates are furnished.

.9 All spare parts and replacement parts specified have been provided.

.10 All record drawings have been submitted and reviewed.

1.25 WARRANTY

.1 Provide a written guarantee stating that systems, equipment, components, etc. have been installed to manufacturer's instructions, that systems meet the Contract requirements and that all deficiencies in material and labour occurring within two (2) years after Substantial Performance of the work, will be corrected at no charge to the Owner.

.2 Obtain Product warranties in excess of two (2) years from the manufacturer on behalf of the Owner. These Product warranties shall be issued by the manufacturer to the benefit of the Owner.

.3 Instruct all manufacturers and suppliers that warranties on Products will commence upon the date of Total Performance of the Work and not from the date the Products are put into operation.

.4 All corrections to deficiencies listed in field review reports and other correspondence, as well as but not limited to those indicated in testing, adjusting, balancing and commissioning, shall be completed prior to turn over.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Mechanical General Requirements.

.3 Unless specified otherwise, this Section shall apply to all Sections of Mechanical Divisions, 21, 22, 23, & 25.

.4 Work to be done under this Section shall include furnishings of labour, materials, and equipment required for installation, testing and putting into proper operation complete Mechanical systems as specified in the Contract Documents, as shown on the Drawings and as otherwise required. Complete systems shall be left ready for continuous and efficient satisfactory operation.

1.2 SUBMITTALS

.1 Submit shop drawings and Product data for Products specified in this Section in accordance with Section of Mechanical General Requirements.

1.3 QUALITY ASSURANCE

.1 Mechanical Work shall be carried out by qualified, licensed Technicians.

Part 2 Products

2.1 PRODUCTS

.1 Products shall be new, of Canadian manufacture where available, first quality and uniform throughout. The Contractor shall submit in tender based on the use of Products specified in the Contract Documents, or on the listed acceptable alternate Products as further noted.

.2 Products shall be CSA or ULC approved and be so labelled. Products not CSA/ULC approved shall receive acceptance by the Owner for installation, and modifications and charges required for such acceptance shall be included in the Work of this Section.

.3 Where a manufacturer is not specified, provide Products of high commercial standard and quality consistent with the standards of these Specifications. Provide Products of the same manufacture for like applications unless noted otherwise in the Contract Documents.

.4 Products shall be designed and manufactured in accordance with latest issue of applicable Standards or authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment.

.5 Acceptance of Products installed presumes that Products have not been damaged or exposed to conditions that would adversely affect performance and life expectancy. If in the opinion of the consultant, Products have sustained damage, or have been exposed to abnormal

conditions it shall be the responsibility of the Contractor to have such tests performed as are deemed necessary by the Consultant to establish the condition and therefore, acceptability of installed Products.

2.2 EQUIPMENT IDENTIFICATION AND DIRECTORIES

.1 Provide every valve on job (except where located on radiation, unit heaters and fixture stops or located within plain site of equipment or apparatus which they control) with an identifying tag, attached to valve system or wheel handle with a brass chain.

.2 Tag shall be brass with stamped numbers filled in with black enamel and shall be approximately 38 mm diameter.

.3 Submit one (1) copy of valve chart mounted in a glazed frame to Owner on completion of work.

.4 All equipment, control panels, starter panels, zone dampers etc., shall be name tagged using 3.8 mm (1.5") high lamacoid plates, Large equipment e.g.: air handling units, condensing units, expansion tanks, air compressors, etc., shall be name labelled using stencils with 63 mm (2.5") high (minimum) lettering.

.5 All services, i.e. water, gas, heating lines etc., shall be identified using stencils with two inch letterings. Identification shall be placed at minimum ten feet intervals and shall also show direction of flow. Minimum lettering size - 50 mm (2") or maximum possible.

.6 All ductwork shall be identified using stencils with minimum 63 mm (2.5") high lettering. Direction of flow shall be marked.

.7 The following colour coding shall be used for the various services:

Type of Piping	**Colour Coding and Labelling**
Vent	Brown (Vent)
Storm	Dark green-brown-dark green (S)
Sanitary	Dark green-brown (SAN)
Domestic Cold Water	Dark green-brown (DCW)
Domestic Hot Water	Yellow-dark green (DHW)
Domestic Circulating Hot Water	Yellow-dark green-yellow (DHWR)
Sprinkler	Red-white (SPKR)
Hot Water Supply	Yellow-black (HWS)
Hot Water Return	Yellow-black-yellow (HWR)
Gas	Yellow - paint complete pipe yellow (Nat. Gas)

.8 All system tagging and identifications shall follow existing colour coding, and the numbering sequence extended to the new additions.

.9 Provide nameplates on each piece of mechanical equipment, such as pumps, fans motors, and motor starters, showing name of system or service performed following wording and numbers used in Schedule on Drawings. Do not cover or paint nameplates and where equipment is insulated, locate nameplate on outside of insulation. Nameplate shall be

black-white-black lamacoid with bevelled edges, and 10 mm minimum white engraved letters. Rivet or fasten with self tapping screws nameplates to equipment in conspicuous location.

.10 Location of Identification on Piping and Ductwork Systems

.1 On long straight runs in open areas in equipment rooms. At not more than 5 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.

.2 Adjacent to each change in direction.

.3 At least once in each small room through which piping or ductwork passes.

.4 On both sides of visual obstruction or where run is difficult to follow.

.5 On both sides of separations such as walls, floors, partitions.

.6 Where system is installed in pipe chases, ceiling spaces, galleries, other confined spaces, at entry and exit points, and at each access opening.

.7 At beginning and end points of each run and at each piece of equipment in run.

.8 At point immediately upstream of major manually operated or automatically controlled valves, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.

.9 Identification to be easily and accurately readable from usual operating areas and from access points.

.10 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

2.3 SLEEVES AND FLOOR PLATES

.1 Pipes, ducts and conduits shall be sleeved, as they pass through walls, floors, ceilings and partitions.

.2 Clearance within sleeves shall be 12 mm. Sleeves shall be sized to clear insulated pipes and ducts which have a vapour barrier.

.3 Sleeves, except those extended above floors shall be flush with finished surfaces.

.4 Sleeves through walls, partitions and floors, other than waterproofed, shall be as follows:

.1 For pipes, conduits and ducts smaller than 0.4 square meters, solid walls, use Schedule 40 steel pipe or 20 gauge (minimum) sheet metal, lapped and spot welded.

.2 For pipes, conduits and ducts smaller than 0.4 square meters through dry wall partitions, use 20 gauge, minimum, sheet metal, lapped and spot welded with lip flange at one end.

.3 For ducts 0.4 square meters and larger, sleeves shall be sheet metal as above, of 16 gauge minimum.

.5 Fire dampers shall be installed in accordance with the conditions of their approval given in the manufacturer's instructions. Provide angle steel frames and collars.

.6 Place and secure sleeves in concrete formwork. Pack within such sleeves with sand to prevent deformation during pouring of concrete.

.7 Provide and locate sleeves for setting in walls and partitions by the appropriate general trade.

.8 Pack and seal the void between the sleeve and the pipe, conduit, duct or insulation, for the full depth of the sleeve with ULC approved methods to maintain the same integrity as the slab, wall and partitions. Submit shop drawing of selected ULC approved installation for review. To maintain fire rating, use 3M™ Fire Barrier Sealant CP 25WB+, Dow-Corning #3-6548 `Silicone RTV' foam, Thomas & Betts `Flamesafe' firestop system, installed in accordance with the manufacturer's specifications and recommendations.

.9 Material to be provided by M.W. McGill & Associates (416-291-8393) Fire-Bloc systems or Double A/D Distributors (416-292-2361) "Firebarrier Firestopping".

.10 Seal the exposed ends of the sleeve packing with approved silicone compound.

.11 Seal the void between sleeve and bare pipe passing through outside foundation walls or floors on grade with "Thunderline Linkseal" as distributed by:

.1 Corrosion Services Co. Limited

.12 Provide chrome plated split type floor plates where exposed pipes pass through finished floors. Floor plates shall be as manufactured by:

.1 Crane Canada Ltd. - No. 1-BC or 10-BC

.13 Provide similar plates where exposed pipes pass through walls or ceilings, but with set screw to hold them in position. Terminate pipe sleeves at these locations so that ends of sleeves are covered by the plates. Plates shall be secured tight against finished surface.

2.4 SUPPORTS AND BASES

.1 Supply and erect special structural required for the installation of mechanical equipment. Provide anchor bolts and other fastenings unless noted otherwise. Mount equipment required to be suspended above floor level, where details are not shown, on a frame or platform bracketed from the wall or suspended from the ceiling. Carry supports to either the ceiling or the floor, or both as required, at locations where, because wall thickness is inadequate, it is not permitted to use such brackets.

.2 Concrete bases and housekeeping pads for mechanical and electrical equipment, which are in direct contact with the floor slab, will be provided under Concrete Division No. 3. Submit drawings to Concrete Division giving dimensions and requirements.

.3 Concrete pads shall be set on the slab and shall be 100 mm high above the slab. Edges of pads are to be chamfered (25 mm). Generally pads shall be 160 mm larger than base of the equipment being supported.

.4 Provide concrete bases for all mechanical equipment unless otherwise shown. Provide a 100mm raised curb around all ductwork and piping penetrating the floor of Mechanical Rooms.

.5 Support hangers, in general, form inserts in concrete construction or from building structural steel beams, using beam clamps. Provide additional angle or channel steel members, required between beams for supporting pipes and conduits.

.6 Do not use explosive drive pins in any section of Work.

2.5 EXPANSION JOINTS AND ANCHORS

.1 Provide for expansion and contraction of pipe being installed.

.2 Erect piping so that strain and weight does not bear on cast connections or apparatus.

.3 Provide bends, expansion loops or swing joints complete with anchors and pipe guides as required to adequately handle pipe expansion and contraction except where expansion joints are specified or shown.

.4 Expansion joints, in domestic hot water and recirculation water piping up to and including 75 mm size and heating system piping up to 65 mm size, shall be expansion compensators with pressure external to bellows and complete with anti-torque device, limit stops and internal guides. Compensators shall be of bronze construction with female solder type ends for copper pipe and shall be suitable for 1033 KPa (150 psig) working pressure. For steel pipe, compensators shall be of steel construction with stainless steel bellows and screwed ends and shall be suitable for 1033 KPa (150 psig) working pressure. Compensators shall be as manufactured by:

.1 Flexonics Corporation of Canada Limited

.2 United Flexible Metallic Tubing (Canada) Limited

.3 Hyddro -Flex. Inc.

.5 Expansion joints shall be suitable for the type of pipe and service for which they are installed and shall be capable of handling the expansion between anchors in the pipe plus not less than 50% safety factor with (-18□C) 0oF ambient and corresponding fluid temperature. Expansion joints for heating system service shall be suitable for a minimum working pressure of (1379 kPa) 200 psig.

.6 Provide pipe guides for each expansion joint using two guides on each side of and adjacent to the joint. Guides shall be pipe rolls or structural steel shapes secured to building structure in an approved manner. Guides may be omitted where an anchor is located within 36" of expansion joint.

.7 Locate anchors where shown or required. Anchors shall consist of structural steel angles, channels or plates secured in an approved manner.

2.6 INSERTS AND FASTENINGS

.1 Supply and install all inserts and fastenings required for support of equipment and hangers provided under this Division. Use beam clamps attached onto structural steel and/or inserts set in concrete.

.2 Inserts shall be of the Midwest, Truscon manufacture and shall be firmly secured to the forms before the concrete is poured. Be responsible for correct location of inserts.

.3 Where supports are required under the roof slab and in other areas where structural bearings of sufficient strength do not exist, provide angle or channel iron supports, properly sized to support the load from the structural framework using beam clamps. Where the wall, partition, floor or roof does not permit the support of heavy equipment, carry suitable support to building structure.

.4 Percussion type fastenings of any kind will not be permitted unless prior approval in writing is obtained from the Architect Consultant.

.5 Bolts and anchors at metallic waterproofed surfaces shall be supplied under this Section but installed under the Waterproofing Section. Refer to architectural drawings for such areas.

.6 Brackets may be attached to masonry walls using expansion shields in shear, but walls must not be punched through and before drilling is started, approval must be obtained from the Architect Consultant.

2.7 FIRE STOPPING & SMOKE SEALS

.1 Sealants for vertical joints to be non-sagging.

.2 Firestop and smoke seal around mechanical and electrical assemblies penetrating non-rated fire separations.

.3 Rigid ducts with dimensions greater than 1300 mm to be fire stopped by bead of fire stopping material between retaining angle and fire separation, and between retaining angle and duct, on each side of fire separation.

.4 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.5 Remove temporary dams after initial set of fire stopping and smoke seal materials.

2.8 PIPE HANGERS

.1 Provide pipe hangers, and their supports, for piping. Install hanger rods vertically, without bends or offsets, and so that finished piping is true with respect to both line and grade.

.2 Hang or support horizontal cast iron drainage piping at every hub. Hangers shall properly fit outside diameter of pipe. Hangers shall be Clevis type and shall be as manufactured by:

.1 E. Myat & Co. Ltd. - Fig. 126

.2 Grinnell Co. of Canada Ltd.

- Fig. 260 for soil pipe
- Fig. 590 for C.I. pressure pipe

.3 Hang or support horizontal plumbing piping, other than cast iron drainage, as follows:

.1 Up to and including 19 mm size
--1.8 m maximum intervals

.2 Size 25 mm and above
--2.4 m maximum intervals

.4 Horizontal piping, for service other than plumbing shall have maximum support space as follows:

NOM. PIPE SIZE (MM)	MAX. SPAN M	NOM. PIPE SIZE (MM)	MAX. SPAN M
12	1.5	75	3.6
19	1.8	89	4.0
25	2.1	100	4.3
38	2.7	125	4.9
50	3.0	150	5.2
65	3.3	200	5.8

.5 Spacing where pipes are grouped shall satisfy the smallest size pipe.

.6 Hangers, for piping, other than cast iron drainage unless otherwise specified, shall be Clevis type as manufactured by:

.1 E. Myatt & Co. Ltd.
--Fig. 124 for uninsulated piping
--Fig. 124L for insulated hot piping
--Fig. 125 for heavy duty uninsulated piping
--Fig. 125L for heavy duty insulated hot piping
--Fig. 125 or 125 for hangers sized to suit O.D. of insulation for cold piping.

.2 Grinnell Co. of Canada Ltd.
--Fig. 260 for uninsulated piping
--Fig. 300 for insulated hot piping
--Fig. 260 for hangers sized to suit O.D. of insulation for cold piping.

.7 Hangers, for copper or brass piping not being used for domestic cold water service, shall be copper plated or plastic coated, as manufactured by:

.1 E. Myatt & Co. - Fig. 152CT

.2 Grinnell Co. of Canada Ltd. - Fig. 97-C

.8 Support vertical cast iron drainage piping, including soil, waste, vent stacks, and rainwater leaders at hubs by a riser clamp located at every other floor slab. Bolt riser clamps around pipe and anchor to concrete slab. Riser clamps shall be as manufactured by:

.1 E. Myatt & Co. - Fig. 182

.2 Grinnell Co. of Canada Ltd. - Fig. 261

.9 Hangers, installed under domestic cold water piping shall be large enough to go completely around covering.

2.9 ACCESS DOORS

.1 Provide access doors for locations where equipment requiring maintenance or adjustment such as expansion joints, dampers, fire dampers, valves and pressure reducing valves, are "built-in". These access doors will be coordinate with general contractor.

.2 Access doors, unless otherwise specified or shown, shall be at least 12-gauge steel, finished prime coat and 2 finish coats match wall/ceiling finish, with concealed hinges, anchor straps, plaster lock, without screws. Access doors in ceilings, where acoustic tile is applied

to plaster or gypsum board, shall be dish type designed to receive tile insert. Refer to painting specifications for more information.

.3 Access doors in fire rated ceilings or walls shall be ULC labelled to match the rating.

.4 Inside frame dimensions shall be approximately 300 x 300 mm. However, if it is necessary for personnel to enter through doors, they shall be at least 600 x 450 mm.

.5 Access doors shall be as manufactured by:

.1 Ancon-Lehage - L1000
.2 Zurn Industries Canada Ltd. - Inspectors
.3 LeHage Industries Ltd.
.4 A.G. Baird Limited - ABCO
.5 Stelpro Limited - Type 700

.6 Submit list of proposed door locations and obtain approval thereof before commencing access door installation.

.7 Submit access door shop drawings for approval as soon as possible after Award of Contract, showing size, type and exact location of access doors.

.8 Access doors are not required in removable acoustic panel type ceilings. Provide approved coloured marking devises after completion of such ceilings, at four corners of each panel below point requiring access.

2.10 MAINTENANCE OF BEARINGS

.1 "Run-in" sleeve type bearing in accordance with manufacturers written recommendations. After they are "run-in", drain, flush out and refill with a new charge of oil or grease as required.

.2 Protect bearings and shafts during installation. Grease shafts and sheaves, to prevent corrosion and dust or dirt accumulation during building construction. Provide extended nipples as required for lubrication purposes. Provide galvanized metal drip pans under oil lubricated fan bearings. "Turn over" rotating equipment at least once a month after delivery to site until building has been accepted by Owner.

.3 Bearings which are found to have been damaged due to the lack of suitable protection shall be replaced.

2.11 PIPE STRAINERS

.1 Pipe strainers shall be Y-type and basket type strainers as shown and shall be selected for 100% of pump capacity.

.2 Screen perforations and working pressure shall be suitable for the systems in which they are installed.

.3 Strainers shall have monel screens and shall be reinforced when installed on pump sections.

.4 Y-type strainers shall be self cleaning and installed with 25mm (1") hose end valve on blow-off connection.

.5 Strainers up to 50mm (2") shall be screwed and for sizes 60mm (2 1/4") and over shall be flanged.

.6 All strainers connected to steel pipe and to copper pipe 60mm (2 1/4") and larger shall have cast iron bodies. All strainers connected to copper pipe 50mm (2") and smaller shall have bronze bodies.

.7 Strainers shall be Sarco, Armstrong, Bell & Gossett, Taco or Atlas.

.8 Provide strainers where shown on the Drawings and in the following locations whether shown or not:

.1 Suction sides of all pumps
.2 Ahead of all steam traps
.3 Ahead of all steam control valves
.4 Ahead of all pressure reducing valves
.5 Ahead of water meter
.6 In addition supply and install around the by-pass for circulating pump as shown an approved fine mesh strainer to handle approximately 10% of the pump capacity.

2.12 CONTROLS

.1 The Mechanical Contractor, (Mechanical Division), shall install the control valves, valve actuators and dampers for all mechanical systems.

2.13 TIMERS/TIME SWITCHES

.1 The timer (time switch) shall be complete with the below features:

.1 Digital programmable, with large LCD screen
.2 Power outage back-up, built-in re-chargeable battery
.3 Manual override On-Off
.4 Time switch contact operation shall be 120 VAC, 60Hz, single pole, 15A, 1/2HP, and 1200VA.
.5 7-day, 24-hour, 18 ON and 18 OFF set point per week, minimum setting is one minute.
.6 Mount in standard single gang box, recessed with white cover plate
.7 Enerlites #HET or equal

2.14 ELECTRIC MOTORS - HIGH EFFICIENCY

.1 Supply electric driven equipment specified under Mechanical Division complete with motors. Comply with SB-10 minimum motor efficiency requirements.

.2 Nameplate rating of motor shall be not less than the input brake horsepower rating of the driven equipment at the specified operating condition not less than the minimum horsepower specified or shown. Motors shall be sized to come up to rated RPM under load within 15 seconds.

.3 Motors up to and including (1/2 hp) 373 Watts shall be 115 volt, 60 Hz, single phase. Motors larger than (1/2 hp) 373 Watts shall be 575 volts, 60 Hz, three phase.

.4 Motors unless otherwise specified shall be 1750 RPM, drip proof with ball bearings and three phase motors shall be CEMA deign "B" with Class "B" insulation.

.5 All motors, 1. H.P. up to and over, unless specified differently, shall be T-Frame, AC Three Phase and equal to or exceeding the Ontario Hydro EnerMark Motor Efficiency Level as tested to either CSA 390 M 1985, or IEEE 112B, and be approved under the Canadian Electrical Safety Code.

.6 Motors that are to operate with a variable frequency drive (VFD) shall be compatible with a VFD.

2.15 FUSES FOR MOTOR PROTECTION

.1 Fuses shall be CSA certified, time delay, energy limiting, 200,000 ampere interrupting capacity to CSA # C22.2 No. 248.

.2 Supply a list of motors, with their starting and operating characteristics, and the type of equipment associated with the motors, to the Fuse Manufacturer for verification of fuse sizes.

.3 Size fuses in accordance with Fuse Manufacturer's recommendations. Note that fan motors are to be sized for 15 second maximum start-up time as specified in Article "Electric Motors".

.4 Where fuses supplied cause unnecessary outages or do not provide adequate protection, retain the Fuse Manufacturer's representative to determine the cause. Replace such blown fuses at no cost to Owner.

.5 Provide one spare set of fuses for each rating and type of fuse used in this Contract, and hand over to Owner at completion of Work.

.6 Fuses shall be class J and class L, as manufactured by:

.1 Ferraz Shawmut

.2 Bussman

.7 Size fuses installed in combination magnetic starters used in conjunction with magnetic starters, for a branch circuit and motor protection for over-current protection in accordance with Fuse Manufacturer's recommendations.

2.16 ELECTRICAL WIRING FOR MECHANICAL

.1 The locations of starters, motors and associated equipment indicated on the Drawings are approximate and diagrammatic only. Coordinate with the Work of the Electrical Division to ensure the proper location of all the equipment.

.2 Conduit and wiring to line side of remotely located starters or to line terminals of Motor Control Centres and from these points to a disconnect and/or motor will be provided under Electrical Division.

.3 Electrical Division shall provide safety disconnect switches required at motors by CESC.

.4 All the motor starters/controllers, and/or line voltage thermostats shall be supplied under Mechanical Division and installed under Electrical Division.

.5 All control wiring, control devices and low voltage thermostats shall be provided under Mechanical Division.

.6 All electric baseboard heaters, cabinet heaters, force flow unit heaters and heating cables shall be provided under Electrical Division. Electric duct heaters shall be provided under Mechanical Division.

.7 Wiring to water unit heaters and cabinet unit heaters will be under Electrical Division. Wiring and conduit required for a low voltage thermostat will be provided by Mechanical Division.

.8 Where individual starters and controls are grouped together, a panel for mounting this equipment shall be provided by Contractor under Electrical Division.

.9 Wiring, motors, control devices and electrical equipment provided under Mechanical Division shall conform to the Canadian Electrical Code as amended to date.

.10 Wiring methods and standards shall conform to those specified in Electrical Division for the area of the building in which the installation is to be made.

.11 Install wiring in conduit unless otherwise noted.

.12 Use thin wall conduit up to and including 32 mm size for wiring in ceilings, furred spaces, in hollow walls and partitions and where not exposed to mechanical injury. Use rigid galvanized steel conduit for wiring in poured concrete, where exposed and for conduit 38 mm size and larger. Plastic conduit is not acceptable above ground.

.13 Run conduit and cables in finished areas concealed above ceilings and in partitions. Run conduit and cable exposed in any unfinished areas such as mechanical rooms, rooms with no suspended ceilings, service tunnels and penthouses and install at right angles or parallel to building lines. Boxes shall be cast type.

.14 Wiring shall be RW-90 X-Link type sized to carry 125% of the full load running current in accordance with the Electrical Code. Wiring shall be minimum No. 12 gauge, except for control wiring which shall be colour coded No. 14 gauge.

2.17 SPARE PARTS AND TOOLS

.1 Furnish spare parts as follows:

.1 One set of v-belts for each piece of machinery. (i.e. fans, exhaust fans).

.2 One set of filters for each filter bank installed. (i.e. handling units, force flow units).

.2 Identify spare parts containers as to contents and replacement part numbers.

.3 Provide one set of special tools required to service equipment as recommended by manufacturer.

.4 Furnish one grease gun and adaptors to suit different types of grease and grease fittings.

.5 Upon completion of project and immediately before hand-over, replace all filters.

2.18 RADIATORS AND HYDORNIC PIPING

.1 All existing hydronic radiator enclosures shall be taken from site to autobody shop for refinishing with properly sandblasted/electrostatic painted and reinstalled.

.2 New custom enclosure type shall match existing on site. Verify field measurement prior to fabrication. Manufactured by Engineered Air, Rosemex, Slant, Trane are acceptable.

.3 Provide new wrapped insulation for all existing hydronic risers.

Part 3 Execution

3.1 CUTTING AND PATCHING

.1 Provide all cutting and patching required for the Work of Mechanical Division. Work shall be carried out in conformance with the requirements of Concrete Division. Include any radiography required to locate concealed services before penetrating into inaccessible locations.

.2 Any modifications to building shall be done so as not to diminish structural, fire resistance, or smoke barrier integrity.

.3 Proposed modifications to the structure shall require acceptance by the Structural Engineer.

.4 The Consultant shall be afforded the opportunity to review the intent prior to any major cutting.

3.2 PAINTING

.1 Provide all exposed ferrous metal Work, and Products, except conduit, with at least one (1) factory prime coat or paint one prime coat on Site and 2 finish coats match wall/ceiling finish. Clean up or wire brush all equipment before painting. The primer shall be rust inhibiting primer in accordance with CGSB-GB-40d.

.2 Do not paint galvanized supports and hangers.

.3 Repaint or refinish all damaged factory applied finishes.

.4 Paint all visible portions of ductwork with one coat flat black paint, unless otherwise noted.

3.3 CONCRETE

.1 Concrete Work shown on the structural Drawings will be done as part of Concrete Division of these Specifications.

.2 Provide all other concrete Work necessary for Mechanical Work. Have such Work carried out in accordance with the Concrete Division of these Specifications.

3.4 EXCAVATION AND BACKFILLING

.1 Before commencement of excavation of the Work, determine with the Consultant, the municipalities and utilities, the presence of existing underground services at the site and verify satisfactory condition. Locate such services and mark out same. Ensure that all trades concerned are aware of their presence.

.2 Do all excavation and backfilling up to grade required for Mechanical Work inside and outside of building. Check available soil test reports. Obtain instructions of the Consultant regarding the type of soils and their extent.

.3 Carry out all trench excavation in strict conformity with all applicable acts and bylaws.

.4 Excavate to the required depth and width. Backfill excess excavation.

.5 Provide additional protect ducts under roads and paved areas.

.6 Refer to details and to Utility Company requirements for concrete encased duct installations.

.7 Where excavation is necessary in proximity to and below the level of any footing, provide a sleeve at the proximity and backfill with 14,000 kPa (2,000 psi) concrete to the level of the highest adjacent footing. Proximity is determined by the angle of repose as established by the Consultant.

.8 Protect the bottom of excavations against flooding and freezing. Use pumping or other means to keep bottom dry. Do not open more than weather will permit. Have excavations inspected at least once a week by authorities. Break up rocks and boulders and remove these by drilling and wedging. Do not use blasting unless approved in writing by the Consultant.

.9 Compact all backfill to a density of 95% Modified Proctor. Before backfilling, obtain approval. Remove all shoring during backfilling. Obtain approval for all compaction machines used.

.10 Backfill trenches within building, with clean sharp sand in individual layers of maximum 150 mm (6") thickness. Manually compact the first layers up to a compacted level of 300 mm (12”). Machine compact the balance up to grade, using approved equipment.

.11 Backfill trenches outside buildings, not under roads, parking lots, or traffic areas, manually compact up to a compacted level of 450 mm (18") above the cable or duct bank with individual layers of material up to 150 mm (6") thick, using sand or granular 'A' gravel. Machine compact the balance up to grade with 150 mm (6") layers of approved excavated material.

.12 Backfill all other trenches outside buildings with granular 'A' gravel in layers not exceeding 150 mm (6") thickness, up to grade level; manually compact up to 450 mm (18"), machine compact the balance.

.13 Do not use water for consolidation or during compaction of backfill, unless approved in writing by the Consultant.

.14 After a period has passed adequate to reveal any settlement fill all depressions to correct grade level with appropriate material, machine compacted. Pay all costs required to make good all damage caused by settlement.

.15 Store and dispose of excavated materials as follows:

.1 During the progress of the contract place the material as directed in such a manner that a minimum of damage or disfigurement of the existing ground will result and the material will not in any way impede the progress of the work. Dispose of surplus material as directed by the Consultant.

.2 Place surplus topsoil separately from subsoil. Leave the site clear and unencumbered.

.3 Protect, brace, support as required existing pipes, ducts, cables, etc. encountered in the work. Do not disturb or interrupt the operation of any services without written approval from the Consultant.

3.5 WORK IN EXISTING BUILDING AND SITE

.1 Maintain the existing life safety systems in existing building in full operation at all times during construction, unless otherwise noted in the Contract Documents.

.2 Maintain all existing systems in full operation during normal occupancy and operation hours, unless otherwise noted in the Contract Documents.

.3 Maintain all systems adjacent to the construction area in full operation at all times during construction, unless otherwise noted in the Contract Documents.

.4 All noise generating works that disrupt the building operations shall be carried out before/after normal occupancy hours and shall be coordinated with Owner.

.5 Co-ordinate with the Owner for scheduling of Works required to be done before/after normal occupancy hours, including but not limit to: drilling through slab; power shutdown; interference to life safety system. All costs involved with this Work shall be included in Contract Price.

.6 The Contractor shall assume responsibility for any disruption caused by its forces to operational building services. Repair any system damaged during the execution of the Work.

.7 Scan (X-ray or ultrasound) for unknown existing concealed conduits, pipes, cables/wires, before excavating ground and drilling slabs.

.8 Remove materials and equipment as shown and as specified in the Contract Documents.

.9 Maintain continuity of existing services serving areas outside the construction area.

.10 Check and inspect existing systems and equipment to be re-used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Mechanical General Requirements.

.3 Unless specified otherwise, this Section shall apply to all Sections of Mechanical Divisions, 21, 22, 23, & 25.

1.2 SUBMITTALS

.1 Submit shop drawings and Product data for Products specified in this Section in accordance with Section of Mechanical General Requirements.

.2 Provide shop drawings to the General Contractor for setting anchor bolts and other appurtenances necessary for the proper installation of this equipment. Submit drawings for approval showing complete details of foundations including necessary concrete and steel work, vibration isolation devices and reinforcing steel. Contractor under Division of Mechanical shall supply necessary information to the Vibration Isolation Manufacturer regarding equipment to be isolated.

Part 2 Products

2.1 GENERAL

.1 Mount equipment, apparatus and piping on approved foundations or suspend from approved supports, as specified herein, shown, or as required.

.2 Erect floor mounted equipment, complete with vibration devices as required, on 100 mm high concrete housekeeping pads unless otherwise specified.

.3 Equipment shall be adequately isolated or acoustically treated to maintain an acceptable noise level in occupied areas of the building. Drawings and Specifications shall be referred to for areas in which a lower or higher noise level is acceptable. Approved, qualified personnel shall take noise measurements over complete audible frequency range in occupied zones adjacent to mechanical equipment rooms and main duct shafts, and in other locations as requested. Maximum Levels:

	AREAS	N.C. LEVELS
.1	General Offices	35
.2	Meeting Rooms	30
.3	Corridors and Lobbies	40
.4	Storage Rooms	40
.5	Entrance Halls	40
.6	Outdoors	45 dBA

.4 Vibration and sound control materials shall be manufactured by:

.1 BVA Systems
.2 Vibron Limited
.3 E.H Price
.4 IAC

2.2 SPRING MOUNTS

.1 Spring mounts shall be complete with levelling devices, 6 mm thick ribbed neoprene sound pads and completely colour coded stable springs. Type FS shall be open spring type with horizontal to vertical stiffness equal to or greater than 1.0. Type CSR shall be similar to FS with built in vertical limit stops. Type CM shall be closed mount springs with built in stabilizers.

.2 Springs shall be selected to operate at no greater than 2/3 solid deflection. Fasteners shall be zinc chromate plated or approved equivalent. Mounts installed outdoors or exposed to high humidity conditions shall have two coats of rust resisting paint or shall be galvanized or cadmium plated and shall have neoprene coated springs.

2.3 SPRING HANGERS

.1 Spring hangers shall be Type SH or SHR with completely colour coded stable springs. SHR hangers shall have a 25 mm thick acoustic isolation pad in series with the spring. Hanger frames for loads over 680 Kg shall be heavy-duty welded channel construction.

2.4 PAD TYPE ISOLATION

.1 Type R rubber waffle or ribbed pads shall be of high quality neoprene 60 durometer and a minimum of 12 mm thick, selected for a maximum loading of 345 kPa Pads built into spring mounts or hangers shall be 60 durometer neoprene.

.2 Rubber-steel-rubber pads, type RSR, shall be 12 mm thick rubber pads, as specified above, bonded to 6 mm steel plates.

.3 Type CC pads shall be kinetic neoprene jacketed pre-compressed moulded fibreglass.

.4 Type R.L.S. neoprene-in-shear mounts shall be moulded in various colour coded durometers and sizes. Top plates shall have tapped holes, and bottom plates shall be completely imbedded in neoprene.

.5 Pad type isolation shall be provided for all roof mounted equipment, and floor mounted equipment.

Part 3 Execution

3.1 INSTALLATION

.1 Isolate motor driven mechanical equipment over 1/2 hp unless other shown (except propeller fans).

.2 Pad type isolation shall be provided for all roof mounted equipment.

3.2 INSTALLATION OF SPRING HANGERS

.1 All piping over 50mm diameter connected to spring isolated equipment shall be supported with minimum 25mm static deflection spring mounts or hangers as follows:

.1 Up to 25mm diameter: first 3 points of support

.2 125 to 200mm diameter: first 4 points of support

.3 250mm diameter and over: first 6 points of support

.2 The first point of support shall have a static deflection of twice the deflection of the isolated equipment, but not more than 50mm.

.3 Any piping supported from the mechanical penthouse floor shall be isolated on type CM or SL mounts with the deflection being equal to that of the isolated equipment.

3.3 PENETRATION OF WALLS AND SLABS

.1 DUCT PENETRATIONS

.1 Contractor shall make sure that all openings around pipes and ducts in the structure surrounding the mechanical equipment rooms shall be sealed airtight as described herein and on the drawings.

.2 Where each duct passes through a wall, floor or ceiling, there shall be a clear annular space of 25 mm between the duct and structure. After all of the ductwork is installed the Contractor shall check the clearance, pack the voids full depth with glass fibre, and caulk both ends with a non-aging, non-hardening approved fireproof sealant (Firestop). Where there is not sufficient access space to pack around all sides of a duct (for example, at the underside of a slab), place a short stub duct in the wall, pack and caulk around it and then attach the inlet and outlet ducts to each end.

.2 PIPE PENETRATIONS

.1 HVAC and Domestic Water Piping

.1 Where a pipe passes through a wall or floor slab, a steel sleeve shall be cast or grouted into the structure. The internal diameter of the sleeve shall be 50 mm larger than the external diameter of the pipe passing through it. After all of the piping is installed in that area, the Contractor shall check the clearance and correct it, if necessary, to within 12 mm. Then the void shall be packed full depth with a ULC approved glass fibre and sealed at both ends, 25 mm deep, with a non-aging, non-hardening, approved fireproof sealant (Firestop).

.2 Vent Pipes

.1 Pipes shall be grouted and caulked into the structure as follows: Before grout has set, rake a groove around the pipe on each side of the wall or slab; groove shall be 12 mm wide and 12 mm deep. After grout has set, fill groove full depth with sealant.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Mechanical General Requirements.

.3 Unless specified otherwise, this Section shall apply to all Sections of Mechanical Divisions, 21, 22, 23, & 25.

.4 Work to be done under this Section shall include furnishing of labour, materials and equipment required for installation of Insulation as specified.

1.2 REFERENCES

.1 Comply with the requirements of the ASHRAE/IES Standard 90.1 latest edition

1.3 SUBMITTALS

.1 Submit shop drawings and Product data for Products specified in this Section in accordance with Section of Mechanical General Requirements.

1.4 REGULATIONS

.1 The type, manufacture and application of pipe covering materials including application of sealer coat, shall be in strict accordance with requirements and final approval of local authorities having jurisdiction.

Part 2 Products

2.1 APPLICATOR AND MATERIAL LIST

.1 Pipe covering, equipment and duct insulation shall be provided by a recognized specialist insulation applicator with and established reputation for this type of work.

.2 The following manufacturers are acceptable:

.1 Insulation Materials:

.1 Mineral Fibre for Low and Medium Temperature (with or without integral vapour retarder jacket)

.1 Knauf Fiber Glass

.2 Manson Insulation Inc.

.3 Johns- Manville Canada

.2 Calcium Silicate for High Temperature

.1 Calsilite

.2 Pabco

.3 Johns- Manville Canada

.3 Mineral Fibre for High Temperature
- .1 Fibrex Inc.
- .2 Partek Insulations Inc.
- .3 Roxul Inc.

.4 Perlite for High Temperature
- .1 Sproule
- .2 Temperlite

.5 Cellular Glass
- .1 Pittsburgh Corning Inc. (Foamglas)

.6 Flexible Elastomeric
- .1 Armstrong World Industries
- .2 Rubatex Corp.

.7 Coatings, Sealers and Adhesives
- .1 Bakor
- .2 Childers
- .3 Foster

.8 Finishing Cement
- .1 Ryder Industries Inc.
- .2 Johns- Manville Canada

.9 PVC Fitting Covers and Jacketing
- .1 Proto Corp.
- .2 Ceel-Co
- .3 Zeston (Johns- Manville)

.10 Foil Faced Vapour Retarder Tape
- .1 Avery Dennison
- .2 Compac
- .3 Mactac

.11 Glass Fabric Reinforcing Cloth
- .1 Alpha Associates
- .2 Clairmont Corp.
- .3 Compac

.12 Aluminum and Stainless Steel Sheeting with Integral Moisture Barrier
- .1 Childers
- .2 Pabco
- .3 Permaclad

.13 Caulking Compounds
- .1 Dow-Corning
- .2 Foster
- .3 Tremco Manufacturing

.14 Bands
- .1 Childers
- .2 Permaclad

2.2 MATERIALS

.1 Fibreglass insulation:

.1 Duct insulation shall be rigid board vapour seal 48 kg/cu.m. (3 lbs/cu.ft.) density duct insulation with factory applied vapour barrier. Flexible duct insulation shall be 24 kg/cu.m. (1-1/2 lbs/cu.ft.) type with vapour barrier.

.2 Pipe insulation shall be preformed sectional fibreglass or mineral fibre insulation with factory applied all service jacket.

.3 Insulation for linear radiant heating panels shall be 12 kg/cu.m. (3/4 lb.cu.ft.) density fibreglass batt insulation with foil back.

.2 Exterior to the building shall be 125 kg/cu.m. (8 lbs/cu.ft.) density board insulation with factory applied reinforced foil vapour barrier.

.3 Flexible elastomeric insulation shall be complete with adhesive applied to both surfaces to be joined. Flexible elastomeric insulation shall not be used on pipes that are electrically traced.

.4 Insulation jacket for services and ductwork exterior to the building, and for indoor components such as valves, pump, meters, etc. shall be field applied U.V. protected mesh reinforced mastic.

.5 High temperature insulation shall be 232 kg/ cu.m. (14.5 lbs/cu.ft.) asbestos free, non-combustible, abuse-resistant pipe and block insulation composed of hydrous calcium silicate meeting ASTM C533, Type I for operating temperatures up to 649 Deg. C. (1200 Deg. F.).

.1 Tie Wire shall be 16 gauge (0.045mm) stainless steel with twisted endons on maximum 300mm (12 in.) centres.

.6 High temperature insulation shall be non-combustable, mineral wool fibre pipe insulation.

.7 Corner beads and channels at floor line shall be 0.4 mm (28 ga.) galvanized sheet metal.

.8 All cements and adhesives shall be as recommended by the manufacturer of the insulation. Insulation, insulation jacket, canvas and adhesive shall be fire retardant with a flame spread rating not to exceed 25 and a smoke developed rating not to exceed 50 when tested in accordance with CAN/ULC-S102-M.

.9 P.V.C. fitted jackets and covers shall have a flame spread rating not to exceed 25 and a smoke developed rating not to exceed 50 when tested in accordance with CAN/ULC-S102-M.

.10 Aluminum Jacket shall be 0.51mm (24 B&S Guage - 0.0201 in) this sheet, embossed finish, with longitudinal slip joints and 50mm (2 in.) laps, die shaped fitting covers with factory applied moisture barrier.

.11 Fire resistant duct insulation shall meet the requirements of NFPA 96. Product shall meet flame spread rating of 25 and smoke developed rating of 50. Insulation product shall be complete with all manufacturers standard fastenings, including (where applicable) aluminum foil tape, filament tape, banding materials, pins, cup-head weld pins, and speed clips for a ULC listed installation.

Part 3 Execution

3.1 INSTALLATION - GENERAL

.1 Ensure that pipe, fittings, sheet metal and equipment on which insulation is to be applied is free from moisture, dirt, and rust, before applying insulation.

.2 Do not apply insulation until the item to be covered has been leak tested.

.3 Apply insulation in a neat workmanlike manner so that finished job is uniform in diameter and smooth in finish. Locate longitudinal seams so as to be invisible.

.4 Insulation finish shall be designated "CONCEALED" where mechanical services (ie: pipe, ducts, etc.) are installed in trenches, chases, furred spaces, pipe and ducts shafts, hung ceilings or raised floors.

.5 Insulation finish designated "EXPOSED" will mean "NOT CONCEALED" as defined herein.

.6 Mitre insulation at pipe elbow and wrap joint with adhesive tape. Where pipe is not to be recovered, cover joints with glass fabric reinforcing cloth pasted on and extending each side of joint throat for a distance equal to one covering diameter.

.7 Insulation having a vapour barrier jacket shall be continuous where it passes through walls or floors. Protect exposed pipe insulation at floor line with 18 ga galvanized steel jacket approximately 100 mm high, secured to floor slab.

.8 Tightly pack annular space between sleeve and pipe covering with insulation and fireproof vapour barrier where insulated pipes pass through sleeved openings in walls or floors. Packing shall extend full length of sleeve, and be finished flush at each end with caulking compound, aluminum colour.

.9 Smooth aluminum sheeting used for re-covering shall be not less than 18 ga. thick on piping, ducts or equipment, and not less than 0.4 mm thick on pipework. The sheeting and insulation shall be detachable at valves, flanges and other bolted connections. Bends shall be custom made swaged ring or lobster back. Sheeting shall be neatly shaped over fittings, valves and strainers. Seal joints with mastic caulk corners. Secure sheeting with bands 450 mm apart.

.10 Bands shall be 12 mm wide stainless steel or aluminum alloy straps with cadmium plated mechanical fasteners.

.11 Where applicator proposes to use material other than those specified as acceptable, submit to the Consultant a complete list of such materials, indicating thickness of material for each individual service and the finishing procedures and materials proposed before installation.

.12 Rigid insulation shall be applied with edges tightly butted. Secure insulation to flat sheet metal surface by means of welded pins or perforated base metal fasteners and speed washers. Locate on not more than 450 mm centres throughout the sheet metal surface with a minimum of two rows per duct side, and adhere with a fire resistant cement. Attach speed washers, when insulation has been placed on the metal spikes and cut off the excess spike flush with washer and re-cover washer with foil faced vapour barrier tape. Cover angles or standing seams on the outside of plenums, casings and ducts which extend beyond face of

applied rigid insulation with 12 mm layer of flexible insulation. Extend this insulation 75 mm on each side of the angles and place tight around the projecting leg of the angle. Apply rigid insulation overlapping edge of flexible insulation on angle so that vertical part of insulated angle projects through work.

.13 Flexible insulation shall be wrapped tightly on to the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum of 50 mm. Insulation shall be adhered to duct surface with mechanical fasteners at 300 mm on centre.

.14 On circumferential joints, the 300 mm flange on the facing, and on longitudinal joints, the overlap shall be stapled with 14 mm flare-door staples 150 mm apart.

.15 After insulation is applied, seal holes, speed washers, corners and joints with 75 mm wide foil faced vapour barrier tape.

.16 Do not insulate over equipment nameplates and identification tags. Locate field applied nameplates and identification tags on outside surface of insulation. Where nameplates are permanently fixed to equipment ensure insulation is applied around nameplate allowing for clearly legible nameplates.

.17 Insulation thicknesses shall be in accordance with ASHRAE 90.1 minimum requirements as listed in the following table:

Nominal Pipe Diameter	Hot Water and Glycol heating Systems (mm) (see note 1, 5)	Domestic Hot Water (mm) (see note 2, 5)	Refrigerant (mm) (see note 3)	Chilled Water(mm) (see note 4)
Less than 25 mm	38	25	13	13
25 mm – less than 38 mm	38	25	25	13
38 mm – less than 100 mm	50	38	25	25
100 mm – less than 200mm	50	38	25	25
200 mm and greater	50	38	40	25

Note:
1. Conductivity Range is 0.25 - 0.29 Btu-in/h sq.ft. ºF.
2. Conductivity Range is 0.22 – 0.28 Btu-in/h sq.ft.ºF
3. Conductivity Range is 0.20 – 0.26 Btu-in/h sq.ft.ºF
4. Conductivity Range is 0.21 – 0.27 Btu-in/h sq.ft.ºF
5. For piping smaller than 32mm and located in partions witin conditioned

spaces, reduction of these thicknesses by 25mm shall be permitted but not to thicknesses below 25mm.

3.2 HOT FLUID PIPING

.1 Cover domestic hot water piping, domestic tempered water piping, domestic water recirculation piping, hot water heating system piping and glycol heating system piping safety valve vent lines, (except safety valve vents from boilers), boilerfeed piping, exposed portions of surface and intermittent blowdown piping, boilerfeed and condensate bleed-off piping, with insulation in accordance with ASHRAE 90.1.

.2 Insulation shall be fibreglass insulation with factory applied fire resistive all service jacket, reinforced white kraft paper jacket bonded to aluminum foil vapour barrier with self-sealed lap. Hold insulation in place with flare type staples. Recover pipe in exposed areas with canvas or PVC jacket.

.3 Cover fittings, valves, flanges and strainers with insulating cement of a thickness equal to that of the adjacent insulation, regardless of whether the adjacent pipe covering is recanvassed or not.

3.3 COLD FLUID PIPING

.1 Cover domestic cold water piping, sanitary and condensate drain piping, storm drain piping, (including roof hoppers and fittings), with 25mm (1") insulation.

.1 Vertical runs of sanitary, condensate and storm drain piping may be left uninsulated where installed in airtight pipe shafts without ducts, but only if not subject to freezing (not close to outside walls) and not subject to sweating due to free air motion.

.2 Insulation shall be with factory applied fire resistive fibreglass reinforced vapour barrier jacket and aluminum foil vapour barrier with self-sealed lap. Recover pipe in exposed areas with canvas or PVC jacket

.3 Domestic water piping, sanitary and condensate drains, storm drains, fire protection piping, wet sprinkler system piping, drum drips of dry sprinkler system, storm sump pump discharge piping, sanitary sump pump discharge piping, piping installed in the unheated garage and other unheated areas shall be electrically traced with 50mm (2") insulation, finished with aluminium jacket banded with aluminium bands. Co-operate with Section which will install electrical tracing wiring between the pipe and insulation. Cover all insulated electrically traced piping and equipment exposed to the outside, with weatherproof aluminum jacket

.4 Cover fittings and valves with a layer of glass fibre insulation with vapour barrier. Recover with insulating cement to insulation on adjacent piping and canvas neatly pasted on with adhesive regardless of whether the adjacent pipe covering is recanvassed or not.

3.4 DUCTWORK AND AIR HANDLING EQUIPMENT

.1 Externally insulate:

.1 Exhaust ducts and relief air ducts min. 1.5m back from outdoor connection

.2 Combustion air ducts and plenums

.3 Blank-offs behind unused sections of louvres

.4 Return air ductwork located in unconditioned space

.5 All supply air ductwork except exposed in conditioned space.

.2 Unless otherwise noted, insulate round supply ducts up to 750mm (30") diameter and rectangular supply ducts up to 750mm (30") width with 25mm (1") thick fiberglass reinforced foil faced 19kg/m^3 (1.15lbs/ft^3) density flame resistant flexible duct insulation. Adhere insulation to duct surface with adhesive applied in strips 150mm (6") wide on 300mm (12") centres. Use fiberglass tying cord or 16 gauge annealed wire until the adhesive sets. Butt edges of insulation tightly together, and seal all breaks and joints with self-adhering aluminum tape.

.3 Unless otherwise noted, insulate round supply ducts over 750mm (30") diameter and rectangular supply ducts over 750mm (30") width with 25mm (1") thick fiberglass reinforced foil faced 48kg/m^3 (3.0lbs/ft^3) density flame resistant rigid duct insulation board. Fasten the insulation with welded pins and speed washers on maximum 300mm (12") centres. Use a minimum of two (2) rows of fasteners per side. Butt edges of insulation tightly together, and seal all breaks and joints with self-adhering aluminum tape.

.4 Where interior acoustic insulation is required, decrease the exterior insulation by equal thickness. Overlap the exterior insulation by at least 300mm (12"), upstream and downstream

.5 Cover plenums, casings, and ductwork which are to be thermally insulated with 25mm thick rigid preformed flexible foil faced duct insulation with factory applied fire retardant vapour barrier, or field applied Kraft laminate attached with adhesive.

.6 Combustion air and fresh air intake ductwork, and plenums shall be insulated with 25mm thick rigid foil faced FF Fibreglass vapour seal insulation. Vapour seal all insulation joints.

.7 Insulate all ductwork exposed to the outside with 75mm (3") insulation and weatherproof aluminum jacket.

.8 Insulate all ductwork exposed to unheated space with 75mm (3") insulation.

.9 After insulation is applied, seal holes, corners and joints the same day with 75mm wide Mac-Tac scrim foil tape.

.10 Cover angles or standing seams on the outside of plenums, casings and ducts, which extend beyond face of applied rigid insulation with a 12mm layer of flexible fire resistant fibreglass, 16 kg per cu m density, with facing. Extend this insulation 75mm on each side of the angle and place tight around the projecting leg of the angle. Apply rigid insulation, overlapping edge of flexible fiberglass on angle, so that vertical part of insulated angle projects through work. Vapour seal joints with an approved sealer.

3.5 RECOVERING AND FINISHING

.1 Recover exposed pipe insulation in finished rooms, fan rooms, mechanical equipment rooms, duct and pipe shafts where access is available, pipe spaces, penthouses, with canvas jacket neatly applied.

.2 Finish externally insulated ducts in fan rooms, penthouses, duct shafts where access is available and equipment rooms, with canvas and lap adhesive after joints and holes have been sealed with 75mm wide Mac-Tac scrim foil tape.

.3 Cement recovering laps with lapping adhesive. After canvas has been applied, give the entire surface a heavy brush coat of the same adhesive applied undiluted.

.4 Canvas for recovering shall be as previously specified with close weave and smooth finish. Submit sample of canvas for approval before installation.

.5 For recovering and finishing of exposed pipe insulation PVC Jacketing may be used instead of canvas. Apply Jacketing and Pipefitting Covers in accordance with manufacturer's recommendations.

.6 Securely fasten a layer of 25mm hexagonal wire mesh over externally insulated exposed fresh air intakes, exhausts, return and supply plenums, (excluding those formed by masonry walls or those acoustically lined), sheet metal blank-offs, and units and casings which are susceptible to damage (i.e. mounted at floor level). Securely apply a corner bead on corners. Apply a 12mm coat of insulating cement in two 6mm layers. Temper final coat with Portland cement. Recover finish coat with canvas as previously described.

.7 Cover insulated circular ducts in exposed locations with backing paper prior to applying canvas.

.8 Hot and cold water piping and also steam and condensate return piping in the kitchen area and the sterilizer areas where above the floor and exposed in finished areas, shall be covered with Johns-Manville Metal-on jacket insulation.

.9 Insulation exposed to outdoors shall be finished not with canvas, but a layer of 880 kg per cu m roofing felt, lapped at all joints, sealed with lap cement and held in place with metal bands on not more than 300mm centres.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Mechanical General Requirements.

1.2 SCOPE OF WORK

.1 Provide all labour, materials, plant, tools, transportation, testing and put into proper operation a complete plumbing and drainage system to the full intent of the drawings and/or specifications.

.2 In general, the major divisions of the work are as follows:

- .1 Plumbing fixtures, floor drains and other plumbing fittings and equipment
- .2 Storm and sanitary drainage piping inside the building, except where shown to be provided by base building
- .3 Domestic hot, cold, and recirculation piping inside the building downstream of building water meter
- .4 Miscellaneous Plumbing Work as shown on drawings and/or as specified herein

1.3 STANDARDS

.1 All work shall conform to the National Building Code; the Ontario Building Code; and all regulations of City, Local, Provincial or Territorial Authorities having jurisdiction. In case of confliction of codes with Specifications and Drawings, the most severe requirements shall apply. Where Drawings call for pipe sizes larger than minimum of the codes, Drawings shall be followed. The codes, however, shall not be violated under any circumstances.

1.4 SUBMITTALS

.1 Submit shop drawings and Product data for Products specified in this Section in accordance with Section of Mechanical General Requirements.

.2 Submit Shop Drawings for the following:

- .1 Valves
- .2 Plumbing specialties, including cleanouts, floor drains, backwater valves, scupper drains, area drains, trap primers, etc.
- .3 Plumbing fixtures, including water closets, lavatories, sinks, showers, faucets, traps, stops, etc
- .4 Pumps

Part 2 Products

2.1 PLUMBING PIPE AND FITTINGS

.1 Buried storm and sanitary drainage piping and fittings shall be plastic SDR 35 type.

.2 Above ground sanitary and storm drains, 75mm (3") dia. and under shall be copper drainage tube (DWV), cast brass fittings and 50/50 solder joints. Drains 100mm (4") dia. and over shall be standard weight cast iron pipe and fittings with mechanical joints.

.3 Above ground sump and sewage pump discharge piping from pump to gravity drain shall be Schedule 40 galvanized steel pipe; stretch reduced continuous weld, ASTM A53, with screwed fittings.

.4 Vents 50mm (2") dia. and less shall be type DWV copper, 65mm (2-$^{1}/_{2}$") and over shall be galvanized steel.

.5 Branch vents shall be type "DWV" hard drawn copper with cast bronze or wrought copper solder type fittings. Buried vents may be plastic ABS DWV type piping.

.6 Domestic water piping installed above the floor, including hot and cold and recirculating piping shall be Type "L" hard drawn copper tubing with cast bronze or wrought copper solder type fittings. No copper piping shall be in contact with ferrous materials. Unions or flange connections similar to Epco "Di-Electric" pipe fittings shall be used when making such connections. Copper pipe and fittings shall be in accordance with the latest issue of C.S.A. Standard Specification. ASTM Standard B88. Copper pipe with roll groove and mechanical coupling Victaulic Style is accep607N table for 50mm (2") pipe size and larger.

.7 **Type M copper is not acceptable.**

.8 Buried water pipe (100mm) 4" size and larger shall be Class 150 Ring-Tite PVC or cement lined ductile cast iron water pipe. Buried water pipe less than 100mm 4" size shall be soft temper copper with no joints below the floor, Type "L".

2.2 VALVES

.1 Conform to requirements of ANSI, ASTM, ASME, and applicable MSS standards.

.2 Provide valves with manufacturer’s name and pressure rating clearly marked on body. Product shall carry valid CRN (Canadian Registration Number).

.3 Provide valves of same manufacturer throughout, where possible. Provide Valves shall be Kitz, MAS, Toyo or approved equal.

.4 All valves shall be suitable for 1.4MPa/200PSIG water working pressure and up to and including 60mm (2 1/4") size, shall be all brass or bronze. Larger sizes shall have Stainless steel, or cast iron bodies and bronze trim. All valves 100mm (4") and larger on main distribution piping shall be with rising stem and shall be flanged.

.5 Install valves set behind access doors, except for unfinished areas, where they may be exposed.

.6 Domestic Water Systems (Hot and Cold), portable water, lead free valves Up to 200 PSIG

.1 Check Valves – Back Flow Prevention. For sizes 50 mm (2”) and under, Screwed Ends - Kitz 822T; Solder Ends - Kitz 823T

.2 Ball Valves - For Isolation and Balancing Service. For sizes 50 mm (2”) and under, Screwed Ends - Kitz 858; Solder Ends - Kitz 859. For sizes 65 mm (2-1/2”) and over: Kitz 150UTDZM-N

.3 Shutoff valves at plumbing fixture connection – Boshart, 08SV series, brass chrome plated.

.7 Check valves 50mm (2") size and smaller shall be 15 degree swing type, Kitz #23. Check valves larger than 50mm (2") shall be Kitz#78.

.8 Gate valves up to and including 50mm (2") size shall be Kitz #44. 65mm (2 1/2") size and over shall be Kitz#72.

.9 Globe valves up to and including 50mm (2") size shall be Kitz #12. 65mm (2 1/2") size and over shall be Kitz #76.

.10 Ball valves size 50mm (2") and less may be used in lieu of globe and gate valves, Kitz #59.

.11 Butterfly valves may be used in lieu of globe and gate valves size 60mm (2 1/4") and over, Kitz #6122El.

2.3 PLUMBING FIXTURES

.1 Plumbing fixtures shall be as described on the drawings.

.2 Fixtures shall be complete with necessary trim, including traps, faucets, supplies, stops, strainers, escutcheons, spuds, wastes, tail pieces, gaskets, brass bolts and carriers of type capable of being secured to floor slab.

.3 Provide wheel handle or screwdriver stop valve on the hot and cold water supply to every fixture on the job, in addition to the valve or faucet on the fixture itself.

.4 Shop drawings for fixtures shall consist of a carefully prepared portfolio showing illustrations, dimension drawings and detail descriptions of the fixtures to be furnished.

.5 Manufacturer: as specified on the drawings or equivalent.

2.4 PRE-PACKAGED DRAINAGE PUMP AND TANK

.1 General

.1 Provide a complete pre-packaged drainage pump/tank system as specified herein and as shown on drawings.

.2 Refer to drawings for more details, i.e. pump head, flow rate, power, etc.

.3 Manufacturer: Liberty Pumps, Zoeller or approved equal.

.2 Pump construction

.1 Hermetically sealed submersible type, operating in a high-quality dielectric oil for cooling the windings and for lubrication of motor bearings.

.2 The motor housing shall be constructed of a deep finned powder coated aluminium and shall be oil filled to dissipate heat. Air filled motors shall not be considered equal since they do not properly dissipate heat from the motor.

.3 Vortex non-clog design, molded engineered polymer impeller.

.4 The motor shaft shall be stainless steel and sealed from the pumped liquid with a carbon ceramic mechanical seal.

.5 All mating parts shall be machined and sealed with a Buna-N O-ring.

.6 All fasteners exposed to the pumped liquid shall be 300 series stainless steel.

.7 The motor shall be protected on the top side with sealed cord entry plate with molded pins to conduct electricity eliminating the ability of water to enter internally through the cord; and the motor shall be protected on the lower side with an engineered double lip seal with stainless steel springs.

.8 Package shall be complete with tank. The tank shall be made of polypropylene, and to be a free standing unit.

.3 Power

.1 The drain pump shall be supplied with 10 feet of multiconductor power cord. It shall be cord type SJTOOW, capable of continued exposure to the pumped liquid.

.2 The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code.

.3 The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity.

.4 Motors

.1 Single phase motors shall be oil filled, permanent split capacitor, class F insulated, NEMA B Design, rated for continuous duty.

.2 At maximum load the winding temperature shall not exceed 155°C unsubmerged.

.3 The pump motor shall have an integral thermal overload switch in the windings for protecting the motor.

.4 The capacitor circuit shall be mounted internally in the pump.

.5 Provide alarm/controller installed beside pump/tank, with the following standard features:

.1 High water level alarm strobe and buzzer

.6 Operating conditions and controls

.1 The drain pump shall be capable of handling effluent with 3/8” solid handling capability.

.2 All units are supplied with CSA and UL approved automatic wide angle tilt switches. The switches shall be equipped with piggy back style plug that allows the pump to be operated manually without the removal of the pump in the event that a switch becomes inoperable.

.3 The switches shall be mounted under a separately sealed access cover and tethered to a removable stainless steel rod for easy removal and serviceability.

.7 Provide a non-slam check valve in discharge pipe above the cover plate and pipe to gravity drain with galvanized pipe. Provide gate valve in discharge pipe above the cover.

.8 All pumps shall be individually tested to include the following.

.1 The pump and power cord shall be visually inspected for imperfections, cuts or nicks.

.2 The pump shall have a ground continuity check and the motor chamber shall be Hi-potted to test for moisture content and/or insulation defects.

.3 The motor and volute housing shall be pressurized and a 10 second air leak decay test run.

.4 Oil is added, and the pump is run. Voltage and current are monitored visually, electronically, and the tester listens for any noise or malfunction.

.5 All the operations, controls, and alarms.

Part 3 Execution

3.1 PIPING INSTALLATION

.1 All work shall be executed by plumbers holding certificates of competency. All fixtures and equipment shall be roughed-in, installed and connected exactly in conformity with respective manufacturer's details and all fitted with individual shut offs. All lines shall be laid or hung to approved falls, and all lines shall be arranged so that any or all systems may be completely drained. All roughing-in shall be concealed, save where specifically excepted by the Architect Consultant. Piping shall not touch the structure, sleeves, other piping, conduits or equipment at any point, save at the necessary connections. This shall be observed carefully to avoid transmission of noise. Allow sufficient space in sleeves, etc. for thermal expansion of piping.

.2 Where piping is installed in filled ground, or earth that cannot support piping, piping shall be supported on a concrete pad or piers, or alternatively it shall be cast iron hung at every joint from reinforcing rods 10mm (3/8") diameter min. asphalt coated as described in Ontario Building Code. Where piping passes through foundation walls, it shall be supported on a reinforced concrete pad as specified under "Excavation and Backfill" in Section of Basic Materials and Methods.

.3 In all piping 75mm (3") size and over, located anywhere, provide copper or brass flanges at each valve and at apparatus.

.4 Water pipe in boiler room and mechanical equipment rooms shall be copper as previously specified but disconnecting copper or brass flanges shall be installed at boilers, chillers, etc., using wrought copper streamlined fittings and with Silfos solder within 8m (25 ft.) of such connections.

.5 Pipes to circular wash fountains and island fixtures shall be insulated, wrapped with polyken tape and run in individual ABS Plastic conduits.

3.2 JOINTS

.1 Joints in cast iron pipes shall be Mechanical type.

.2 Joints in screwed steel pipe shall be made up with an approved joint compound. The use of lampwick will not be permitted. Pipe threads shall be full and clean cut. Pipes shall be reamed after being cut.

.3 Joints in copper piping shall be made using special tools of proper size. Ends shall be cut off at right angles to pipe and reamed. Inside of fitting and outside of pipe shall be thoroughly cleaned with steel wool and coated with flux. Joints shall be soldered with a blowtorch or oxyacetylene flame using single or double tip torch depending on fitting size. Use hard solder made up of 95% tin and 5% antimony for pipe sizes up to and including 78mm (3"). Use Silfos for pipe sizes 100mm (4") and above. Working parts of valves must be removed during soldering. Wrought copper streamlined fittings must be used where Silfos is specified.

.4 Joints in plastic piping to be solvent welded.

.5 All solders and jointing materials shall meet the current code requirements regarding the maximum allowable lead content.

3.3 CLEANOUT INSTALLATION

.1 Provide cleanouts on straight horizontal pipes with maximum spacing between cleanouts as followings:

.1 In the case of a sink waste pipe, 6m (20 ft).

.2 In the case of a horizontal sanitary drainage pipe, or storm drainage pipe, other than a waste pipe from a sink, DN100 (4") and less ,15m (50 ft) .

.3 In the case of a horizontal sanitary drainage pipe or storm drainage pipe larger than DN150 (6"), 30m (100 ft).

.2 Provide cleanouts at changes of direction greater than 45° in a sanitary drain, at the end of all branches, at the base of all riser lines, on all exposed or accessible traps (except water closet traps), at where drains leave the building, at all points on the system where so indicated or required by Code, or where necessary because of interruption of general line of flow.

.3 Cleanouts shall be full size of pipe up to 100mm (4") and not less than 100mm (4") for larger pipes. Full size "Y" or "TY" branches shall be provided for cleanouts on drains and their branches.

.4 All cleanouts shall be made accessible and wherever necessary branch connections shall extend to finished surfaces of floors with polished bronze floor plate and frame for each, set flush with floor and with vandalproof socket head screws to match the cover finish.

.5 Care shall be taken to locate all Barrett type cleanouts above any curbs, bases, etc. Barretts shall be covered with access doors as specified.

3.4 PIPE HANGERS

.1 Provide pipe hangers and supports for all piping and equipment supplied and installed under this Section. Refer to Section of Basic Materials and Methods for detailed requirements.

3.5 FLASHING

.1 All piping extending through the roof or other waterprooofed area shall be flashed with Thaler Roofing Specialties Products roof flashing. Flashing shall be left ready as directed by the roofers or water proofers for them to make watertight connections.

.2 Piping other than cast iron may be flashed with 0.5mm sheet copper soldered at all joints and provided with a conical weather drip clamped to pipe.

.3 Where pipes pass through walls, flashing shall be turned back into the wall and caulked.

3.6 PIPE EXPANSION AND CONTRACTION

.1 Provide for the expansion and contraction of pipe work. Erect all pipe in such a manner that the strain and weight does not come upon cast connections or apparatus. Provide bends or swing joints for this purpose.

.2 Provide anchors and expansion loops where required and where shown on drawings. Anchors shall be equal in strength to the pipe being anchored, both in shear and in bending.

3.7 TRAP PRIMERS

.1 All floor drains, hub drains, funnel drains etc., shall be trapped and provided with a 10mm (3/8") water connection for trap seal.

.2 Install insulated flush valve tanks at high level for priming and/or P.P.P. Model P1 & P2 Prime Rite automatic primer valves complete with distribution units.

3.8 CO-ORDINATION

.1 Coordinate the work with reference to ceiling space and heights, partitions, lighting, ductwork, etc.

.2 Where the food store merchandising layouts or commercial kitchen layouts are applicable, coordinate these layouts supplied for plumbing work prior to the rough-ins of plumbing pipes and fixtures.

3.9 BACKVENTS

.1 Every plumbing fixture shall have its own trap and these shall be vented in accordance with the Ontario Building Code or any other local rules and regulations.

.2 Vents smaller than 75mm (3") shall be increased to 75mm (3") before passing through the roof.

3.10 COLD WATER DISTRIBUTION

.1 Run piping to plumbing fixtures, hose bibbs and all other miscellaneous equipments requiring cold water connections on the job.

3.11 HOT WATER DISTRIBUTION

.1 Run hot water piping as indicated on the Drawings and connect to all fixtures, and all other miscellaneous equipment requiring hot water connection.

.2 Recirculation piping shall be arranged to provide a continuous and positive circulation of hot water throughout the system at all times. Branch shut-offs in recirculation piping shall match the shut-offs in the hot water mains, so that any section of the system could be shut

down and drained for maintenance. No recirculation branch shall be less than 20mm (3/4") size.

.3 There shall be no high points or air pockets in any recirculation lines. Lines shall be so arranged and graded that air shall collect at the fixtures or at the hot water tanks. Where it is impossible to avoid high points, install automatic air eliminator traps, Sarco Type 13WN with discharge piped to nearest drain.

3.12 DRAINAGE AND SANITARY SEWER SYSTEM

.1 The general arrangement of the storm and sanitary drainage piping is shown on the Drawings. Install a complete drainage system as shown.

.2 Include connections and revisions to the existing sewers.

.3 The area drains connecting to internal drainage system are part of the work of this Section.

.4 Provide complete venting system per Ontario Building Code.

.5 Connect vent lines into the soil stack above highest fixture or extend separately through roof to a height of 600mm (24") above roofline and 3.6m (12 ft) away from any opening into building and flash properly

3.13 FIXTURE INSTALLATION AND SUPPORTS

.1 Supply, install and connect up complete all plumbing fixtures shown on the Drawings. Protect all fixtures until the building is accepted by the Owner.

.2 All wall hung plumbing fixtures shall be supported by wall brackets. The bolts for these brackets are to be carried through the wall and through a steel plate 150mm (6") wide, 3mm thick and full length of bracket, plus 50mm (2") or to suit studs on wall.

.3 Water closets shall be set in mastic to prevent water on floor from entering space between floor and bowl or pipe sleeve.

.4 Supply and install below showers, janitor's receptors, and all other waterproofed areas required for plumbing fixtures a 2.5mm sheet lead safe, soldered at all joints, flashed into the floor drain and turned up 150mm (6") into all walls and curbs. "Compotite" manufactured membrane may be used in lieu of sheet lead.

.5 Provide shutoff vale on each branch pipe connection to each plumbing fixture.

3.14 THERMAL INSULATION

.1 Provide insulation as required in Section of Thermal Insulation.

3.15 TESTING

.1 Make pressure tests on all piping included in this Contract. Furnish all pumps, compressors, gauges and connectors necessary for tests.

.2 Conduct tests in presence of Consultant and all other personnel of Governing Authorities having jurisdiction. Notify all parties in ample time to permit them to be present.

.3 Conduct tests before piping is painted, covered or concealed.

.4 Test drains for tightness and grade as required by the Ontario Water Resources Commission Act, Regulation No. 736 and the local plumbing inspector.

.5 Hydrostatically test domestic water piping to a pressure of at least 1050 KPa (152Psi).

.6 All drains shall be tested for tightness and grade as required by the Ontario Building Code and Governing Authorities.

.7 Any tests required by the Architect and/or Consultant during the progress of the work or at its completion, shall be made without cost to the Owner. Such tests shall be carried out solely for the purpose of determining if the work as actually installed meets specified requirements.

.8 Caulking of threaded joints shall not be acceptable, faulty piping shall be replaced with new pipe and fittings.

.9 Conduct hydrostatic tests for a minimum period of 2 hours, or longer when requested. During this time the pressure shall remain constant and the exterior surfaces of pipe or fittings shall not show any cracks or other form of leak.

.10 Promptly correct any defects that develop through tests and re-test to complete satisfaction of Consultant and Governing Authorities.

.11 Submit records of all pressure tests, flushing and sterilization tests, and Approvals of Governing Authorities approvals to Consultant immediately on acceptance of tests and/or approvals.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Mechanical General Requirements.

1.2 REFERENCES

.1 Comply with the requirements of the latest edition of the following:

- .1 Building codes and fire codes
- .2 ASHRAE Standards
- .3 SMACNA Standards
- .4 AMCA Standards
- .5 NFPA-90A
- .6 NFPA-96
- .7 ANSI/AHRI 430-2009: Central Station Air Handling Units
- .8 ANSI/AHRI 1060 (I-P)-2011, Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment
- .9 NEBB (National Environmental Balancing Bureau)
- .10 NABC (National Air Balance Council)
- .11 AABC Standards (Associated Air Balance Council)

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Mechanical General Requirements for all equipment supplied under this Section, including:

- .1 Fans
- .2 Controls
- .3 Grilles and diffusers
- .4 Dampers
- .5 Louvres

Part 2 Products

2.1 DUCTWORK

.1 Ductwork shall be constructed of first class material and according to the recommended standards of ASHRAE Handbook, latest edition.

.2 Ductwork, unless noted or specified elsewhere, shall be first grade galvanized steel lock forming quality.

.3 Round ductwork and fittings to be spiral lock seam galvanized ductwork.

.4 Underground ductwork shall be spiral lock seam with waterproof coating. Cover in concrete and slope to a pump out plenum.

.5 Flexible ductwork shall be aluminium (maximum length of 3 meters (10 ft)).

.6 Splitter dampers shall be with Durodyne bracket and adjusting rods.

.7 Fasteners shall be rivets and bolts throughout, sheet metal screws accepted on low velocity ducts except adjacent to all fire dampers and access doors where pop rivets are required.

.8 Turning vanes shall be S.E. Rozell manufacture. Duct turning vanes shall be reinforced where air velocity exceed 10 m/s.

2.2 SEALANTS AND TAPES

.1 Except where used in conjunction with impermeable tape sealants shall be fire resistive compounds, non-flammable (ASHRAE) in wet state. Sealants used in conjunction with impermeable tape shall consist of non-oxidizing resin compound and shall have a 1034 kPa shear strength; sealant shall not support combustion in the dry state.

.2 Duct tapes shall be of the pressure sensitive type, at least 51 mm wide. Tape used with a sealer compound shall have polyethylene coating on 80-thread count cloth with total thickness of 18 mil, and shall be furnished by the sealant manufacturer to ensure compatibility of materials for proper curing.

.3 Vapour seal adhesive tape, and that used without sealant, shall be vinyl plastic, flame resistant and shall have physical properties as follows: 45 g/mm width, tensile strength 23 kg/mm width. Maximum flame spread rating of sealant and tapes to be 25.

.4 All ductwork joints for supply and return ductwork shall be provided with duct tape and sealant.

2.3 FLEXIBLE DUCT CONNECTORS

.1 Connections for conventional systems shall be fabricated from non-combustible, air-tight, moisture-proof material coated with layers of neoprene or vinyl. Provide 1.3mm (18-gauge) protective collar over flexible connections

.2 Connection materials shall be:

.1 Duro-Dyne of Canada Ltd. - Durolon

.2 Ventfabric Inc. - Ventglas

.3 Elgen Manufacturing Corp. - Neoprene

.3 Securely anchor ductwork to building structure at the flexible connection and select length of flexible material to allow 100 mm movement of supply air equipment and 50 mm for other fans.

2.4 FANS

.1 GENERAL

.1 Provide fans of type, size arrangement and performance as detailed in Schedules and as required herein.

.2 Acceptable manufacturers are as follows:

.1 Cook

.2 Greenheck

.3 Twin City

.4 Carnes

.5 Reversomatic

.6 Flaktwoods

.7 PennBarry

.3 Space allocation, motor sizes, base details and connection arrangements are based on equipment by manufacturers as shown in Schedules. In submitting a Tender based on installation of equipment supplied by another of the named manufacturers, include allowance for changes in ductwork, piping, electrical starters and wiring necessary to accommodate proposed equipment. After submission of shop drawings, submit details, drawn to same scale as Contract Drawings showing how layout is to be modified to accommodate approved equipment.

.4 Fans shall be selected from manufacturer's catalogued range of standard products, shall be statically and dynamically balanced, and when operating at maximum speed for class of construction shall be running at least 20% below first critical speed.

.5 The fan manufacturer will check that the motor horsepower specified is sufficient to accelerate the fan to operating speed without motor overload within normal time limits.

.6 Interior and exterior surfaces of fan equipment manufactured from black steel shall be factory cleaned and primed with red oxide chromate primer.

.7 Fans used for smoke exhaust shall be suitable for continuous operation at 205°C (400°F).

.8 Fan motor shall be:

.1 Not less than the motor horsepower, shown in the schedule.

.2 Sized in accordance with criteria specified under "motors"

.2 CEILING FANS

.1 Provide ceiling fans with integral aluminum ceiling grille or in-line type. Each fan shall be completed with a backdraft damper. Provide fans with aluminum wall outlet boxes or roof cap containing a built-in backdraft damper.

2.5 GRILLES AND DIFFUSERS

.1 Supply and install all grilles and diffusers as required and as shown on the drawings.

.2 Diffusers shall be of type, performance and size indicated on the drawings.

.3 Provide baffles to direct air away from walls, columns or other obstructions within the radius of diffuser operation.

.4 Provide door grilles as specified on drawings. Fire rated door grille shall be model Air Louvers 1900A, UL listed rated for use in fire doors up to 1-1/2 hour rating. Grille size as specified on drawing. Submit finish to architect for approval.

.5 Acceptable manufacturers: E.H. Price, Air Louvers, Titus, Nailor Industries.

2.6 DAMPERS

.1 Provide manual dampers at all duct branches, and where necessary for system balancing.

.2 Install motorized dampers supplied under Controls and Instrumentation where shown. Motorized dampers shall be equipped with actuator types as indicated on the schedule/specifications.

.3 Manual dampers in rectangular ductwork shall be of the opposed blade type provided with extended control shaft and locking quadrant.

.4 Manual dampers in round ductwork shall be butterfly type with round edged 10 gauge disk set in round sheet metal housing with rubber packing glands and wing nuts. Damper blades shall fit snugly when fully closed, 10 degrees from vertical and shall have indexing device to indicate position.

.5 Dampers shall be located so that access is available for adjusting quadrant or servicing damper motors.

.6 Acceptable manufacturers: Ruskin Corp, Nailor Industries Inc, E.H. Price.

2.7 OUTSIDE OPENINGS AND LOUVERS

.1 Provide louvers, bird screens, ductwork, plenums and blank-offs for intakes and exhausts. Confirm and co-ordinate opening size and location with other trades concerned. Provide motorized dampers as required.

.2 Louvers shall be:

.1 Air performance rating and water penetration shall be in accordance with AMCA publication 511

.2 6” deep extruded aluminum frame, with drainable head collects and removes water

.3 Extruded aluminum drainable blades

.4 16mmx1mm expanded, flattened aluminum bird screen

.5 Where required, provide hinged frame, double side security bars.

.3 Blank-offs shall be 18 gauge galvanized sheet steel suitably reinforced (including 50 mm thick insulation) and sealed with fire resistant mastic between galvanized steel and aluminum.

.4 Acceptable products:

.1 Ruskin #ELF6350

.2 Construction Specialties

.3 E.H. Price

Part 3 Execution

3.1 DUCTWORK

.1 All ductwork shall be constructed in strict accordance with the latest ASHRAE Guide.

.2 All ductwork unless specifically noted otherwise, shall be made of galvanized iron. Metal shall be best quality open hearth steel. The galvanizing shall be carefully done to prevent cracking.

.3 All laps shall be in the direction of air flow. No sheet metal screws shall be used in the duct where it is possible to use rivets and bolts. All edges and slips shall be hammered down so as to leave a smooth finished surface inside the ducts.

.4 All ducts shall be braced and stiffened so that they will not breathe, rattle, vibrate or sag.

.5 Rectangular ducts shall be constructed by breaking the corners and grooving the longitudinal seam, using the Pittsburgh lock or approved air tight joint. Elbows and transformation sections shall be formed with Pittsburgh corner seams or double seam corners.

.6 Ducts shall be free of obstruction, vibration and rattle. Leakage will be permitted to a maximum of 5% in the longest duct run.

.7 All rectangular ductwork carrying air at low or medium pressure and having any side over 300mm in width or depth shall be reinforced by cross bracing.

.8 All ducts shall be complete in themselves and no single partitions shall be permitted between ducts unless specifically shown.

.9 All tees, elbows or bends shall be made with a centre-line radius of not less than 1-1/2 times the width of the duct. Where space conditions do not permit the specified radius, then square throat fittings may be used complete with double thickness turning vanes.

.10 In special cases only, with prior approval of the Consultant, pipes may pass through ducts. In these cases, the pipe shall be covered with a streamline deflector, the duct shall be sealed air-tight and increased in size to provide the original free area.

.11 Where drawings indicate that the ductwork is to be insulated, make provisions for neat insulation finish around damper quadrants, access doors, etc. Mount metal collars of suitable size and width on insulated ducts to allow insulation to be neatly finished.

.12 Provide counterflashing for roof mounted equipment and any other duct openings in the roof.

.13 The sides of tapered fittings shall not slope at an angle exceeding 15 deg. from the line of air flow unless specifically shown or approval of the Consultant is obtained.

.14 The transitions at the axial fan shall not exceed l0 deg.

.15 Minimum low pressure duct gauges shall be as follows:

.1 Rectangular Ductwork, Galvanized Iron:

	.1	Up to 300 mm (Largest side)	.55 mm thick
	.2	310 to 750 mm	.70 mm thick
	.3	760 to 1370 mm	.85 mm thick
	.4	1380 to 2150 mm	1.01 mm thick
	.5	2160 mm and up	1.31 mm thick
.2	Round Ductwork, Galvanized Iron:		
	.1	660mm or less dia.	.55mm thickness
	.2	670 to 910mm dia.	.85mm thickness
	.3	920 to 1270mm dia.	1.01mm thickness
	.4	1280 to 1520mm dia.	1.31mm thickness

.16 Round ductwork shall be shop or factory fabricated of helically wound galvanized iron strips with spiral lock seam. Each duct section and fitting shall have a plain and a belled or swaged end to permit a sliding fit with an overlap of not less than 100mm. Insert sheet metal screws in joints at 300mm centres around perimeter with not less than three screws per joint. Ducts over 1000mm dia. shall have flanged joints. Surface of overlap or flanges shall be cleaned and painted with duct sealing compound before sections are joined.

.17 Ninety degree elbows shall be of five piece construction. Mitred elbows with approved turning vanes may be used where space limitations do not permit use of five piece elbows. Forty-five degree elbows shall be of three piece construction.

.18 Flexible ducts shall be aluminum helically would spiral duct, equal to Flexmaster T/L, maximum 10 ft. length. Provide acoustic flex equal to Flexmaster model T/L-A, where ducts are to be internally insulated.

.19 Supply and install deflectors or splitters with quadrant dampers at all points on supply systems and exhaust systems where small ducts are taken from larger ones.

.20 Supply and install manual dampers and turning vanes where shown.

3.2 DUCT SUPPORTS

.1 Ducts 1500mm and less in width or depth shall be supported by 25mm wide by 16 gauge or heavier galvanized bent hangers fastened to the side and bottom of the duct by bolts, rivets or metal screws. Straps shall be continuous under the duct. Speed nuts and nailed units shall not be used to fasten hangers to ducts. Hangers shall be spaced at not more than 2.5m intervals.

.2 Ducts over 1500mm width or depth shall be supported with 10mm diameter vertical rod hangers bolted to an angle supporting the duct from below and bolted to the bottom of the duct at 600mm intervals. Space hangers at not more than 1200mm intervals.

.3 Where vertical ducts pass through floors, they shall be supported by angles rivetted or bolted to the duct and bearing on the building structure.

.4 Support all ducts immediately adjacent to flexible connections.

.5 Duct hangers for ducts shall not be suspended from the steel roof deck. Hangers for such ducts shall be supported from structural bearings such as beams, top chords of steel joists,

or structural concrete slabs. Where structural bearings do not exist, provide angle or channel iron from nearest structural bearings to support hangers.

3.3 FLEXIBLE DUCTWORK

.1 At connection points between sheet metal and flexible duct use sealing compound and tape. Make a further mechanical connection using sheet metal screws.

.2 Sharp bends of flexible duct with centreline radius less than diameter of duct will not be accepted.

.3 Install maximum length of 3m (10') of flexible duct for each ceiling outlet.

.4 Flexible duct shall not penetrate through masonry or metal enclosure.

.5 Flexible ductwork may not be used on any branch ducts that have penetrated a ½ hour fire separation.

3.4 FLEXIBLE CONNECTIONS

.1 On the suction and discharge of all fans, provide 150mm wide airtight Duralon, elastomer coated, fibreglass fabric, flexible connections to isolate the fan from the ductwork.

.2 Length of connection:

.1 75 mm (3 in) for movement up 40 mm (1.5 in)

.2 150 mm (6 in) for movement over 40 mm (1.5 in)

.3 Minimum distance between metal parts when system is in operation: 25 mm (1 in).

.4 Securely anchor ductwork to building structure on building side of flexible connection.

3.5 OUTSIDE OPENINGS

.1 Openings will be left under Divisions 3, 4 and 7 in the outside wall, roof, etc., where shown and required for fresh air intakes and exhaust.

.2 Flashing for roof curbs and ducts under Division 7. Counterflashing by this Section.

.3 Supply and install all necessary ductwork and plenums for intakes and exhausts and patch around same to make a weathertight job.

3.6 CONNECTION TO LOUVRES

.1 Extend ductwork up to weatherproof louvres and make connections to same. Fill and caulk all openings to prevent water from draining to the wall or ceiling between the louvre and ductwork.

3.7 FANS

.1 Install fans in location shown, align shafts, belt drive and motor, adjust belt tension and check motor rotation before start-up.

.2 Protect motors and fans during construction and rotate fans, by hand if necessary, every month between delivery and acceptance of the building.

.3 Adjust variable pitch fan/motor sheaves as required during balancing to achieve specified air quantities.

.4 Do not operate unit until filters (temporary or permanent) are in place. Provide new permanent filters at takeover by Owner.

.5 Provide inlet boxes (SMACNA) on all centrifugal fans.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Mechanical General Requirements.

.3 Employ a single qualified and approved independent company to perform testing, adjusting, balancing and commissioning of all systems and products under Mechanical Divisions.

1.2 QUALIFICATIONS

.1 The company must be a member in good standing with either National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC), and will be subject to approval by the Consultant.

.2 Perform testing, adjusting, balancing (TAB) and commissioning in accordance with most stringent conditions of selected standard:

.1 AABC Standards (Associated Air Balance Council)
.2 NEBB (National Environmental Balancing Bureau)
.3 NABC (National Air Balance Council)
.4 SMACNA Standards
.5 ASHRAE Standards
.6 AMCA Standards
.7 ANSI/AHRI 1060 (I-P)-2011, Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment
.8 NFPA-90A
.9 NFPA-96

1.3 WORK INCLUDED

.1 Perform all tests specified and all tests required by authorities having jurisdiction.

.2 Review Contract Documents before project construction is started and confirm in writing the adequacy of provisions for the work.

.3 Schedule time required for the work (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.

.4 Provide all equipment, labour, calibrated instruments, and pay for expenses of manufacturers representatives, incidentals, and all power and fuel required to carry out the tests.

.5 Test equipment to the requirements of the equipment manufacturer.

.6 Follow start-up procedures as recommended by the manufacturer.

.7 During construction, coordinate location and installation of TAB & commissioning devices, equipment, accessories, measurement ports and fittings.

.8 Have the person in charge visit the project site at least once a month and submit a report stating that the work is satisfactory for future balancing and testing with respect to number, location and accessibility of balancing and testing devices, openings and all other aspects pertinent to this work.

.9 Fully record all tests including date, location, system, equipment tested, test set up, test results, etc.

.10 Test records of all manufactured equipment shall be complete with a manufacturer's affidavit.

.11 Have all test records signed by testing technician, and witnesses.

.12 Do not balance systems until each system has successfully passed the initial operational test.

.13 Where applicable, phasing of the work will require portions of the new and existing systems balanced at different times. Refer to the General Conditions on phasing.

.14 Start final TAB & commissioning only when building is essentially completed, including:

- .1 Installation of ceilings, doors, windows and other construction
- .2 Application of sealing, caulking and weather-stripping
- .3 Normal operation of mechanical systems
- .4 Air systems:
  - .1 Filters in place, clean
  - .2 Duct systems clean
  - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances
  - .4 Correct fan rotation
  - .5 Fire, smoke, volume control dampers installed and open
  - .6 Coil fins combed, clean
  - .7 Access doors, installed, closed
  - .8 Outlets installed, volume control dampers open
- .5 Liquid systems:
  - .1 Flushed, filled, vented
  - .2 Correct pump rotation
  - .3 Strainers in place, baskets clean
  - .4 Isolating and balancing valves installed, open
  - .5 Calibrated balancing valves installed, at factory settings
  - .6 Chemical treatment systems complete, operational

1.4 ACCURACY

.1 Perform TAB to within plus or minus 5% of design values.

.2 Prior to TAB, submit list of instruments used together with serial numbers.

.3 Calibrate in accordance with requirements of most stringent of referenced standard for the applicable systems.

.4 Calibrate within 3 months of TAB. Provide certificate of calibration.

1.5 VERIFICATION

.1 Reported measurements shall be subject to verification by Consultant. Provide instrumentation and manpower to verify results of up to 30% of all reported measurements. Number and location of verified measurements shall be at discretion of Consultant.

.2 Bear costs to repeat TAB, as required to satisfaction of Consultant.

.3 After TAB is completed, replace drive guards, close access doors, lock devices in set positions, and ensure sensors are at required settings.

.4 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

.5 TAB will be considered complete only when all final reports are approved by Consultant.

1.6 SUBMITTALS

.1 Prior to commencing TAB work, submit shop drawings showing:

.1 Details of instruments to be used
.2 Details of TAB procedures to be used
.3 Certificate of instruments calibration
.4 Forms and diagrams to be used

.2 Produce “as-built” full system schematics. Use as-built drawings for reference. Show location of permanent and temporary instruments and gauges, required for testing and balancing. Show location of any work for future.

.3 Submit PDF files of preliminary TAB reports, complete with index tabs for verification and approval of Consultant.

.4 Submit PDF files and 6 copies of final TAB reports after approval by the Consultant.

.5 TAB report format to be in accordance with referenced standard listed above, but using design drawing units.

.6 In TAB report, note those records for which tests have been witnessed by Authorities having jurisdiction.

.7 In TAB report, prepare a complete list of instruments used for each type of test and attach to each copy of the test report. Each list shall contain for each instrument:

.1 Name of instrument manufacturers
.2 Instrument number
.3 Scale(s) and full scale accuracy

.8 At the completion of testing, adjusting, balancing, commissioning and demonstration submit the following to the Consultant:

.1 Letter certifying that all work specified is complete, clean and operational in accordance with the Contract Documents

.2 As-built documents, sequences of operation and all maintenance manuals

.3 All TAB & commissioning reports

.4 All inspection authorities approvals

Part 2 Products

2.1 NIL

Part 3 Execution

3.1 AIR SYSTEMS

.1 Measurements: to include as appropriate for systems, equipment, components, controls: air velocity, static pressure, Velocity pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power voltage and current, noise, vibration.

.2 Locations of equipment and system measurements: to include as appropriate:

.1 Inlet and outlet of damper, filter, coil, humidifier, fan, other equipment causing changes in conditions

.2 Controller and controlled device

.3 Main duct, main branch, sub-branch, and run-out (or grille, register or diffuser)

.4 Provide fan curves indicating operating point with the air balancing report.

.3 Adjust, balance and test all system components until the trial test data are within five percent (5%) of design requirements for the overall system and each component. Repeat balancing and adjusting until the requirements are met.

.4 Adjust each outlet by anemometer, velometer, pitot tube, or anemotherm readings to provide proper air quantities. Adjust each supply outlet to provide proper throw and distribution in accordance with space and occupancy requirements.

.5 Perform all work required within the air handling unit casings to assist in balancing the systems.

.6 Arrange to have additional spread plates or baffles installed within the air handling unit casings where stratification or undesirable velocity patterns are evident.

.7 Balance main duct branches using the number of pitot tube traverses required to verify that required distribution has been achieved.

.8 Balance sub-branches to the required amounts as summated from measured quantities at all outlets.

.9 Systems shall be balanced so that fans operate at lowest possible speed and static pressure consistent with delivery of specified air quantities.

.10 Static pressure dampers shall be installed where static pressure must be reduced for control of either pressure or noise.

.11 After adjustment of supply, return and related exhaust fans, adjust minimum fresh air damper position to obtain design fresh air quantity. Damper position shall be determined by measurement of outside return mixed air temperatures and confirming calculations shall be included in balance report.

.12 Check the setting on all unit heaters, fan coil units, cabinet heaters, variable air volume fans, variable air volume boxes, and adjust as required.

.13 Provide pressure testing of the ductwork according to SMACNA. Minimum test length shall be 15 meters and 2 takeoffs and elbows.

.14 Mixing plenums: establish leakage at dampers, for mixing condition at minimum outside air, and at fifty percent (50%) outside air. Leakage shall not result in more than 0.6°C (1°F) differential in average mixed air temperature. Use pitot tube traverse readings. Have automatic dampers adjusted as required.

.15 The air balancing report shall include the following information, but not limited to:

.1 Diffusers, grilles, registers, floor outlets: System, room no., outlet designation and required air volume as per drawings, test air volume, test air velocity.

.2 Air supply systems: Provide design and test information including fan number, fan make, total fan air volume, minimum outside air volume, return air volume, total pressure, total static pressure, suction static pressure, discharge static pressure, fan RPM, motor make, size, motor nameplate information, rated amperage, actual amperage.

.3 Exhaust systems: Provide information including fan number, size and model, motor size, motor nameplate information, rated amperage, actual amperage, fan RPM, total pressure, static pressure, suction static pressure, air volume.

3.2 FANS

.1 Air quantity shall be measured by taking anemometer traverses across a cooling coil, a heating coil or at a filter bank or by pitot tube traverses in the fan suction or discharge plenum.

.2 Static pressure difference between fan inlet and discharge, motor amperage and fan rmp shall be measured and motor horsepower shall be determined from an appropriate curve showing horsepower, as a function of motor amperage for that particular motor.

.3 The results of these measurements shall be plotted on the fan characteristic curve supplied by the manufacturer and the air volume, static pressure and rpm lines should form a triangle enclosed by a rectangle with a vertical dimension not more than 15% of rated static pressure and a horizontal width of not more than 10% of rated air volume. The horsepower (KW) taken from the fan characteristic shall be within 10% of the horsepower, KW given by the motor amperage readings.

.4 Provide new drives and belts on equipment as required for TAB.

.5 Start and stop each fan at least five (5) times. Ensure that each fan is free wheeling and does not produce any abnormal vibration at any speed. Allow proper time interval between starts to motor manufacturer's requirements.

.6 Check fan starting and stopping time against time recorded on shop drawings.

.7 Let each fan and drive run continuously for one (1) hour, and check the motor temperature rise, and check bearing temperatures.

.8 Check the working of all motor starters, remote pushbutton stations and all motor interlocks.

.9 Check that when the fan runs at maximum power consumption no overload occurs in its electrical circuit.

.10 Perform these tests in conjunction with Division of Electrical, the fan manufacturer and if applicable with Controls and Instrumentation subcontractor.

3.3 UNIT HEATERS, CABINET UNIT HEATERS, DUCT HEATERS AND FAN COIL HEATERS

.1 Test units for proper performance, air pattern, and cycling under their automatic controls.

.2 Check for proper mechanical and electrical installation.

3.4 TEMPERATURE CONTROL

.1 Check automatic valves and dampers for correct installation, smoothness of operation, and proper stroking.

.2 Test two way control valves for tight shut off under maximum pressure drop conditions (no flow through associated circulating pumps).

.3 Check that sequenced control devices operate properly without overlap. Check that such sequenced devices are equipped with properly functioning pilot positioners.

.4 Check the accuracy of all sensor-controller assemblies by comparing the results with those obtained with independent measuring instruments.

.5 Check the accuracy of all panel mounted indicating gauges by comparing with readings obtained with independent measuring instruments.

.6 Check reset systems for proper compliance with design reset schedules.

.7 Monitor the adjustment of the temperature control system to ensure that the system performs as intended.

.8 The temperature control system shall be commissioned during the applicable season, i.e., heating systems during winter and cooling system during summer.

.9 Submit a full report including a statement that the systems perform satisfactorily and as intended over the full range of operating conditions.

3.5 VIBRATION ISOLATION EQUIPMENT

.1 Check all vibration isolators for proper deflection and freedom of movement under all operating conditions of equipment being isolated.

.2 Check flexible connections at all equipment isolated with vibration isolators to ensure that they are free from binding under no load, full load, start up and coast down of the isolated equipment.

3.6 DEMONSTRATION

.1 Arrange for demonstration and instruction of Owner's staff on all aspects of equipment and system operation.

.2 Arrange for and pay for services of manufacturer's representatives required to provide instruction on specialized portions of the installation.

.3 Demonstration and instruction will be provided on the following systems:

- .1 Operation of all automatic control dampers and temperature control devices
- .2 Response of all terminal units to thermostats and other controls
- .3 Location of and operation of all access panels
- .4 Location of all valves and control devices above ceilings
- .5 Operation of building occupied/unoccupied controls
- .6 Location and operability of fire dampers
- .7 Noise levels of all mechanical equipment and terminal devices under maximum operating conditions

.4 Operation of all equipment and systems under each mode of operation including:

- .1 Hydronic heaters
- .2 Fans
- .3 Others specified

3.7 RUNNING-IN

.1 After completion, balancing and adjusting and prior to takeover and operation by the Owner, run each system in with automatic controls fully operational during a period of at least fourteen (14) days including weekends.

.2 Maintain a daily log of key operating parameters.

.3 Before handing any system over, submit certified records for review by the Consultant.

.4 Systems without record of 14 days uninterrupted acceptable operation will not be taken over.

.5 Systems which cannot be run in prior to occupation shall be run in after occupation. The Owner shall delay his own operation until the performance of each system proves satisfactory and has been accepted.

.6 Adjust systems as necessary to result in acceptable operation.

END OF SECTION

HL ENGINEERING

ELECTRICAL SPECIFICATIONS

FOR PROJECT:

TLDSB MILLWORKS 2021

HL PROJECT NO.: 20070
RE-ISSUED FOR TENDER
NOVEMBER 15, 2021

HL ENGINEERING LTD
14721 WOODBINE AVE.,
STOUFFVILLE, ON
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CONTENTS

Part 1 General

1.1 SUMMARY

.1 Division 00, General Requirements is part of this Section and shall apply as if repeated here.

.2 Unless specified otherwise, this Section shall apply to all Sections of Electrical Divisions, 26, 27, & 28. The Electrical Contractor's scope shall include Divisions 26, 27, & 27.

.3 Conform to the conditions stated in the Contract Documents.

.4 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

1.2 INTENT AND SCOPE OF WORK

.1 The Work shall include all labour, materials, tools, equipment, services and incidentals, etc., necessary to provide the complete systems.

.2 The intent of these specifications is to provide complete systems that are ready for operation, and while no attempt has been made to detail or list each individual part required.

.3 Sections of these Specifications are not intended to delegate functions nor to delegate Work and supply to any specific trade.

.4 The Specifications are integral with the Drawings which accompany them. Neither is to be used alone. Any item or subject omitted from one, but included in the other is properly specified.

.5 Wherever differences occur in the Contract Documents, the maximum conditions and higher standards will govern and be allowed for in the Contract Price. The item to be incorporated will be at the option of the Consultant.

1.3 DEFINITIONS

.1 Where used, words "Electrical" or "Electrical Work", "Electrical Divisions", "Electrical Systems" shall include all Work in Divisions of 26, 27 and 28.

.2 Where used, words "Section" and "Division" shall also include other Subcontractors engaged on Site to perform work to make the building and Site complete in all respects.

.3 Where used, the word "Product" shall mean the material, equipment, component, machinery, or fixture forming the completed Work.

.4 Where used, the word "connect" shall mean to supply and install all wiring and raceways and make all power connections to Products.

.5 Where used, the word "supply" shall mean to include all labour, materials and services to furnish to the Site in the location required or directed complete with accessory parts, but is not intended to include installation.

.6 Where used, the word "install" shall mean to include all labour, materials and services to secure in place Products, including receiving, unloading, transporting, storage, uncrating, installing, connecting and performance of such testing and finish Work as is compatible with the degree of installation specified complete ready for use.

.7 Where used, the word "provide" shall mean to supply and install as each is described above.

.8 Where used, the word "commission" shall mean to start-up and initial operation of Products as required to demonstrate satisfactory operation of Products and the entire system including calibration of any instrumentation.

.9 Where used, the word "Work" shall mean the total construction required by the Contract Documents and includes all labour, Products and services.

.10 Where used, wordings such as "approved, to approval, as directed, permitted, permission, accepted, acceptance, report to", shall mean "approved, directed, permitted, accepted, report to", by the Consultant.

1.4 STANDARDS AND REGULATIONS

.1 Conform to latest version of the applicable standards and regulations, including Federal, Provincial and Municipal laws, By-laws, regulations, Codes and Standards and the requirements of other authorities having jurisdiction in the area where the Work is to be performed. Minor changes required by an authority having jurisdiction shall be carried out without change to the Contract Price. Standards established by the Drawings and Specifications shall not be reduced by applicable codes or regulations.

.2 Comply with the latest editions and all amendments of the following standards and regulations. Where conflicts in requirements occur, the higher standards shall apply.

- .1 Canadian Standards Association (CSA) Standards
- .2 Underwriter's Laboratories of Canada (ULC) Standards
- .3 Canadian Underwriters Association (CUA) Standards
- .4 Ontario Building Code (OBC)
- .5 Ontario Fire Code (OFC)
- .6 National Building Code of Canada (NBCC)
- .7 National Fire Code of Canada (NFCC)
- .8 National Fire Protection Association (NFPA) Standards
- .9 Ontario Electrical Safety Code (OESC) and Bulletins
- .10 Electrical Safety Authority (ESA) Requirements
- .11 National Electrical Manufacturers Association (NEMA) Standards
- .12 Electrical and Electronic Manufacturers Association of Canada (EEMAC) Standards
- .13 All standards and regulations mentioned in other Sections of this Division

1.5 TENDERS AND FORMS

.1 State separate prices in the Bid Form for the Work indicated in the Contract Documents. Prices shall include the complete cost of the Work, i.e. all equipment, wiring, material, labour, incidentals, profit, overhead, etc, excluding taxes. It shall be the Owner's option to delete from the Contract any of the Work indicated at the prices stated.

.2 Cash allowances shall be carried in the Contract for the Work indicated, including all equipment, wiring, material, labour, incidentals, profit, overhead, etc, excluding taxes. If the actual cost is less than the Cash Allowance, the remainder shall be reverted to the Owner. If the actual cost exceeds the Cash Allowances, the Owner will reimburse the extra amount.

1.6 PERMITS AND FEES

.1 Apply for, obtain, and pay for permits, licenses, certificates, connection charges and inspections required by authorities having jurisdiction. Include any premiums applicable due to requirements for after office hour inspections.

.2 Submit all required documentation to the authorities for their approval and comments before starting any Work. Provide all additional drawings, details or information as may be required. Comply with any changes requested by Authorities as part of the Contract, but notify the Consultant immediately of such changes.

1.7 EXAMINATION OF SITE AND CONDITIONS

.1 Examine the Site and local conditions prior to tender submission.

.2 Examine carefully all Drawings and complete Specifications to ensure that Work and equipment will satisfy Site conditions and performance requirements as shown. The Drawings do not show all Site conditions and existing equipment. The Contract Price shall cover all existing Site conditions.

.3 No allowance will be made later for any expense incurred through failure to make these examinations or to report any such discrepancies and omissions in writing, five Working Days prior to tender closing.

.4 Examine the work of Other Contractors and report at once any defect or interference affecting the work, its completion or warranty.

.5 Submission of a tender confirms that the Contract Documents and Site conditions are completely understood and accepted without qualifications unless exceptions are specifically indicated in the Bid Form.

1.8 CONTRACT DOCUMENTS

.1 The Contract Drawings of this Division are performance drawings and indicate the scope and general arrangement of the Work. They are diagrammatic except where specific details are given.

.2 They shall be read in conjunction with Architectural, Structural, Mechanical and all other Division Drawings of the Contract.

.3 The Drawings do not show all conduits and/or wiring or all structural, mechanical and architectural details.

.4 Obtain accurate dimensions from the architectural and structural Drawings, or by Site measurement. Locations and elevations of services are approximate and must be verified before construction is undertaken.

.5 Make changes required to accommodate structural conditions, (beams, columns caps, etc.). Obtain the Consultant's approval before proceeding.

.6 Adjust the location of materials and/or equipment up to 3 meters in any direction as instructed without adjustment to Contract Price, provided that the instructions are given before installation and rough-in.

.7 Plan and install conduit runs respecting all applicable conditions including structural, mechanical and architectural details.

1.9 SHOP DRAWINGS

.1 Prepare and submit shop drawings of all Products in accordance with Division 1-General Requirements as specified herein and in each Section of this Division.

.2 PDF files are acceptable.

.3 Shop drawings shall have a minimum 210 mm x 285 mm (8-1/2" x 11") clear space on the front sheet, suitable for stamping. The cover sheet shall include the project name, Contractor's name and Product description. Where multiple Products are submitted in one binding, include an index of all equipment as the front sheet.

.4 Assume full responsibility for submission of shop drawings. Allow a minimum of 10 Working Days for the Consultant review.

.5 The Consultant will only review shop drawings bearing the Electrical Division and Contractor's stamps of approval.

.6 Submit shop drawings showing the following:

.1 Contract name
.2 Contract number
.3 Manufacturer's name and model number
.4 Supplier's name
.5 Approval agencies
.6 Shipping and working weight
.7 Performance characteristics
.8 Dimensions, including required clearances
.9 Electrical characteristics
.10 Bill of materials and finishes
.11 Time required to fabricate and deliver
.12 All variations from Contract Documents
.13 Construction and field connection details

.14 Installation requirements

.7 The review shall not relieve the Contractor of its responsibility to provide Products in accordance with the design intent and Contract Documents.

.8 Manufacturer's printed data sheets for standard items are acceptable providing pertinent characteristics are identified and relate to specified items.

.9 Each shop drawing shall be checked and stamped as being correct, by trade purchasing item, and by the Contractor, before drawing is submitted.

.10 Where applicable, provide wiring details, schematics, single line drawings, and wiring diagrams showing interconnection with the Work of other Divisions.

.11 Verify and check dimensions to ensure proper installation of equipment in available space and without interference to the Work of other Divisions. Ensure that electrical and all other coordination is complete prior to submission of shop drawings.

.12 Provide data sheets and samples for all wiring devices and wall plates prior to installation. Device and plate colours/finishes to be confirmed prior to ordering.

.13 Where requested, submit samples of Products for review and approval.

.14 Do not have equipment delivered to the Site until a shop drawing for the item has been reviewed.

1.10 EXISTING, INTERFERENCE AND DETAIL DRAWINGS

.1 Submit complete existing electrical system drawings prior to construction work.

.2 Existing drawings shall show complete and accurate existing electrical system conditions, location of all devices and equipment, conduits and wires, junction boxes and power suppliers to building loads.

.3 Prepare Existing, Interference and Details Drawings in conjunction with all parties and trades concerned showing sleeves and openings and passage of piping and conduits through building structure. Drawings shall also show inserts, curbs, equipment bases, anchors, special hangers and weights on all load points.

.4 Prepare fully dimensioned detail drawings of Products and services in electrical rooms, service and ceiling spaces, and all other critical locations. Coordinate the Work with all other Divisions. Base drawings on reviewed shop drawings and indicate all details pertaining to access, clearances, sleeves, electrical connections, and elevations of pipes, ducts and conduits. Include location of access doors provided under this Division.

.5 Ensure that clearances required by jurisdictional authorities are indicated on the interference drawings.

.6 The Owner will not consider any extra cost as a result of the Contractor’s failure to prepare proper drawings. Submit drawings two (2) weeks after receipt of the Notice to Commence the Work.

1.11 RECORD DRAWINGS

.1 Conform to the General Requirements. Maintain at least 2 sets of documents and clearly mark on same as the Work progresses, changes and deviations from Work shown so that on completion the Owner will have records of the exact location of ducts and equipment and a record of material and equipment changes.

.2 The Contractor shall obtain a clean set of prints at the start of Contract Work and shall keep these prints up-to-date at the Site, accurately recording all changes made on the project and locating all services, equipment, etc. which may have been shown only diagrammatically on the Contract Documents.

.3 The Contractor shall ensure that as-built information is accurately recorded and shall check same. As-Built drawings shall be reviewed at each Site meeting.

.4 Prepare record drawings showing the following:

.1 All buried conduit runs are to be shown complete with dimension from building lines.

.2 Inverts of all services entering and leaving the building and at property lines

.3 Dimensions of underground services in relation to property lines at key points of every run

.4 Elevations of underground services in relation to ground floor level of the building

.5 Location of all services embedding in the structure, utilizing grid line references

.6 Dimensioned locations of all services left for future work

.7 All changes to the Work due to Change Orders and Site Instructions

.8 All changes to the Work during construction

.9 All changes to structural and architectural elements that affect the backgrounds of this record set

.10 Location and designation of all electrically supervised valves, flow switches and pressure switches

.11 Location and designation of all items requiring access or service in a hidden location

.12 Location of all access doors provided under Electrical Division

.13 All changes and revisions to Specifications, details and equipment schedules

.14 All homerun conduits, junction boxes for complete electrical systems

.5 Upon completion of the Work, prior to the Substantial Performance inspection and after final review with, the Contractor shall neatly transfer recorded information and make a final As-Built submission for review in the following form:

.1 One (1) copy of clean, legible prints

.2 One (1) copy of ACAD2010 format drawings, files shall retain all setting (layers, line types, scales colors, etc) used in the Contract drawing

.6 After Record Drawings have been reviewed, revise if necessary. Deliver drawings in the form of Autocad disk and three (3) sets of prints taken from those disks to the Owner. Where original design ACAD files to be obtained from HL, a cost of $500.00 plus HST will apply. **Refer to the request form in Section 01 33 00 Submittals.**

1.12 OPERATION AND MAINTENANCE MANUAL

.1 The Contractor will be responsible for collecting and organizing three (3) copies of all data, operating instructions, maintenance and trouble-shooting instructions, parts lists, parts diagrams, evidence of all tests and certifications, complete reviewed shop drawings, etc. and assembling them in neat manuals in hard cover. Identify cover “Operation and Maintenance Manual for NAME OF THE PROJECT”. Manuals shall be separated with dividers in logical sections and volumes.

.2 The Contractor shall also collect from Subcontractors and Suppliers all Guarantees/Warranties specified in the Contract Documents. Check that starting date (date of Total Performance of the Work) and extent of each guarantee/warranty are clearly indicated. Check also that all guarantees/warranties indicate the Supplier’s Name or Subcontractor’s Name as appropriate together with contact phone number. Assemble neatly in labelled section of each manual.

.3 Prior to requesting the Substantial Performing inspection, submit one (1) copy for review. Make all corrections as requested and forward the corrected two (2) copies to the Owner.

1.13 SCHEDULING

.1 Comply with the construction schedule. Conform to phasing of Work if applicable. Conform to interim and final completion dates.

.2 Coordinate the Electrical schedule with general construction schedule.

.3 Submit a bar chart schedule showing the start and completion dates for each activity based on a critical path analysis of the Work.

.4 Include in the schedule for Electrical Work done by others, e.g. Power Supply Authority connection.

1.14 ALTERNATES AND SUBSTITUTIONS

.1 Substitute Products will only be considered when tendered Products become unobtainable. State in the tender the proposed substitute and amount added or deducted.

.2 It is the responsibility of the Contractor to ensure "Substitute Products" fit the space allotted and provides the performance specified in the Contract Documents.

.3 If Products manufactured and/or specified by a manufacturer named as equivalent are used in lieu of the manufacturer specified, the Contractor shall be responsible for ensuring that the substituted Product is equivalent in performance and operating characteristics to the specified Product, and, it shall be understood that all costs for additional space, larger power feeders and changes to associated or adjacent Work will be borne by the Contractor offering the substitution. In addition, in Equipment Rooms where Products named as equivalent is used in lieu of specified Products and the dimensions of such Products differs from the specified Products, prepare and submit for approval, accurately dimensioned layouts of rooms affected.

1.15 VALUATION OF CHANGES

.1 For each change submit a complete itemized breakdown of labour and material.

.2 Only the net difference between an extra and a credit will be subject to overhead and profit mark up.

.3 Material shall be valued at current trade prices incorporating all discounts and labour rates. Overhead and profit shall be as shown in the Tender Form.

1.16 WORKMANSHIP

.1 Workmanship and method of installation shall conform to best standards and practice and be performed to approval. Work shall be done by tradesmen skilled in the type of work to be performed. Where required by local or other By-laws and Regulations, tradesmen shall be licensed in their trade. Install all Work and equipment according to the manufacturer's printed directions.

1.17 INSTALLATION REQUIREMENTS

.1 Coordinate the Work of this Division with the Work of all other Divisions. Inform the Subcontractors for the Work of other Divisions of the locations of openings, chases, sleeves, supports, services, connections, etc., to be incorporated into the Work.

.2 Check the locations of all expansion/building joints and ensure that all electrical installations, are at or crossing these locations, are as detailed and as required to compensate for the possible movement at the joint.

.3 Confirm the exact location of outlets, fixtures and connections. Check architectural details and elevations for more requirements. Confirm location of connection points for equipment supplied under other Divisions or by the Owner.

.4 Install neatly all equipment and apparatus to allow free access for maintenance, adjustment and eventual replacement.

.5 Install metering and/or sensing devices to provide accurate and reliable sampling of quantities being measured. Install instruments to permit easy observation.

.6 Provide suitable shielding and physical protection for devices.

.7 Install all Products and services in accordance with the manufacturer's requirements and/or recommendations.

.8 Provide all supports, hangers and fasteners. Secure all Products and services so as not to impose undue stresses on the structure and systems.

.9 Ensure that the load onto structures does not exceed the maximum loading per square meter (foot) as shown on structural Drawings or as directed.

.10 Do not use explosive activated tools.

1.18 FIELD REVIEW

.1 The Owner and Consultant shall have access to the Site at all times for review of the Work during construction.

.2 Arrange for review of Products during manufacturing.

.3 Provide all gauges, instruments and other necessary measuring equipment required for review of the Work.

.4 Maintain a complete set of Contract Documents at all times for field reference.

.5 Correct any deficiencies as they are reported during the performance of the Work.

1.19 TEMPORARY SERVICES

.1 Provide temporary office, workshop and tools and material storage space for the Work and assume responsibility for any loss or damage thereto. Buildings erected for this purpose shall conform in appearance to those erected for similar purposes under other Divisions of the Specifications.

.2 Provide temporary lighting for whole construction area.

.3 Provide scaffolding and shoring necessary for the Work of this Division. Scaffolding and shoring shall be adequate to protect the workmen according to Provincial and Local Regulations.

.4 Provide rigging and mill-wrighting, labour and equipment necessary for the Work of this Division. Employ only workmen well experienced and skilled in such trades for this portion of the Work.

.5 Provide hoisting machinery, operators, labour and materials necessary to lift and place equipment supplied under this Division.

.6 The permanent systems or any part thereof shall not be used during construction for construction purposes, unless so permitted in advance by the Owner, in writing.

1.20 PROTECTION AND CLEANING

.1 Securely plug or cap open ends of electrical raceways or equipment to prevent entry of dirt, dust, debris, water, snow or ice.

.2 Equipment stored on Site shall be protected from weather and kept dry and clean at all times. Take care to avoid corrosion of metal parts.

.3 Protect all finished and unfinished Work of this and other Divisions from damage due to carrying out of this Work.

.4 Make good any damage caused directly or indirectly to walls, floors, ceilings, woodwork, brickwork, finishes, etc.

.5 Before energizing any systems, inspect and clean the inside of all panelboards, switchgear and cabinets to ensure that they are completely free from dust and debris.

.6 Clean all polished, painted and plated Work. Clean all lighting fixtures. Remove all debris, surplus material and tools.

.7 Carry out additional cleaning operations of systems as specified in other Sections of this Division and as Division 1 requires.

1.21 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling.

.3 Divert unused wiring and metal materials to a metal recycling facility, or place in appropriate on-site bins for recycling.

1.22 MOCK-UPS AND TRIAL USAGE

.1 Provide mock-ups in accordance with the conditions stated in the Contract Documents and Division 1 of the Specifications.

.2 Trial usage of any equipment or materials shall not be construed as evidence of acceptance of same and no claim for damage shall be made for injury to, or breaking of, any part of such Work which may be so used.

1.23 COMMISSIONING

.1 Be responsible for commissioning of all Work provided under this Division. The total commissioning requirements of this Division involve:

.1 Complete activation of all systems

.2 Calibration, testing and verification of all systems

.2 Commissioning shall commence with activation and verification of all systems in accordance with requirements of the Specifications. This will include, but not be limited to, the following items to be tested, adjusted and verified:

.1 Lighting and power distribution

.2 Fire alarm system

.3 Emergency lighting system

.4 Electric heating equipment/system

1.24 TESTING

.1 Carry out all tests specified in the Contract Documents and tests required by authorities having jurisdiction. The testing and adjusting is the responsibility of the Contractor.

.2 Provide all equipment, labour, instruments, expenses of the manufacturer's representative, and incidentals, and pay for all power and fuel required to carry out the tests.

.3 Submit the record of all tests signed by the Contractor's Superintendent and, where applicable the manufacturer's representative. Show in schedule form a record of the systems or parts of systems tested, the date of the test, the circumstances such as current, temperatures, etc., the duration of the test and any special remarks pertaining to events during the test. Note the test has been witnessed by authorities having jurisdiction.

.4 Submit certification letters from the manufacturers of all equipment certifying that their technical representatives have inspected and tested their equipment and are satisfied with the methods of installation and operation. Where existing systems are extended, provide letters covering both new and existing equipment and connections. These letters shall

state the names of persons present at testing, methods used and a list of functions performed with location and room numbers where applicable.

.5 Conduct the following tests, at a minimum:

.1 Fire alarm system test

.2 Emergency lighting system test

.3 Power distribution, including control and switching, polarity tests, voltage-drop tests and phase balancing measurement

.4 General operations: energize and operate electrical circuit and item

.5 Circuits originating from branch distribution panels

.6 Lighting and lighting control

.7 Motors, heaters and associated control equipment, including sequenced operation

.8 Di-electric tests, hi-pot tests, insulation resistance tests and ground continuity tests as required by nature of various systems and equipment

.9 Demonstrate systems operation

.10 Repair, alter, replace, test and adjust as necessary for a complete and operating electrical system

1.25 INSPECTION

.1 Arrange for inspection of all Work by the authorities having jurisdiction. Upon completion of the Work furnish final unconditional certificates of approval by the inspection authorities.

.2 Application for final review will be considered when the Work has been completed and written declarations submitted that all commissioning, testing adjustment, set up and documentation is complete. Final review shall be done when:

.1 All reported deficiencies have been corrected.

.2 All systems have been balanced, tested, commissioned and are operational.

.3 The Owner has been instructed in the operation and maintenance of all equipment.

.4 All reports have been submitted and reviewed.

.5 All maintenance manuals have been submitted and reviewed.

.6 All tags and nameplates are in place and all data submitted and reviewed.

.7 Cleaning up is finished in all respects.

.8 All certificates are furnished.

.9 All spare parts and replacement parts specified have been provided.

.10 All record drawings have been submitted and reviewed.

1.26 DEMONSTRATION AND INSTRUCTION

.1 Provide personnel, equipment and tools to demonstrate and instruct the Owner’s designated personnel in the operation, controlling, adjusting, trouble-shooting and servicing of all systems and equipment to satisfaction of the Owner. This Work shall take place during the Owner’s regular business hours prior to acceptance.

.2 Where specified elsewhere in this Division, manufacturers shall provide demonstration and instructions.

.3 Where deemed necessary, the Owner's agent may record these demonstrations via video tape or other means for future reference.

1.27 WARRANTY

.1 Provide a written guarantee stating that systems, equipment, components, etc. have been installed to manufacturer's instructions, that systems meet the Contract requirements and that all deficiencies in material and labour occurring within two (2) years after Substantial Performance of the work, will be corrected at no charge to the Owner.

.2 Obtain Product warranties in excess of two (2) years from the manufacturer on behalf of the Owner. These Product warranties shall be issued by the manufacturer to the benefit of the Owner.

.3 Instruct all manufacturers and suppliers that warranties on Products will commence upon the date of Total Performance of the Work and not from the date the Products are put into operation.

.4 All corrections to deficiencies listed in field review reports and other correspondence, as well as but not limited to those indicated in testing, adjusting, balancing and commissioning, shall be completed prior to turn over.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Unless specified otherwise, this Section shall apply to all Sections of Electrical Divisions, 26, 27, & 28

.4 Work to be done under this Section shall include furnishings of labour, materials, and equipment required for installation, testing and putting into proper operation complete electrical systems as specified in the Contract Documents, as shown on the Drawings and as otherwise required. Complete systems shall be left ready for continuous and efficient satisfactory operation.

1.2 SUBMITTALS

.1 Submit shop drawings and Product data for Products specified in this Section in accordance with Section of Electrical General Requirements.

1.3 QUALITY ASSURANCE

.1 Electrical Work shall be carried out by qualified, licensed electricians.

Part 2 Products

2.1 PRODUCTS

.1 Products shall be new, of Canadian manufacture where available, first quality and uniform throughout. The Contractor shall submit in tender based on the use of Products specified in the Contract Documents, or on the listed acceptable alternate Products as further noted.

.2 Electrical Products shall be CSA or ULC approved and be so labelled. Products not CSA/ULC approved shall receive acceptance by the Owner for installation, and modifications and charges required for such acceptance shall be included in the Work of this Section.

.3 Products shall not be installed or connected to the source of electrical power until approval is obtained.

.4 Where a manufacturer is not specified, provide Products of high commercial standard and quality consistent with the standards of these Specifications. Provide Products of the same manufacture for like applications unless noted otherwise in the Contract Documents.

.5 Products shall be designed and manufactured in accordance with latest issue of applicable Standards or authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment. Confirm capacity, ratings and characteristics of

Products being provided to supply power to equipment provided under other Sections of the Work. Resolve discrepancies before such items are purchased.

.6 Acceptance of Products installed presumes that Products have not been damaged or exposed to conditions that would adversely affect performance and life expectancy. If in the opinion of the consultant, Products have sustained damage, or have been exposed to abnormal conditions it shall be the responsibility of the Contractor to have such tests performed as are deemed necessary by the Consultant to establish the condition and therefore, acceptability of installed Products.

2.2 ELECTRICAL IDENTIFICATION

.1 Cable and conduit

.1 Identify conduits and cables for the various systems by the use of the following distinctive coloured labels. The labels shall comprise pressure sensitive plastic tape with printing labels indicating the system. Apply a small area of paint to the inside of each outlet box, pull box and panel as it is being installed. Identify junction boxes in suspended ceiling areas with colour on both inside and outside.

.1 Power system - yellow

.2 Fire alarm systems – red

.2 Locate identification labels as follows:

.1 Behind each access

.2 At each change of direction, at junction boxes, and at both ends of each run

.3 Not more than 15m apart in straight runs

.4 Where passing through a wall, partition, and floor; one on each side of the wall, partition, and floor

.2 Cable and conduit labels

.1 For power and lighting system feeders, install labels at either end of the conductors where terminated inside of equipment to match wiring diagram conductor identification or panelboard circuit numbers. Typical identification Panel AA circuit - 21; use "AA-21". For a three phase circuit provide identification on phase A conductor only. For a single phase circuit provide identification on the phase conductor.

.2 For lighting branch circuits identify circuit at panel and in outlet box connection to lighting fixture. Install label on phase conductor tap-off. Typical identification if fixture connected to Panel A, circuit 5; marker identification A-5.

.3 For branch circuits supplying single phase and three phase devices such as receptacles and connections to equipment identify conductors at panel and in device outlet box. Install label on phase conductor inside outlet box. Typical identification if device is connected to Panel B - circuit 14, marker identification "B-14".

.4 For switchboards identify all control conductors at terminal strips inside equipment and where terminated at all remote devices. Identification shall match the numbering system on the Drawings and "Reviewed" shop drawings.

.5 For fire alarm systems, identify all conductors at terminal strips located in:

.1 Control panels.

.2 Annunciators.

.3 Printers.

.4 Local terminal cabinets.

.5 All remote devices.

.6 All connections in the system.

.7 Provide identification in accordance with the numbering system on the "Reviewed" shop drawings.

.6 For miscellaneous systems identify all conductors at terminal strips located in:

.1 Control and/or monitoring panels.

.2 Control and/or monitoring stations.

.3 Local terminal cabinets.

.4 All remote devices.

.5 All connections in the system.

.6 Provide identification in accordance with the numbering system on the "Reviewed" shop drawings.

.3 Equipment nameplates

.1 Provide lamacoid name plates, white background with black engraved letters 0.4" (10 mm) high, for electrical equipment but not limited to panels, switchboards, transformers, disconnect switches, breakers, contactors, relay panels, starters, TVSS, FACP and miscellaneous panels.

.2 Nameplates shall indicate voltage, capacity, upstream, and downstream equipment. Typical identification for panel: "Lighting Panel C, 230/415V, 3 phase, 4 W. Supplied from Panel BB".

.3 Install plates after all painting has been completed. Secure with mechanical fastening devices except on the inside of panel doors where gluing will be acceptable.

.4 Power system colour code

.1 Power system phase colour code:

.1 Red - Phase A

.2 Black - Phase B

.3 Blue - Phase C

.4 Neutral - White

.5 Ground - Green

.2 Identify incoming utility service lines with enamel paint conforming to the above colour code.

.3 Band buses in switch board and panels shall conform to the above colour code.

.4 Provide branch conductor conforming to the above colour code.

.5 Manufacturer’s nameplates

.1 Have the manufacturer's nameplates affixed to each item of all equipment showing the size, name of equipment, serial number and all information usually provided, including voltage, cycle, phase, horsepower, etc., and the name of the manufacturer and its address. Ensure that all stamped, etched or engraved lettering on plates is perfectly legible. Ensure that nameplates are not painted

over. Where apparatus is to be concealed, attach the nameplate in an approved location on the equipment support or frame.

.2 Ensure that panels and other apparatus which have exposed faces in finished areas do not have any visible trade marks or other identifying symbols. Mount nameplates behind doors.

.6 Signage

.1 Provide signage to the local inspection authority on all equipment and electrical rooms.

.2 The suitable warning signs must be installed as per the Electrical Safety Code.

.3 Where applicable, provide warning signs for ground fault protection circuit as required by ESC.

.4 Where applicable, provide warning signs and marking for the power disconnect switches for fire pumps as per NFPA-20, section 9.3.

2.3 WIRES AND CABLES

.1 Comply with the requirements of the latest editions of the followings:

.1 CSA C22.2 No. 0.3, Test Methods for Electrical Wires and Cables

.2 CAN/CSA-C22.2 No.131 – Type TECK 90 Cable

.3 CSA C22.2 No. 38, Thermoset Insulated Wires and Cables

.4 CSA C22.2 No. 75, Thermoplastic-Insulated Wires and Cables

.5 CSA C22.2 No. 65, Wire Connectors

.2 Use copper conductors RW90XLPE and/or RWU90XLPE, 90ºC rated insulation unless otherwise noted in the Contract Documents.

.3 All wire and cable voltage rating shall be 600V. All outdoor wire and cable shall be -40 Deg. C rated.

.4 Direct burial cable is **not** acceptable. All wire and cable shall be run in conduit.

.5 Solid conductors of #12AWG and smaller. Stranded conductors for #10 AWG and larger.

.6 Except as indicated hereinafter, wire for lighting and receptacle branch circuits to be #12 AWG except that #10 minimum to be used where the home run exceeds 27m (90’).

.7 Minimum #10 for all exterior lighting circuits.

.8 Wire for control circuits to be #12AWG minimum, and for 24 volt control circuits to be #18 AWG minimum.

.9 Wire to ceiling outlet boxes on which a lighting fixture is or may be mounted, with conductors having insulation suitable for 90°C.

.10 Cables located in plenum, ceiling or floor spaces shall be totally enclosed in non-combustible conduit or raceway or be armoured cable where permitted by the Ontario Building Code.

.11 Unless specified otherwise in the Contract Documents, wire for branch circuits shall be 2#12 + Ground in 16mm conduit.

.12 Wires and cables for outdoor locations shall be rated accordingly.

.13 Armoured cables shall be complete with interlocked aluminum armour, approved fastening and connectors and meet the requirements of Vertical Flame Test-Cables in Cable Tray of CSA C22.2 No. 0.3. The PVC jacket cables (TECK 90 and ACWU90) shall be FT6 rated.

.14 Install all wiring in raceways, unless indicated as armoured. Route wire and cable to meet project conditions. Use suitable cable fittings and connectors.

.15 Use an approved lubricant to assist in pulling conductors through conduit. Neatly train and lace wiring inside boxes, equipment and panelboards.

.16 Balance the loading on feeders so that unbalanced load is less than 10%.

.17 Limit the voltage drop at the end of feeders and branch circuits to 2% at the rated load of the circuit.

.18 Lighting fixture wiring in accessible ceiling spaces shall be run in conduit from the lighting panel to ceiling outlet boxes with armoured cable drops no longer than 2m permissible from the boxes to fixtures.

.19 Protect all exposed non-armoured cables in manholes, pull pits and trenches with an approved fire protective fibreglass tape of '3M' manufacture or approved equal. Extend the protective wrapping on the cables where they leave pull pits or trenches below switchgear to the circuit breaker or fused switch terminals. Rack cables in manholes and pull pits to provide clear access for maintenance and servicing.

.20 Splice wire, up to and including No. 6 gauge, with nylon insulated expandable spring pressure type connectors. Splice large conductors using compression type connections insulated with heat shrink sleeves.

2.4 RACEWAYS AND FITTING

.1 Drawings do not show all raceways. Those shown are generally in diagrammatic form only.

.2 Comply with the requirements of the latest editions of the following:

- .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware
- .2 CSA C22.2 No. 45, Rigid Metal Conduit
- .3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit
- .4 CSA C22.2 No. 62, Surface Raceways and Lighting Fixture Raceways and Fittings
- .5 CSA C22.2 No. 83, Electrical Metallic Tubing
- .6 CSA C22.2 No. 126, Cable Tray System

.7 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit

.8 CAN/CSA C22.2 No. 227.3, Flexible Non-metallic Tubing

.9 CSA C22 No. 18, Outlet Boxes, Conduits Boxes, Fittings and Associated Hardware

.3 Conduits

.1 Steel galvanized electrical metallic tubing (EMT) installed:

.1 In partitions;

.2 In ceiling spaces;

.3 In service spaces.

.4 In masonry walls.

.2 Rigid steel conduit hot dip galvanized inside and outside installed:

.1 On the exterior of building;

.2 Where exposed to mechanical damage;

.3 Where conduits turn up or turn down out of concrete slab;

.4 Damp and wet locations.

.3 Rigid PVC (unplasticized) conduit except for exit light, emergency lighting, and fire alarm system installed:

.1 In slabs with rigid steel galvanized turn-up;

.2 Underground with rigid steel galvanized turn-up;

.3 In concrete walls;

.4 Damp and wet locations.

.4 Flexible armoured conduit:

.1 In partitions;

.2 For lighting fixture drops;

.3 From ceiling junction boxes into wall outlets;

.4 Flexible armoured conduits shall be limited to 10'-0" lengths where run horizontally from take-off junction boxes.

.5 Liquid tight flexible conduit:

.1 Final connection to motors.

.2 Any equipment which vibrates or generates noise.

.6 Provide green ground/bond wire in all conduits.

.7 Provide bushings on the ends of all conduits in enclosure, boxes, panels and cabinets, to protect the conductor installation. Except where grounding bushings are specified, use all plastic insulated bushings with a temperature rating of 150°C with double locknuts.

.8 For EMT use steel concrete tight set screw fittings as manufactured by T & B or equal. Die cast or pressure cast fittings are not acceptable.

.9 For rigid steel conduit use only insulated throat set screw type fittings. Threadless, die cast or pressure cast fittings are not acceptable.

.10 Use PVC conduit for all landscaping locations where conduit comes in contact with soil. Refer to the Landscape Drawings for the final elevation of planting soil. Co-ordinate and adjust electrical devices accordingly. Use epoxy glue coupling, and formed offsets. Approved manufacturers are Scepter Mfg. Co. Ltd and CGE “Cobocon”.

.11 Conceal all conduits except in service spaces, mechanical rooms, electrical rooms and ceiling spaces.

.12 Install all locknuts and bushings to ensure a secure mechanical and electrical bond. Use Erickson couplings in lieu of running threads.

.13 Where conduit joints occur in concrete, use silicone sealing compound to make water tight.

.14 Lay out conduit to drain free of all moisture.

.15 Securely hold conduits in place in concrete or masonry during pouring and construction operations; provide templates, forms and spacers as necessary.

.16 Support multiple runs of conduit on channel or angle iron with rod hangers.

.17 All exposed conduits shall be run parallel to building lines and to other conduits.

.18 Secure all conduits in place with conduit clamps T & B or equal. Perforated pipe straps, wire lashings, wood screws or nails are not acceptable.

.19 Provide conduit expansion joints where conduits cross building expansion joints, also in straight runs of conduit 30 m (100') or longer. Conduit expansion joints shall be telescoping sleeve type, with insulated bushings and ground jumper.

.20 Make field bends and offsets uniform and symmetrical without flattening conduit. Minimum bending radius shall be ten (10) times the conduit diameter.

.21 Ream conduit ends to remove burrs and sharp edges. Fit conduit stubs with waterproof plastic caps during installation to protect threads and to prevent entrance of moisture into conduit.

.22 Test all conduits for clear bore using ball mandrel, brushes and snake. Clear any conduit which rejects the ball mandrel. Replace if necessary. Bear all costs involved in making all Work good, restoring all surfaces to their original pre-construction condition.

.23 Install a continuous nylon cord 180 kg (400 lb) test in each conduit left empty.

.24 Install a correctly sized green copper ground wire within each conduit.

.25 Provide conduit seals in conduits which pass to the outside.

.26 Provide pull boxes, fittings or junction boxes in conduit runs, on the basis of not more than two (2) right angle bends or their equivalent or not more than 30 m (100'), in straight runs between boxes. For outdoor direct buried conduit, up to 50m.

.27 Size conduits to code requirements, provide larger sizes where noted in the Contract Documents.

.28 Size conduits for low voltage wiring in accordance with the manufacturer's recommendations.

.29 Provide conduit sealing fittings and correspond for hazardous application to Electrical Safety Code requirements.

.30 Maximum conduit size permitted in a concrete slab shall be 35 mm. In any case verify with Structural Consultant for acceptability.

.31 Where multi-conduits parallel run and/or crossover in concrete slab/wall, verify with Structural Consultant for acceptability.

.4 Surface metal raceway

.1 The surface metal raceway systems shall consist of surface metal raceway, appropriate fittings and device brackets to complete installation.

.2 The raceway is to be utilized in dry interior locations only in accordance with the Ontario Electrical Safety Code.

.3 Submit drawings for approval showing the complete layout of all Products that make up the complete system for each floor prior to installation with raceway lengths, device type (power and data), locations and circuits identified, complete with data sheets and samples.

.4 The surface raceway system specified herein for branch circuit wiring and/or data network, voice, video and other low-voltage wiring shall be Hubbell HBL4750 series or Wiremold V4000 Series. The raceway shall be metal, two-piece design with a base and a snap-on cover. The raceway shall be complete with one integral barrier in the base for power/data separation. Power shall be in top; data in the bottom. Finish shall be ivory unless otherwise noted in the Contract Documents.

.5 Complete with power receptacles and telecommunication outlets as required.

.6 Receptacle / Data plates shall be Wiremold V4047 series, or equaled by Hubbell.

.7 For individual devices located on surfaces where conduit cannot be recessed in finished area, provide single or double channel raceway system Products: Wiremold V500/V700/V2400, ivory finish, or equalled by Hubbell.

.5 Install raceways system complete with appropriate fittings such as connectors, bushings, elbows, couplings, locknuts, expansion fittings, fasteners and supports and accessories supplied as integral parts of assembly, as specified in the Contract Documents. Installation shall comply with Regulatory Authorities requirements.

.6 Neatly install exposed raceway running parallel to, and at right angles to, building lines and equally spaced in groups.

.7 Keep raceway ends parallel and on proper spacing to suit knockouts or raceway openings in equipment or enclosure.

.8 Keep raceways at least 150 mm clear of heating pipes, flues and hot item surfaces. Where the required clearance cannot be provided, obtain written approval alter the layout or to reduce clearance.

.9 Provide expansion couplings, with bonding jumper and ground clamps where raceways cross building control joints.

.10 Use only metallic, enclosed raceway on installation that require shielding of electrical cables or where installed in ceiling used as return air plenum, as specified or indicated on Drawings.

.11 Raceways shall have established positive low resistance paths to ground and effectively isolate conductors so that any short-circuit arc is confined.

.12 Select appropriate fittings, such as grounding bushings, bonding and grounding straps, to maintain continuity and effectiveness of grounding of raceway system.

.13 Provide necessary fasteners and supports acceptable for type and size of raceways, to ensure a rigid, complete assembly.

.14 Provide suitable inserts or expansion type machine bolts for fastening raceways, fittings, boxes and equipment to concrete surfaces.

.15 Do not use wood screws, lag screws, expansion shields, rawl plugs and nylon inserts.

.16 Secure raceway and other associated Work to structure members. Raceway shall not be supported from the ceiling suspension system.

.17 Thoroughly clean raceway and dry clear obstructions before pulling cable or wire.

.18 Minimum raceway size: 16mm (1/2") conduit equivalent system.

2.5 OUTLET AND CONDUIT BOXES

.1 Comply with the requirements of latest edition of the followings:

.1 CSA Standard C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings

.2 CSA Standard C22.2 No. 85, Rigid PVC Boxes and Fittings

.2 Outlet and conduit boxes - general

.1 Size boxes in accordance with CSA C22.1.

.2 102mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 347V outlet boxes for 347V switching devices.

.6 Combination ganged boxes with appropriate steel removable barriers where outlets for more than one system are grouped.

.7 Where standard make boxes are not suitable, provide boxes of special design to fit space and other requirements.

.8 Where vapour proof lighting is specified, provide matching vapour proof ceiling or wall junction boxes and fittings as required.

.3 Sheet steel outlet boxes

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76mm x 50mm x 38mm or as indicated in the Contract Documents. 102mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102mm x 54mm x 48mm.

.3 102mm square or octagonal outlet boxes complete with steel fixture studs where supporting lighting fixtures. Die cast fittings are not permitted.

.4 102mm square outlet boxes with extension and plaster rings for lush mounting devices in finished plaster or tile walls.

.4 Masonry boxes

.1 Electro-galvanized stamped steel masonry single and multi gang boxes for devices flush mounted in exposed block walls, minimum size 95mm x 50mm x 64mm standard.

.5 Concrete boxes

.1 Electro-galvanized stamped steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

.6 Recessed floor boxes and outlets

.1 For concrete and wood floor:

.1 Concrete tight electro-galvanized sheet steel floor boxes with adjustable finishing rings to suit floor finish with brushed aluminum cover plate. Confirm exact cover finish to suit floor finish prior to ordering devices during the shop drawings review.

.2 Minimum 2 compartments for both power and communication and 4-gang capability

.3 Device mounting plates (brackets) to accommodate power receptacles and communication outlets.

.4 Complete with minimum 2 duplex power receptacles and one communication single gang plate for 2 communication outlets.

.5 Minimum size: 254mm x 204mm x 76mm (deep)

.6 Wiremold Resource #RFB series or equal

.2 Poke-thru type boxes for floor with access from below:

.1 UL fire rated of 2hr, water tight, suitable for plenum space.

.2 Die-cast aluminum cover, confirm exact cover finish to suit floor finish prior to ordering devices during the shop drawings review.

.3 Minimum 2 compartments for both power and communication and 2 1/2-gang capability

.4 Device mounting plates (brackets) to accommodate power receptacles and communication outlets.

.5 Complete with minimum 2 duplex power receptacles and one communication single gang plate for 2 communication outlets.

.6 Wiremold Evolution #6AT series or equal

.3 Raised Access Floor Boxes and outlets

.1 Die-cast aluminum housing with 2 compartments for both power and communication, 3-gang capability

.2 Flush in raised floor tile complete with lift-up cast aluminum recessed cover and cable lid. Confirm exact cover finish to suit floor finish prior to ordering devices during the shop drawings review.

.3 Device mounting plates (brackets) to accommodate power receptacles and communication outlets.

.4 Complete with 2 duplex power receptacles and one communication single gang plate for 2 communication outlets.

.5 Minimum: 203mm x 152mm x 114mm.

.6 Wiremold #AF series or equal

.7 Conduit boxes

.1 Cast FS or FD aluminum, or feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

.2 PVC FS or FD boxes or PVC conduit where required in special corrosive areas as indicated on the Drawings.

.8 Fittings - general

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits

.4 Double locknuts and insulated bushings on sheet metal boxes

.9 Installation

.1 Support boxes independently of connecting conduits. Install all boxes vertically plumb and securely fastened so associated trades will not cause the box to be misaligned.

.2 Where interior recessed boxes on exterior wall, a good vapour barrier continuity technique shall be employed such as Iberville or Mold Processors 1004-VB plastic backboxes.

.3 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of the Work.

.4 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.5 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washer is not allowed.

.6 Size and install appropriate boxes and enclosures in accordance with applicable section(s) of Ontario Hydro Electrical Safety Code and the manufacturer's recommended procedures.

.7 Co-ordinate the location and installation of boxes so as to be accessible and clear from the building system equipment.

.8 Install pull boxes in inconspicuous but accessible locations.

.9 Use pull boxes for conduits larger than 35mm. Use conduit outlet bodies for conduit 35mm.

.10 Provide approved hole plugs in unused conduit knockouts and openings.

.11 Furnish boxes and enclosures with corrosion resistant machine screws.

.12 Boxes and enclosures embedded in concrete for flush-mounted, shall be secured properly with connecting conduits and related Works set in place before concrete is poured. Forms, when used, shall be able to be removed without disturbing installed boxes or enclosures.

.13 Ensure junction and outlet boxes mounted in ceiling cavities do not interfere with removal of ceiling tiles.

.14 Use masonry boxes for flush mounting in exposed block walls, concrete boxes for flush mounting in concrete wall.

.15 Furnish conduit boxes with neoprene gaskets for outdoor area or hazardous area application.

.16 Install all wall boxes for door security access devices, fire alarm devices, etc., adjacent to lock side of door openings unless otherwise shown on the Drawings. Check door swing before installing any switch.

.17 Install all boxes in walls so that tapped holes for mounting wiring devices or fixtures will be aligned vertically or horizontally, as required. Where boxes are grouped at one location with common and varying mounting heights, align boxes horizontally and vertically from centre line unless otherwise indicated in the Contract Documents.

.18 Offset outlet boxes in sound attenuating partitions to avoid undue transmission of sound between the partition elements. Use flexible conduit connections where wiring is required between outlet boxes on opposite sides of partition.

.19 Offset outlet boxes where installed on either side of a fire separation.

.20 Where steel supports are required for outlet boxes, wood supports are not acceptable.

.21 Maintain integrity of vapour barriers along building perimeter wall where flush outlet boxes are required.

2.6 ACCESS PANELS AND DOORS

.1 All access panels and doors shall be Milcor or Bel, 12 gauge with concealed hinges.

.2 In glazed tile walls provide #304 alloy stainless steel with #4 finish recessed frame and secured with stainless steel countersunk flush head screws.

.3 In plaster surfaces provide dished steel door for plaster finish with welded metal lath and plastic grommet for keyhole.

.4 In other finishes use plain steel door with lock and anchor straps, complete with factory prime coat.

.5 In lay-in ceilings, tiles properly marked may serve as access panels.

.6 Provide the appropriate Subcontractors for other Divisions of the Work with panels and doors, complete with frames and all pertinent information for installation. Ensure that all panels and doors are flush mounted and properly aligned with building modules and grids. Indicate locations on record drawings.

.7 Select all access panels and doors to provide adequate access, and to suit appropriate architectural finish, minimum size 150 mm x 150 mm (6" x 6"). Where necessary for persons to enter, provide minimum 600 mm x 450 mm (24" x 18") size doors.

2.7 METALS

.1 Provide all other electrical Work such as, but not limited to, equipment bases, supports, catwalks, framework to support checker plates and electrical equipment above trenches and cable pits, ladders, pit and trench covers, etc. Have such Work carried out in accordance with the requirements of Division of Metals.

2.8 SLEEVES AND CURBS

.1 Provide conduit sleeves of galvanized steel for conduit and cable runs passing through concrete walls, beams, slabs and floor. Cut flush with finished surface.

.2 Extend galvanized conduit sleeves for conduit rising through slabs a minimum of 4" above finished floors.

.3 Through exterior walls below grade waterproofed floors, and other waterproof walls use heavy weight cast iron pipes machine cut. Extend sleeves 100 mm (4") above finished floors, and cut flush with underside of floor.

.4 For rectangular duct openings for bus ducts and cable tray use minimum 18 gauge galvanized steel sleeves or provide a removable wood box-out of the required size. Brace sleeves to retain their position and shape during the pouring of concrete and other work.

.5 Seal sleeves and openings to maintain fire rating. Use 3M™ Fire Barrier Sealant CP 25WB+, Dow-Corning #3-6548 `Silicone RTV' foam, Thomas & Betts `Flamesafe' firestop system, installed in accordance with the manufacturer's specifications and recommendations.

.6 Seal all openings and sleeves after installation of equipment:

.1 With an approved material to maintain fire rating where sleeves and openings pass through fire separations and floors.

.2 With an approved material to maintain fire rating for sleeves and openings provided for future equipment.

.7 Size sleeves to provide 13 mm (1/2") clearance all around.

.8 Provide all flashing and waterproofing for sleeves through the roof and exterior walls in accordance with the requirements of Division of Thermal and Moisture Protection.

.9 Except where furred in, provide watertight concrete curbs, 100 mm (4") high by 100 mm (4") wide with 19 mm (3/4") chamfered edges around all sleeves and openings passing through waterproof floors.

2.9 SUPPORTS AND BASES

.1 Submit the proposed method of attachment of hangers and beam clamps, to cellular steel deck for approval before proceeding with Work.

.2 Supply and erect special structural Work required for the installation of electrical equipment. Provide anchor bolts and other fastenings unless noted otherwise in the Contract Documents. Mount equipment required to be suspended above floor level, where details are not shown, on a frame or platform bracketed from the wall or suspended from the ceiling. Carry supports to either the ceiling or the floor, or both as required, at locations where, because wall thickness is inadequate, it is not permitted to use such brackets.

.3 Electrical panels, switches or other electrical equipment shall be complete with suitable bases or mounting brackets.

.4 Provide channel or other metal supports where necessary, to adequately support lighting fixtures. Do not use wood unless wood forms part of the building structure.

.5 Secure supports, in general to structure, from inserts in concrete construction or from building structural steel beams, using beam clamps. Provide additional angle or channel steel members, required between beams for supporting conduits and cables.

.6 Provide any additional supports required from existing concrete construction for any piping or equipment, by drilling same and installing expansion bolt cinch anchors.

.7 Do not use explosive drive pins in any section of Work without obtaining prior approval.

.8 Hangers for electrical conduit shall be galvanized after fabrication. Conduit hangers shall be as manufactured by:

.1 Burndy Canada Ltd.
.2 Canadian Strut Products Ltd.
.3 E. Myatt & Co. Ltd.
.4 Steel City Electric Co.
.5 Pilgrim
.6 Thomas & Betts
.7 B-line

.9 Do not use, perforated strapping (grappler bars).

.10 Steel supports in wet or dry locations shall be galvanized after fabrication.

.11 Provide concrete housekeeping pads or bases for all floor mounted equipment 100 mm (4") high with 19 mm (3/4") chamfered edges, keyed to the floor slab and extending at least 100 mm (4") on all sides of the equipment. Where draw-out truck type circuit breakers are provided extend pad to accommodate complete withdrawal of breaker. Provide and set all anchor bolts.

.12 Use only factory made threaded or toggle type insert.

.13 Place inserts only in structural members and not in the finishing material.

.14 Provide bus ducts, cable trays, and wireways with fire barriers at each floor level and fire separation.

.15 Provide locations and dimensions for all pads and curbs and provide and set all anchor bolts for all concrete Work provided under Division of Concrete.

2.10 SPARE PARTS

.1 Furnish spare parts and maintenance materials as recommended by the equipment manufacturer for the warranty period.

2.11 EMERGENCY CALL SYSTEM

.1 Provide emergency call system in barrier-free washrooms, and as noted. The system shall consist of controller (power supply module), ‘assistance required’ signs, emergency call stations, relays transferring signal to access control releasing electric strike, power wiring in conduit and signal wiring in conduit.

.2 System shall be Camden CX series, or approved equal.

.3 Activating an emergency call station (pushing the button) shall automatically result in the following:

.1 Indication light in push button shall be illuminated at the switch.
.2 ‘Assistance Required’ signs shall operate.
.3 Where applicable, electric strike to release.

.4 The emergency call station shall include:

.1 Combination push button and lamp indicators, red color. Latching switch (push-on/push-off) rated at 1A/ 125VAC. Normally-open, single pole

.2 Relay (dry contact) transferring single to access control system releasing electric strike

.3 Stainless steel faceplate

.4 Mount in recessed single gang box at 1100mm AFF

.5 'Assistance Required' signs

.1 Dome light, clear lexan lens, 'Assistance Required' test, 90dB sounder.

.2 Rating: 0.03A at 120VAC

.3 Wall mounted in recessed box 200mm above the door or 200mm below ceiling.

2.12 HAND DRYERS

.1 Hand dryers shall be surface mounting, temper-resistant housing, vandal-resistant grille, automatic activation (hands-free operation), rating of 1,000W at 120V1Ø, air intake slot, brushless fan motor with thermal protection, sound level of 63DBA at 2 meters. 10 years warranty. Dyson #Airblade V or equal.

.2 Provide 15A 1P GFI breaker in panels to feed each hand dryer.

.3 Confirm exact location on site prior to rough-in. Mounting height: 1000mm AFF from top of hand dryer, unless otherwise noted. Install hand dryer to manufacturer's instructions.

Part 3 Execution

3.1 NEUTRALS AND PHASING

.1 Provide one (1) identified grounded neutral conductor for each set of branch circuits connected to different mains of each panel.

.2 For circuits identified as computer dedicated (D) or isolated ground (IG), provide individual neutral per identified circuit.

.3 Install a separate neutral for each GFCI circuit when the GFCI is located at the panelboard.

.4 Connect two or three (2 or 3) circuits sharing a common neutral to different mains or phases.

.5 Balance the connected loads across the mains of each panel to within 15%.

.6 Circuit numbers on the panels must correspond to the numbers on the Drawings.

.7 Connections in all equipment to be Phase A, B and C from left to right, and front to back when viewing from the front or accessible direction.

3.2 MOUNTING HEIGHTS

.1 Mounting heights are from floor level to centre line of device outlet, unless noted otherwise in the Contract Documents. Confirm all locations before installation. In all areas accessible to persons in wheelchairs, the mounting heights of all switches, thermostats, intercom switches, pull stations, etc., shall comply with the Ontario Building Code "Barrier Free" requirements.

.2 The mounting heights of all power and lighting devices shall comply with Ontario Electrical Safety Code requirements. The mounting heights of all fire alarm devices shall comply with CSA requirements.

.3 If mounting height of equipment is not specified or indicated in the Contract Documents, verify before proceeding with installation.

.4 Install electrical equipment at the following heights (centre of device) unless indicated otherwise in the Contract Documents.

- .1 Wall switches, dimmers, timers, speed controllers, speaker volume controllers, thermostat: 1100 mm.
- .2 Wall receptacles:
  - .1 General: 350 mm.
  - .2 Above top of continuous baseboard heater: 250 mm.
  - .3 Above top of counters or counter splash backs: 250 mm.
  - .4 In mechanical rooms: 1100 mm. (gang with switch)
- .3 Panelboards: as required by Code or as indicated in the Contract Documents.
- .4 Wall mounted speakers: 150 mm below ceiling.
- .5 Door bell pushbuttons and door open push buttons: 1100 mm.
- .6 Security key switches, card readers and intercom switches: 1100mm.
- .7 Security wall-mounted motion sensor: 2300mm, or 150mm below ceiling.
- .8 Service receptacle for roof mounted equipment: 750mm above finished roof.

3.3 WIRING OF MECHANICAL EQUIPMENT

.1 The locations of starters, motors and associated equipment indicated on the Drawings are approximate and diagrammatic only. Coordinate with the Work of the Mechanical Division to ensure the proper location of all the equipment. The exact locations of conduit terminations at mechanical units shall be determined from the equipment manufactures' approved shop drawings. Conduits must be installed to enter only in the locations designated by equipment manufactures.

.2 All electric baseboard heaters, cabinet heaters, force flow unit heaters and heating cables shall be provided under Electrical Division. Electric duct heaters shall be provided under Mechanical Division.

.3 Electrical Division shall provide safety disconnect switches required at motors by CESC whether shown on the Drawings or not. Provide power wires and connections to all mechanical equipment.

.4 All the motor starters/controllers, and/or line voltage thermostats shall be supplied under Mechanical Division and installed under Electrical Division.

.5 All control wiring, control devices and low voltage thermostats shall be provided under Mechanical Division.

.6 Where motor starters, switches and the like, are grouped together, provide suitable plywood backboard to which all such equipment shall be secured.

.7 Where the single-phase exhaust fan shall be controlled by manual switch, power connections to the fan, heavy-duty toggle control switch and the safety disconnect means shall be provided under Electrical Division.

3.4 SERVICES TO EQUIPMENT SUPPLIED BY OWNER / OTHER DIVISIONS

.1 Provide all necessary connections required for equipment supplied by the Owner and under other Divisions. Examine all Drawings and Specifications and identify all requirements.

.2 Verify the type, rating and location of all outlets and/or connections required for all equipment provided by the Owner and under other Divisions.

.3 Provide isolation devices as required to the equipment for all services.

3.5 PROVISION FOR FUTURE EQUIPMENT AND CONSTRUCTION

.1 Spaces designated for future equipment or building expansion shall be left clear.

.2 Provide services for future extensions complete with Products necessary for present termination and to permit future extension.

.3 Identify each service by a permanent marker at its termination point.

3.6 CUTTING AND PATCHING

.1 Provide all cutting and patching required for the Work of Electrical Division. Work shall be carried out in conformance with the requirements of Concrete Division. Include any radiography required to locate concealed services before penetrating into inaccessible locations.

.2 Any modifications to building shall be done so as not to diminish structural, fire resistance, or smoke barrier integrity.

.3 Proposed modifications to the structure shall require acceptance by the Structural Engineer.

.4 The Consultant shall be afforded the opportunity to review the intent prior to any major cutting.

3.7 PAINTING

.1 Provide all exposed ferrous metal Work, and Products, except conduit, with at least one (1) factory prime coat or paint one prime coat on Site. Clean up or wire brush all equipment before painting. The primer shall be rust inhibiting primer in accordance with CGSB-GB-40d.

.2 Unless otherwise noted in the Contract Documents, finish painting will be done under Division 9 of these Specifications.

.3 Do not paint galvanized supports and hangers.

.4 Repaint or refinish all damaged factory applied finishes.

3.8 VIBRATION AND NOISE CONTROL

.1 Spring type vibration isolations shall be complete with horizontal spring constant (kH) to vertical (kV) ratio between one and two to assure stability. Select springs to operate no greater than 2/3 solid deflection. For indoor mounting use springs with one (1) coat of zinc chromate primer and two (2) coats of paint. For outdoor mounting use springs of neoprene coated steel or stainless steel. All spring housings to be hot dipped galvanized. Where the spring assembly is bolted to the floor provide vibration isolation washers and pads to reduce transmission of vibration.

.2 Pad type isolators shall be rubber for indoor application, neoprene for oil filled devices and for outdoor use. Use 30 durometer rubber and 50 durometer neoprene. Select pad type isolators which do not exceed the mid-point of their recommended operating rate with maximum deflection of 20% of thickness. Use minimum 6 mm (1/4") thick pads under spring assemblies.

.3 Provide spring type vibration isolators for IC engine driven equipment. Raise equipment to operating height, levelled with blocks and shims so that connections can be made to a rigid system at operating level before isolator adjustments.

.4 For power class transformers provide spring or pad type isolators in accordance with the manufacturer's recommendations. Where dry type transformers are contained within unit substation enclosures mount the core and coils to the structural framing of the unit substation. Locate isolators between core and coil frame and unit substation structural frame.

.5 Provide pad type isolators for all floor mounted dry type distribution transformers. Locate isolators between transformer enclosure and floor.

.6 Where transformers are platform mounted from structure above provide spring hangers with levelling devices and sound pads in all supports.

.7 Make connections to rotating, vibrating, magnetic or other noise producing equipment such as motors, transformers, and between independent structure by means of loop flexible conduits.

.8 If objectionable noise or vibration should be transmitted to occupied portions of the building by any part of the electrical Work, make necessary changes and/or additions, to the Commissioner’s approval, at no increase to the Contract Price.

3.9 CONCRETE

.1 Concrete Work shown on the structural Drawings will be done as part of Division 3of these Specifications.

.2 Provide all other concrete Work necessary for the Work of this Division. Have such Work carried out in accordance with the Concrete Division 3 of these Specifications.

3.10 WORK IN EXISTING BUILDING AND SITE

.1 Maintain the existing life safety systems in existing building in full operation at all times during construction, unless otherwise noted in the Contract Documents.

.2 Maintain all existing systems in full operation during normal occupancy and operation hours, unless otherwise noted in the Contract Documents.

.3 Maintain all systems adjacent to the construction area in full operation at all times during construction, unless otherwise noted in the Contract Documents.

.4 All noise generating works that disrupt the building operations shall be carried out before/after normal occupancy hours and shall be coordinated with Owner.

.5 Co-ordinate with the Owner for scheduling of Works required to be done before/after normal occupancy hours, including but not limit to: drilling through slab; power shutdown; interference to life safety system. All costs involved with this Work shall be included in Contract Price.

.6 The Contractor shall assume responsibility for any disruption caused by its forces to operational building services. Repair any system damaged during the execution of the Work.

.7 Scan (X-ray or ultrasound) for unknown existing concealed conduits, pipes, cables/wires, before excavating ground and drilling slabs.

.8 Provide temporary lights in the construction area to carry out the Work.

.9 Provide temporary power connections to temporary services during construction.

.10 Disconnect and remove materials and equipment as shown and as specified in the Contract Documents.

.11 The existing electrical conduits/wiring to remain in ceiling spaces, interfering with new installation, shall be raised or re-mounted.

.12 All new conduit installations in ceiling shall be fastened tight to the ceiling structure or rod suspended at high level to the underside of the ceiling slab.

.13 Where circuits to be removed which are fed from panels outside of the construction area, remove feeder back to panel, make safe circuit and update panel directories.

.14 Make safe all circuits to be cut off.

.15 Maintain continuity of existing services for other circuits/devices serving areas outside the construction area. Provide additional wiring/conduits/boxes etc. to suit existing services to be maintained and also implement new Work as detailed in the Contract Documents.

.16 Check and inspect existing distribution equipment to be re-used (i.e., panel breakers, disconnect switches, etc.) for abnormal thermo-graphic scan under actual loads in operation and submit scan results indicating problems have been corrected.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide all grounding to comply with the Ontario Electrical Safety Code and the latest instructions of the Inspection Authority, with any further requirements as noted herein.

Part 2 Products

2.1 MATERIALS

.1 All grounding conductors shall be stranded copper, bare or insulated as required, in conduit sized to meet electrical safety requirements unless otherwise noted in the Contract Documents.

.2 Use Cadweld process for all weld connections. Burndy and/or AMP of Canada Ltd. mechanical grounding connectors are an acceptable equivalent to welded connections.

.3 All ground connectors shall be designed and approved for grounding purposes.

2.2 Execution

2.3 INSTALLATION

.1 Bond all interior non-electrical metallic piping systems to the electrical system ground including, but not limited to, water supply, wastewater, and gas systems.

.2 Bond all conduit, and all non-current carrying metal parts, equipment cases, frames, bases, brackets, etc.

.3 Bond each piece of fixed equipment back to the switchboard or panel feeding that equipment, by one of the following methods:

.1 Where equipment is fed by a steel conduit, provided sizing is adequate, utilize conduit for the ground return conductor. At switchboard provide a grounding bushing, and strap such conduits to the ground bus (size per Code).

.2 Where the size of the conduit is inadequate (per Code), or if the conduit is flexible, install a separate insulated copper ground inside the conduit. At the switchboard or distribution panel, provide a grounding bushing, loop the ground conductor through the bushing, and connect to the switchboard ground bus. At the fixed equipment, connect to an internal ground bus, or connect to the inside of the metal enclosure utilizing approved screws and connectors (remove all paint).

.3 For branch circuits, the conduits may be used for grounding, provided seamless steel fittings are used on EMT and threaded fittings are used on rigid conduit. At each receptacle connect a stranded copper ground wire from the outlet box to the

grounding terminal on the receptacle. Install a separate grounding conductor in all PVC conduits.

.4 Where equipment is fed by a multi-conductor power cable, provide a ground conductor in the cable. At the switchboard or panel, connect to the ground bus. Use a grounding connector on the cable for positive grounding of the metallic sheath. Loop the ground wire to the grounding connector.

.4 Run a separate ground wire in all flexible conduits. Connect each end to ground bus or lug or connector.

.5 Where mechanical protection is required for insulated grounding conductors install in rigid conduit. Use rigid PVC conduit in concrete or below grade slab and aluminum conduit in other locations.

.6 Provide weld connection or mechanical grounding connectors for:

.1 All connections between grounding conductors

.2 All connections to building steel

.3 All connections between grounding conductors and cable lugs

.7 Where single ground conductor is in one conduit, the conduit must be non-ferrous.

.8 Arrange grounding to provide the minimum impedance paths for ground fault currents. Provide any additional grounding required for approval by the inspecting authorities.

END OF SECTION

1.1 General

1.2 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide factory assembled power distribution equipment as herein specified and as shown on the Electrical Drawings.

.4 Refer to the Electrical Drawings for more requirements on: voltage; phase; size and type of mains; size, type and quantity of the branch devices; location; surface or flush mounting.

1.3 REFERENCE

.1 Comply with the requirements of the latest edition of the following:

.1 CSA C22.2 No. 31, Switchgear Assemblies
.2 CSA C22.2 No. 29, Panelboards
.3 CSA C22.2 No. 5, Molded Case Circuit Breakers
.4 CAN/CSA C22.2 No.47, Air-Cooled Transformers (Dry-Type)
.5 CSA C9, Dry Type Transformers
.6 CAN/CSA-C802.2, Minimum Efficiency Values for Dry-Type Transformers
.7 CAN/CSA-C802.3, Maximum Losses for Power Transformers
.8 CSA C22.2 No. 4, Enclosed and Dead-Front Switches
.9 CSA C22.2 No. 39, Fuseholder Assemblies
.10 CSA C22.2 No. 248 (Part 1 to Part 16), Low Voltage Fuses
.11 CSA C22.2 No. 190, Capacitors for Power Factor Correction

1.4 SUBMITTALS

.1 Submit shop drawings in accordance with Section of Electrical General Requirements.

.2 Shop drawings shall include electrical details, dimensions, ratings, types, and quantity.

1.5 APPROVED MANUFACTUERS

.1 The manufacturer shall be the manufacturer of the major components within the assembly, including circuit breakers and fusible switches.

.2 Use the Products of one manufacturer for the entire project. Acceptable manufacturers are:

.1 Cutler-Hammer
.2 Schneider
.3 Siemens

.4 GE

.5 Approved equal

1.6 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section of Basic Materials and Methods.

.2 Identify circuits controlled by each breaker on directory cards provided with panels. Directories shall be typed and mounted in metal frame with clear plastic cover.

.3 Modify existing power panel directory.

Part 2 Products

2.1 BREAKERS

.1 Provide new breakers to match existing in existing power panel.

2.2 ENCLOSURES FOR ALL PRODUCTS

.1 Indoor dry locations: CSA type 1.

.2 Indoor sprinkler locations: CSA type 2.

.3 Outdoor locations: CSA type 3R.

2.3 PANELBOARDS

.1 Panelboards rated 120/208 volt AC shall have short-circuit rating as shown on the Drawings, but not less than 14 kA RMS symmetrical.

.2 Panelboards shall be labeled with the short-circuit rating.

.3 Interiors shall be completely factory assembled devices.

.4 Enclosure:

.1 Indoor dry locations: CSA type 1.

.5 Provide doors with concealed hinges, combined locks and latches for all panelboards.

.6 Two (2) keys for each panelboard and key all panelboards alike.

.7 Interior trim shall be dead-front construction to shield users from energized parts.

.8 Main bus shall be tin finished high quality copper and extend the full length of the panel. Ground bus shall be sized to accommodate branch circuit grounding conductors.

.9 Sequence phase bussing with odd numbered sections on the left and even on the right, with each section identified by permanent number identification as to circuit number and phase.

.10 Provide bolt-on type circuit breakers.

.11 Means of locking off shall meet CSA requirements of elevator power supplies

.12 Minimum circuits shall be 42, unless otherwise noted in the Contract Documents.

.13 Trims and doors shall be painted ANSI 61 grey. Factory applied paint finish on all exterior surfaces.

.14 All required lugs.

.15 Connectors for future breakers and switches. Drill and tap bus work.

.16 Circuit breakers shall be quick-make, quick-break type, for manual and automatic operation, with over centre toggle handle. The handle shall reside in a position between "ON" and "OFF".

.17 Circuit breakers shall have thermal and magnetic trip mechanism, to provide inverse time current tripping and instantaneous tripping, trip-free and trip indicating.

.18 Multi-pole breakers shall be common trip type and have a common handle. Tie handles are not acceptable.

.19 Clearly marked with their rated ampacity and respective trip rating and visible without removing bolted covers.

.20 Provide class 'A' ground fault protection with the circuit breaker, where required by the Electrical Safety Code.

2.4 TRANSFORMERS

.1 Product of one manufacturer for the entire project. Acceptable manufacturers are:

- .1 Hammond
- .2 Delta
- .3 Siemens
- .4 Cutler-Hammer
- .5 Schneider

.2 Type ANN, air cooled, copper windings, Class 220 insulation, **115ºC rise,** 3 phase, 60 Hz, 600 Volts delta primary, 120/208 volts, 3 phase, 4 wire star secondary, with four 2-1/2% taps brought to a terminal board; two taps FCAN, two taps FCBN.

.3 Basic Impulse Level (BIL) and Impedance values shall comply with CSA Standards.

.4 Maximum loss and minimum efficiency values shall comply with CSA Standards C802.2 and C802.3.

.5 EMF level, not to be higher than 10 mG top, 10 mG side and 10 mG at one meter.

.6 Quiet operation with 3DB lower sound level.

.7 Electrostatic shield. Epoxy vacuum impregnated.

.8 Enclosure: removable metal front panel.

.9 Transformer housing of freestanding rigid self-supporting structural steel frame.

.10 Test all transformers in accordance with applicable CSA Standards and include ratio, polarity, impedance, load loss, no load loss, existing current, induced potential and applied potential. **Submit test data for each transformer for review.**

2.5 DISCONNECT SWITCHES

.1 Provide all disconnect switches, whether an integral part of equipment or separately mounted.

.2 Enclosure:

- .1 Indoor dry locations: CSA Type 1.
- .2 Indoor sprinkler locations: CSA Type 2.
- .3 Outdoor locations: CSA Type 3R.

.3 Provision for padlocking in off switch position by locks

.4 Mechanically interlocked door to prevent opening when handle in ON position.

.5 Fuses: size as indicated in the Contract Documents.

.6 Fuse holders: suitable without adaptors, for type and size of fuse indicated.

.7 Heavy-duty horsepower rated, quick-make, quick-break action, front operation, with integral handle mechanism and visible contacts in “OFF” position.

.8 ON-OFF switch position indication on switch enclosure cover

.9 Switches identified for use as service equipment are to be labeled for this application

.10 Furnish solid neutral assembly and equipment ground bar.

.11 Lugs suitable for copper and/or aluminum conductors

.12 Identify name of load controlled.

2.6 FUSES

.1 Fuses up to 600 volts and over 600amps:

- .1 Where used in motor, transformer and other circuits with an inrush: Class L time delay. Ferraz Shawmut type A4BT or approved equal by Bussman.
- .2 All remaining fuses: Class L non-time delay. Ferraz Shawmut A4BY or approved equal by Bussman.

.2 Fuses up to 600 volts and up to and including 600amps:

.1 Where used in motor, transformer and other circuits with an inrush: Class J time delay. Ferraz Shawmut type AJT or approved equal by Bussman.

.2 All remaining fuses: Class J non-time delay. Ferraz Shawmut type A4J or approved equal by Bussman.

.3 Fuse storage cabinet: Wall-mounted sheet metal cabinet with shelves, suitable size to store spare fuses and fuse pullers, complete with hinged door.

2.7 CONTACTORS

.1 Conform to the requirements of latest edition of CSA C22.2, No. 14 – Industrial Control Equipment.

.2 The contactors shall be fully rated and withstand the large initial in-rush currents of lamps without contact welding.

.3 Contactors shall be NEMA rated, magnetic, electrically operated, electrically held, and complete with suitable type enclosure and 120V coil.

.4 Fail open: contacts shall open upon the supply voltage drop below 75% of the rated voltage.

.5 Accessories

.1 Pilot lights (ON/OFF).

.2 On/Off/Auto selector switch for lighting control panel.

.3 Auxiliary contacts (NO and NC) and relays to match control function.

.4 Control circuit fuse-holders and fuses.

.5 Control transformers in each 347/600V enclosed contactor. Transformer shall be 120V secondary and furnished with primary and secondary fuses. Bond unfused leg of secondary to enclosure.

.6 Mount contactors in lighting control panel at 1500 mm AFF to operating handle/pushbutton.

.7 Mount power control contactors above power panels.

.1 Display power factor with indication for an inductive or capacitive power factor. Indicate the insufficient KVAR to achieve target power factor. Indicate harmonic condition.

.2 Calculate and store in memory the KVAR of each step.

.3 The time delay between switching of capacitors shall be field programmable.

.4 Programmable target selector.

.5 All output contacts shall be disabled after main power interruption. The controller shall retain its programming after the restoration of supply voltage.

Part 3 Execution

3.1 GENERAL

.1 Modify existing power panel directory.

.2 Install disconnect switches complete with fuses if applicable.

.3 In finished areas, where disconnecting devices are required, provide a circuit breaker in flush mounted enclosure.

.4 Provide three spare fuses of each type and size used above 600 amp and six spare fuses of each type and size used up to and including 600amp.

.5 Install fuses in mounting devices immediately before energizing circuit.

.6 Ensure correct fuses fit to physically match mounting devices.

3.2 PANELBOARDS

.1 Install panelboards securely, plumb, true and square, to adjoining surface.

.2 Provide three (3) empty 35 mm (1 ¼") conduits from all lighting and receptacle panelboards, terminated in ceiling space above.

3.3 TRANSFORMERS

.1 Provide vibration and noise control and make connections in accordance with the requirements of the Vibration and Noise Control Section in this Division.

.2 Suspend or wall mount transformer up to 45kVA.

.3 Ensure adequate clearance around transformer for ventilation.

.4 Install transformers in level upright position.

END OF SECTION

1.1 General

1.2 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide all switches, receptacles, wiring devices and cover plates as required to complete the installation.

1.3 REFERENCES

.1 Comply with the requirements of the latest editions of the following:

- .1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Wiring Devices
- .2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices
- .3 CSA-C22.2 No.55, Special Use Switches
- .4 CSA-C22.2 No.111, General-Use Snap Switches
- .5 CSA-C22.2 No. 144, Ground Fault Circuit Interrupters

1.4 SUBMITTALS

.1 Submit shop drawings and Product data in accordance with Section OF Electrical General Requirements.

1.5 MANUFACTURER

.1 Wiring devices shall be manufactured by 1) Hubbell; 2) Pass & Seymour; 3) Leviton; 4) Watt Stopper; 5) Lutron. Catalogue numbers are referred to below to indicate quality standard.

Part 2 Products

2.1 SWITCHES

.1 White premium specification grade, quite type

.2 Terminal holes approved for No. 10 AWG wire

.3 Silver alloy contacts

.4 Urea or melamine moulding for parts subject to carbon tracking

.5 Suitable for back and side wiring

.6 Fully rated for tungsten filament and fluorescent lamps

.7 Switches for 120 Volt lighting circuits shall be Hubbell CSB115W, CSB315W and CSB415W, 15 ampere for single pole, three-way and four-way switching as required for the application.

.8 Switches for 347 Volt lighting circuits shall be Hubbell HBL18221, HBL18223, 20 ampere for single pole, three-way switching as required for the application. Switch handles – white. Provide key operated switches where shown of the same series.

.9 Switches for motor or other control applications shall be horsepower rated, Hubbell, HBL7832D and HBL7810D 30Ampere for double-pole and three-pole for one application.

2.2 RECEPTACLES

.1 White premium specification grade, urea moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring

.3 Break off links for use as split receptacles

.4 Eight back wired entrances, four side wiring screws

.5 Triple wipe contacts and riveted grounding contacts

.6 Impact-resistant nylon face

.7 U-ground

.8 GFCI receptacles shall meet UL 943 requirements and be complete with test and reset buttons, and LED indication light

.9 Duplex receptacle, 15 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, BR15WHI (CSA 5-15R)

.10 Duplex receptacle, 20 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, BR20WHI (CSA 5-20RA)

.11 GFCI duplex receptacle, 15 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, GFST15W (CSA 5-15R)

.12 GFCI duplex receptacle, 20 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, GFST20W (CSA 5-20RA)

.13 Isolated ground receptacle, orange, 15 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, IG5262 (CSA 5-15R)

.14 Single 30 amp, 120 volt, 1 phases, 2 pole, 3 wire, Hubbell, HBL9308 (CSA 5-30R)

.15 Single 30 amp, 120/208 volt, 2 phases, 3 pole, 4 wire, Hubbell, HBL9430A (CSA 14-30R)

.16 Single 50 amp, 120/208 volt and 120/240 volt, 2 phases, 3 pole, 4 wire, Hubbell, HBL9450A (CSA 14-50R)

.17 TVSS duplex receptacle, gray, 15 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, HBL5262GYWSA (CSA5-15R)

.18 Weather-resistant duplex receptacle, 15 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, BR15WHIWR (CSA5-15R)

.19 Temper-resistant duplex receptacle, 15 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, BR15WHITR (CSA5-15R)

.20 Temper-resistant duplex receptacle, 20 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, BR20WHITR (CSA5-20R)

.21 Temper-resistant GFCI duplex receptacle, 15/20 amp, 120 volt, 1 phase, 2 pole, 3 wire, Hubbell, GFTRST15W/20W (CSA5-15R/20R)

2.3 COVER PLATES

.1 Stainless steel type 302, complete with matching screw or snap on type

.2 Weatherproof covers shall be while-in-use type polycarbonate body, cover and plates, conforming to NEMA3R. Hubbell # WP826MP

2.4 DIMMERS

.1 Slide dimmers, specification grade, white finish and cover plate shall match wall lighting switch

.2 Preset ON/OFF switches and LED indicator

.3 Minimum 1000W rating for incandescent lamp

.4 Minimum 10A rating for fluorescent ballast and/or low voltage transformer

2.5 OCCUPANCY SENSORS

.1 Wall sensor switches

- .1 Adaptive technology for time delay
- .2 No minimum load requirement
- .3 180° coverage up to 900 square feet
- .4 Dual technology, ultrasonic and passive infrared
- .5 Manual override for both on and off
- .6 Compatible with all electronic/magnetic ballast and incandescent lamp
- .7 Built-in photocell
- .8 120VAC or 347VAC to suit application, 800W, dual switching circuits to suit application
- .9 Installed in recessed single gang box, white finish and cover plate shall match wall lighting switch
- .10 Watt Stopper #DW-100 series

.2 Ceiling Sensors

.1 Adaptive technology for time delay

.2 Complete with 120VAC (or 347VAC to suit application) power supply and switching relay, dual switching relay circuits to suit application

.3 Dual technology, ultrasonic and passive infrared

.4 360° coverage up to 2000 square feet

.5 Compatible with all electronic/magnetic ballast and incandescent lamp

.6 Watt Stopper #DT-300 series

Part 3 Execution

3.1 INSTALLATION

.1 All wiring devices to be flush mounted in finished space. Surface installation is permitted in unfinished and/or service space.

.2 Install single throw switches with the handle in "UP" position when switch closed.

.3 Install devices in gang type outlet box when more than one switch is required in one location. When supplied from different voltages or power sources, provide metal barriers in the ganged box.

.4 Permanently identify ‘347V’ on each 347V switch cover plate.

.5 Clean debris from outlet boxes.

.6 Install devices plumb and level. Adjust devices and wall plates to be flush and level.

.7 Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

.8 Clean exposed surfaces to remove splatters and restore finish.

.9 Test each receptacle device for proper polarity.

.10 Test each GFCI receptacle device for proper operation.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide all lighting fixtures with lamps, ballasts and accessories as specified herein and as shown on the Electrical Drawings.

1.2 REFERENCE

.1 Comply with all requirements of the latest edition of CSA Standards.

1.3 SUBMITTALS

.1 Submit shop drawings in accordance with Section of Electrical General Requirements.

.2 Include fixture catalogue data sheets with shop drawings. Arrange the fixture catalogue data sheets and identify in the same sequence as the specified fixture list. Fixture catalogue data sheets shall indicate the following:

.1 Dimensions, weight, material, finish and mounting details

.2 Performance: Candle power distribution curves in two planes, C.V. chart of indoor fixtures and lumen output chart of outdoor fixtures and flood lights.

.3 Pole wind loading, weight, dimension, anchoring details and finish

.4 Lamps: type and base, burning hours, CRI, CCT and lumens

.5 Ballasts/drivers: type, wiring diagram, watts, voltage, P.F., sound rating, starting temperature, efficiency and other required characteristics

.3 Submit photometric IES file for all substituted fixtures. Where requested, submit an electronic lighting level calculation analysis for the area with substituted fixtures.

.4 Where requested, submit fixture samples of each substituted fixtures.

.5 Submit a colour/finish chart for all lighting fixtures for final selection/approval.

.6 Where requested, submit certified heat-run test data for each type of ballast mounting.

.7 Where requested, within four (4) weeks of Contract award, provide information on the electronic ballast operating frequency for Owner’s co-ordination with Owner supplied equipment operating at high frequencies.

1.4 WARRANTY

.1 Warrant LED lamps and drivers for a minimum of 5 years from the date of Substantial Completion of the Work. Include labour for replacing lamps and drivers in the warranty.

Part 2 Products

2.1 LAMPS AND DRIVERS

.1 LED

.1 Minimum lamp and driver life of 50,000 burning hours

.2 4100°K CCT unless otherwise noted.

.3 Quietest electronic driver

.4 Dimming drivers shall dim continuously between 100% and 5% light output at a minimum.

.2 Manufacturers

.1 Philips

.2 Osram-Sylvania

.3 G.E.

2.2 LIGHTING FIXTURES

.1 Fixtures shall have CSA labels and shall be complete with lamps, ballasts and necessary accessories for installation.

.2 Unless otherwise indicated in the Contract Documents, linear lighting fixture bodies shall be minimum 20 gauge, cold rolled prime steel of rigid construction with knockout as required. Fixture rigidity shall permit any suspension method without sag. Shall be suitable for either individual or continuous mounting.

.3 Reflecting surfaces shall be with an average reflectance of not less than 85%.

.4 All fixture types shall be designed with adequate heat sinks to dissipate the generated heat in order to prevent ballast and lamps from overheating with the resulting decrease in their rated life expectancy and/or light output. Fixtures shall be wired with type GTF fixture wire.

.5 All fixtures shall be complete with required safety disconnect means.

.6 Fixtures shall be designed so that minimum time is required for lamp or ballast/driver replacement.

.7 Plastic lenses shall be 100% virgin acrylic not less than 3 mm thick.

.8 Include the cost of all necessary accessories for a complete installation in the Contract Price. No extras will be entertained as a result of the supplier or Contractor failing to provide such accessories.

Part 3 Execution

3.1 INSTALLATION

.1 Install all fixtures in the standard manner for the type of fixture and in accordance with the manufacturer's instructions. Support all fixtures from building structural members. The drop ceiling supports are not acceptable.

.2 In non-accessible ceilings, wire with not less than 1220 mm of AC90 or RW90 wire in flexible conduit to adjacent outlet boxes placed above the finished ceiling within reach of the fixture openings.

.3 In accessible ceilings wire with 1830 mm of AC90 or RW90 wire in flexible conduit to adjacent outlet boxes.

.4 Where fixtures are not installed in the approved ceiling system, provide steel fixture studs, brackets and hangers. Where fixtures are hung on chain hangers, provide chain of closed link type capable of supporting ten times the fixture weight. Use U-bolts for chain ends; S-hooks are not acceptable.

.5 Provide all mounting hardware for all fixtures.

.6 Provide suitable trim for all fixtures installed in drywall ceiling or within lay in or snap in tiles.

.7 Provide I.C. frame/enclosure for all fixtures installed in insulated ceiling. Confirm the insulated ceiling areas.

.8 Provide fire rated boxes for all recessed fixtures in the fire rated ceiling area.

.9 Protect fixtures from dirt and damage during construction and clean when the installation is completed. Replace fixtures showing marks or scratches due to handling or tool marks.

.10 Align fixtures shown in continuous rows or broken lines so that all rows appear as straight lines. Crooked lines and misplaced fixtures will not be accepted.

.11 Where luminaries are surface mounted on inverted T-bar ceilings, they shall be supported directly from the building structure. Where this is not possible due to presence of mechanical ducts or other obstruction, supply and install galvanized steel channel, Unistrut or approved equal, above the ceiling, securely attached to the structure and not from the suspension system for the ceiling, and fasten the luminaires to the channel with clamping nut, bolt, flat washers and lock washer to the satisfaction of the Consultant. Provide bolts at least every 1.2m of the length of the fixture (i.e., 3 bolts for 2.4m fixture).

.12 Fixtures are shown on the Electrical Drawings in approximate locations only. Install fixtures in accordance with reflected ceiling plans, details and/or field instructions.

.13 Install lighting fixtures in service areas, underground parking areas, unfinished areas, mechanical and electrical rooms after the mechanical and electrical equipment is in place. Locate fixtures on Site to clear all obstructions to the approval of the Consultant. Provide auxiliary steel members for hanging fixtures below ducts and other equipment.

.14 Where the ceiling height is less than 3 metres, suspend ceiling surface mounted fixtures at 3 metres AFF. Where the ceiling height is more than 3 metres, suspend ceiling surface mounted fixtures at 3 metres AFF.

.15 Check the latest ceiling finishes in all areas where recessed fixtures are specified to ensure that fixtures are purchased with suitable ceiling trim for the particular ceiling finish. Replace fixtures which are sent to the Site with the wrong ceiling trim or flanges with fixtures having the correct trims, flanges, etc. as required, at no cost to the Owner.

.16 Fixtures shall be installed in accordance with the reflected ceiling layouts with due consideration for mechanical diffusers, bulkheads, sprinkler heads, and other obstructions. Check the Mechanical and Architectural Drawings before roughing-in to avoid any possible conflict.

.17 Fixtures connected to ground fault interruptor circuits shall have separate neutrals (common neutrals for 2 or 3 circuits are not acceptable).

.18 Exterior wall mounted lighting fixtures shall be mounted on recessed boxes except where fixtures with integral outlet boxes are specified, in which case the recessed outlet box is not required. Outlet boxes shall be firmly anchored to the wall.

.19 Unless otherwise indicated in the Contract Documents, supply and install concrete bases for lighting standards. Concrete bases shall be trowel finished with all exposed corners bevelled at 45 degrees. Junction boxes shall be carefully set and anchored to ensure flush fit of junction box cover. Concrete bases shall be constructed of 20 Mpa concrete air entrained and steel reinforced as shown on the Drawings.

.20 Include third party functional testing of all lighting control devices and systems. Submit test report.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide an emergency lighting system including exit signs, remote heads, and battery units, as shown on the Drawings, as specified herein and as otherwise required.

1.2 REFERENCE

.1 Comply with the requirements of the latest edition of the following:

.1 CSA-C22.2 No. 9, General Requirements for Luminaires
.2 CSA-C22.2 No. 141, Unit Equipment for Emergency Lighting
.3 CSA-C22.2 C860, Performance of Internally Lighting Exit Signs
.4 CSA-C282, Emergency Electrical Power Supply for Buildings

1.3 SUBMITTALS

.1 Submit shop drawings and Product data in accordance with Section of Electrical General Requirements.

.2 Include fixture catalogue data sheets with shop drawings indicating dimensions, components, electrical characteristics and performance data for each fixture and device. Arrange the fixture catalogue data sheets and identify in the same sequence as the specified fixture list.

.3 Submit test report and verifications following the completion of testing.

1.4 WARRANTY

.1 For the complete system, provide a 2-year, no-charge, unconditional guarantee, and 5-year pro-rated charge guarantee on workmanship and parts.

.2 For batteries, on the second 5-year, provide a pro-rated charge guarantee on workmanship and parts.

1.5 MANUFACTURERS

.1 Emergi-Lite

.2 Lumacell

.3 Beghelli

Part 2 Products

2.1 STANDARD EXIT SIGNS

.1 Pictogram exit signs meet or exceed CSA 22.2 No.141-10 standard for pictogram exit signs

.2 The housing shall be constructed of rugged extruded aluminum

.3 The faceplate(s) shall be constructed of extruded Aluminum and shall incorporate a protective clear poly-carbonate panel.

.4 Each face plate shall come standard with two legend films for pictogram and directional indicators.

.5 Lamps: Less than 2.5W, LED.

.6 Inputs:

.1 DC: 12V as shown on the Drawings.

.2 AC: Universal: 120V/347V.

.7 Directional arrows: universal type for field adjustment.

.8 Mounting: universal for field selection of ceiling surface, wall surface, and/or pendent

.9 Provide white metal wire guard in rough areas and as required.

2.2 STANDARD REMOTE HEADS

.1 Single or double cast aluminum head(s), complete with mounting plates, 300 degree horizontal and 80 degree vertical minimum adjustment.

.2 Lamps: LED Narrow beam, 6W or as shown on the Drawings.

.3 Input: 12VDC as shown on the Drawings.

.4 Mounting: ceiling or wall as shown on the Drawings.

.5 Finish: white painted.

.6 Provide white metal wire guard as required.

2.3 BATTERY UNIT

.1 Supply voltage: as indicated on the Electrical Drawings.

.2 Output voltage: 12V DC.

.3 Operating time: 1/2 hour minimum.

.4 Battery: sealed, maintenance free, long-time lead with rated life of ten (10) years.

.5 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V for plus or minus 10% input variations capable of restoring a discharged battery to the fully-charged state within twenty-four (24) hours, and switched to a float charge when not in full charge mode.

.6 Solid state transfer circuit

.7 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.

.8 Signal lights: solid state, for "AC Power ON' and 'High Charge'.

.9 Lamp heads: integral on unit and remote, 345° horizontal and 180° vertical adjustment, white painted cast aluminum head. Lamp type: wide beam flat MR16 LED, 2-6W, unless noted otherwise in the Contract Documents.

.10 Cabinet: suitable for direct or shelf mounting to wall and complete with knockouts for conduits. Removable or hinged front panel for easy access to batteries.

.11 Finish: standard factory finish.

.12 Auxiliary equipment:

- .1 Advanced diagnostic printed circuit board with auto self test and time delay
- .2 Test switch and LED trouble indicator
- .3 Battery disconnect device
- .4 AC input and DC output terminal blocks inside cabinet
- .5 Mounting shelf
- .6 Transient voltage surge suppressor on the supply side of power to the unit

2.4 WIRING

.1 Refer to Section of Basic Materials and Methods.

Part 3 Execution

3.1 INSTALLATION

.1 Pendant mount exit signs in service rooms and other areas where necessary to clear obstructions. Install suspended exit signs using pendants supported from swivel hangers.

.2 Install all unit equipment, remote heads, exit signs, and accessories in accordance with the manufacturer's instruction.

.3 Direct heads for illumination to meet OBC requirements.

3.2 TESTING AND VERIFICATION

.1 Arrange with the manufacturer to conduct a complete commission, inspection and test of all installed emergency lighting system.

.2 The manufacturer's representative shall be responsible for properly aiming remote heads, recording the light level readings, recording battery full load operation time, issuing a verification indicating that lighting levels meet CNBC requirements, and the system has been installed properly.

.3 Submit the report and verification to Consultant.

.4 Correct all deficiencies.

.5 Shall be witnessed by Consultant.

.6 All costs involved in the testing, verification, and corrections shall be included in the Contract Price.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This section of specification is an integral part of the contract documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide the following electric heating assemblies and system complete with all components/accessories and controls.

.4 Electric duct mounted heaters are excluded.

1.2 REFERENCE

.1 Comply with the requirements of the latest editions of the following:

.1 CSA C22.2 No. 130, Requirements for Electrical Resistance Heating Cables and Heating Device Sets

.2 CSA C22.2 No. 46, Electric Air Heaters

.3 CSA C22.2 No. 72, Heater Elements

.4 CAN/CSA C273.4, Performance Requirements for Electric Heating Line-Voltage Wall Thermostats

.5 CAN/CSA C828, Performance Requirements for Thermostats Used with Individual Room Electric Space Heating Devices

1.3 SUBMITTALS

.1 Submit shop drawings in accordance with Section of Electrical General Requirements.

.2 Product Data: dimensions, mounting methods, characteristics, performance criteria, materials, accessories, mechanical and electrical data, product characteristics and limitations.

.3 Manufacturer's Installation Instructions: Submit assembly, support details, and connection requirements.

.4 Submit color/finish chart for all lighting fixtures for final selection/approval.

1.4 QUALIFICATIONS

.1 Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

Part 2 Products

2.1 ELECTRIC BASEBOARD HEATERS

.1 Acceptable manufacturers:

.1 Ouellet

.2 Approved equal

.2 Assembly: ULC listed and labeled with terminal boxes on both ends, covers, controls and all mounting accessories.

.3 Heating Elements: Through-type nickel chromium element enclosed in mineral insulation in stainless steel sheath fitted with aluminum fins.

.4 208V, and 250w/ft in general.

.5 Cabinet: heavy-duty aluminum body, flat top. Integral air diffusion reflector with wireway. Bottom inlet top outlet. End panel, end caps, corners, and joiner pieces to snap together. Furnish full-length damper.

.6 Finish: anodized aluminum.

.7 Control: easy access built-in tamper-proof heating thermostat, factory wired.

.8 Where noted on drawings, compete with control relay to be controlled by remote low voltage thermostat. Control relay shall also be ready for future BAS system on/off control. Include wires in raceway for control wires between thermostat and heater control relay.

.9 Floor-mounted with pedestals.

.10 Ouellet #OCB or equal.

2.2 THERMOSTATS

.1 Low voltage remote-control programmable electronic thermostat, white finish.

.2 Temperature range: 5 - 30°C.

.3 Resolution and precision: 0.5°C.

.4 Digital display of ambient and set point temperature; temperature setting recorded permanently; 4-settings for weekdays (5 days), and 4-setings for weekend (2 days).

.5 Complete with 208VAC transformer (matching heaters). Control up to 8 heaters.

.6 Surface mounted at 1200mm AFF.

.7 Provide temper-resistant guard where required.

.8 Three (3) years warranty.

.9 Ouellet # OTH24-AFR or equal.

2.3 ELECTRIC CABINET HEATERS

.1 Acceptable manufacturers:

.1 Ouellet.

.2 Approved equal

.2 Assembly: ULC listed and labeled assembly with terminal box, covers, controls and all mounting accessories.

.3 Heating Elements: Through-type nickel chromium element enclosed in mineral insulation in stainless steel sheath fitted with aluminum fins.

.4 Cabinet: Pre-drilled back for securing to wall. Adapter for ceiling mounted unit. Integral air diffusion reflector with wireway at bottom. Front inlet/front outlet. Minimum 20 gauge steel or extruded aluminum equivalent in strength with front panel, end panel, end caps, corners, and joiner pieces to snap together. Furnish full-length damper.

.5 Finish: Clear anodized aluminum or powder coated finish, almond colour, unless otherwise required.

.6 Fan: Direct-drive, statically and dynamically balanced, with fan guard.

.7 Motor: Permanently lubricated, totally enclosed, ball bearing type, built-in thermal overload protection, built-in safety disconnect switch or plug-in electrical connection. Where power supply voltage is not matched with motor, provide built-in transformer for motor.

.8 Control: Built-in tamper-proof heating thermostat, factory wired.

.9 Applications: Wall and/or ceiling mounted as shown on drawings; recessed mounted. Verify the exact application and co-ordinate more installation requirements with Architect before ordering.

.10 Ouellet #OAC & #OACP series or equal.

2.4 ELECTRIC CEILING RADIANT HEATING PANELS

.1 Assembly: ULC listed and labeled assembly with terminal box, covers, controls and all mounting accessories.

.2 Refer to drawings for size & wattage/voltage.

.3 Heating Elements: encapsulated cassette element.

.4 22 (& 24) gauge galvanized steel panel. Minimum 1 inch, 1-pound density, high temperature fiberglass insulation. Crystalline surface.

.5 Finish: white.

.6 Provide line voltage wall mounted thermostat to control heating panel. Thermostat shall be programmable electronic thermostat, white finish. Temperature range: 0 - 30°C. Resolution and precision: 0.5°C. Digital display of ambient and set point temperature. temperature setting recorded permanently; 4-settings per week, and 4-setings per weekend. Switching rating: 20A, 2-pole, 240V.

.7 Qmark #CP series or equal.

Part 3 Execution

3.1 INSTALLATION OF HEATERS

.1 For recessed units, verify recess dimensions are correct size.

.2 Verify wall construction is ready for installation.

.3 Verify concealed blocking and supports are in place and connections are correctly located.

.4 Install the electric heaters in accordance with the manufacturer’s instructions.

.5 Use wire in electric heaters, which is specifically approved for electric heater use.

.6 Install equipment exposed to finished areas after walls and ceilings are finished and painted. Avoid damage.

.7 Protection: Provide finished cabinet units with protective covers during remainder of construction.

.8 Unit Heaters: Provide at locations as indicated on Drawings. Coordinate to assure correct recess size for recessed units.

.9 Install electric heating equipment including devices furnished by manufacturer but not factory-mounted. Furnish copy of manufacturer's wiring diagram submittal. Install electrical wiring in accordance with manufacturer's submittals.

.10 The installation shall be inspected by the manufacturer’s approval for the completed installation.

.11 Perform the heater tests to ensure that all heaters, fans and heating controls are operating properly. Submit the test reports.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Related Sections:

.1 Section 27 05 00 - Telecommunication Raceway Systems

1.2 WORK INCLUDED

.1 Retain an approved P.A. System Contractor (supplier) to upgrade existing P.A. system as specified herein and as required on drawings.

.2 Electrical Contractor and System Contractor shall also co-operate in every respect with each other.

.3 The System Contractor shall meet with Owner’s representative(s) throughout the project to ensure that all their requirements are met.

.4 System contractor: RJ Winters, (905) 424-8804, Attn: Bob Winters.

1.3 REFERENCES

.1 Comply with the latest edition of the following:

.1 EIA/TIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces

.2 J-STD-607-A, Commercial Building Grounding and Bonding Requirements for Telecommunications

.3 EIA/TIA-568-B series, Commercial Building Telecommunication Cabling Standard and Subsequent Addendums and Revisions

.4 EIA/TIA-606-A, Administration Standard for Commercial telecommunications Infrastructure

1.4 SUBMITTALS

.1 Shop drawings

.1 PA speakers

.2 Detailed data and specification cut-sheets

Part 2 Products

2.1 INTERIOR CEILING SPEAKERS

.1 8” (203mm) dual cone

.2 8 Ω impedance.

.3 5 watt multi-tap built-in 25/70 volt transformer

.4 91dB (1W/m) sensitivity. 90 to 20K Hz frequency response.

.5 Speakers shall be in a white steel, acoustically treated back box with fire-resistant ABS resin baffle and Rim.

.6 Speakers shall be flush ceiling and flush wall mounted and shall be complete with TH20 back box and white finish coated grilled baffle.

.7 Ceiling and wall mounted speaker shall be Speco Technologies #SPG86T series, or approved equal by Tortech & Advance Network.

.8 Speaker mounted on classroom control panel shall be square, and size shall fit-into control panel.

2.2 P. A. CABLES

.1 Speaker cabling shall be Grey FT6, 1 pair twisted, 18 AWG as specified by the equipment manufacturer. All speakers shall be looped as per zones and/or locations back to central equipment rack.

Part 3 Execution

3.1 INSTALLATION

.1 All cabling shall be installed to conform to the requirements of the Canadian Electrical Code and applicable Provincial Codes. Cabling shall be sized in accordance with Class 2 requirements, but shall be protected from mechanical injury or other injurious conditions such as moisture, excessive heat or corrosive action in accordance with Class 1 requirements.

3.2 IDENTIFICATION

.1 All cables shall be color coded and individually labeled with the speaker location, such as room number, exterior, etc.

3.3 TESTING

.1 Test all cables for correct continuity and polarity.

.2 All speakers must be tested. Sound level uniformity over the speakers shall be plus or minus 4dB in the 4kHz octave band throughout the entire coverage area.

.3 The work will not be considered complete until the Owner is satisfied with the system operations, configurations, and the training of staff.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section of the Specifications is an integral part of the Contract Documents and shall be read accordingly.

.2 Comply with Section of Electrical General Requirements.

.3 Provide labour, materials, and equipment for, modification, installation, testing, and commissioning of a complete existing modified operating fire alarm system as specified herein, indicated on drawings, add/or required otherwise. The system shall be left ready for continuous and efficient satisfactory operation.

1.2 REFERENCES

.1 Comply with the requirements of the latest edition of the following:

.1 CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems
.2 CAN/ULC-S525, Audible Signal Device for Fire Alarm Systems
.3 CAN/ULC-S526, Visual Signal Devices for Fire Alarm Systems
.4 CAN/ULC-S527, Control Units for Fire Alarm Systems
.5 CAN/ULC-S528, Manual Pull Stations for Fire Alarm Systems
.6 CAN/ULC-S529, Smoke Detectors for Fire Alarm Systems
.7 CAN/ULC-S530, Heat Actuated Fire Detectors for Fire Alarm Systems
.8 CAN/ULC-S531, Standard for Smoke Alarms
.9 CAN/ULC-S533, Egress Door Security and Releasing Devices
.10 CAN/ULC-S536, Inspection and Testing of Fire Alarm Systems
.11 CAN/ULC-S537, Standard for the Verification of Fire Alarm System Installations
.12 CAN/ULC-S541, Speakers for Fire Alarm Systems
.13 CAN/ULC-S553, Installation for Smoke Alarms

1.3 SUBMITTALS

.1 Submit shop drawings in accordance with Section of Electrical General Requirements. Shop drawing shall include:

.1 Details and performance specifications for system control annunciation and peripherals.
.2 Details for devices

.2 Submit arrangement and wording of annunciators for fire alarm zone indications to local fire department and provide changes as requested. Submit document to local fire department to department’s requirement.

.3 Following completion of verification, and of acceptance of the installation by local fire department, submit the certification of the Fire Alarm system, together with detailed verification record sheets showing location of each device and all verification results.

.4 Submit the operating and maintenance manual in accordance with section of Section of Electrical General Requirements., the manual shall include:

.1 Instructions for the maintenance of the fire alarm system

.2 Approved shop drawings with all the connections

.3 As-built drawings showing all the devices

1.4 QUALITY ASSURANCE

.1 New devices shall match existing.

.2 The existing FA Manufacturer as shown on drawings.

Part 2 Products

2.1 GENERAL

.1 Modify existing fire alarm system, upgrade existing fire alarm control panel, upgrade existing fire alarm annunciator panel, upgrading all existing wires to accommodate new floor plan.

.2 Add more alarm, supervising, and control zones in existing fire alarm panel as shown.

2.2 SYSTEM DEVICES

.1 General

.1 All new devices shall match existing and shall be compatible with existing fire alarm system.

.2 Manual Pull Stations

.1 Manual pull stations shall be single stage, red, extruded aluminum, semi-flush or surface, red, pull activated, wall mounted in 102mm square Red box. At maglock doors, the station shall have a dual contact.

.2 Mount pull stations with operating lever at 1200mm AFF. Maximum lateral distance from door opening: 1500mm (600mm for mag-lock door).

.3 Where required, provide tamper proof, weatherproof clear shield complete with a battery operated warning horn.

.3 Heat Detectors

.1 Combination fixed 57°C (135°F) and 8.3°C (15°F)/min rate-of-rise type, in all areas except where normal temperature fluctuations exceed 10°C (18°F)/min.

.2 Fixed temperature 91°C (195°F) type, provided in areas with normal ambient temperature between 38°C (100°F) and 66°C (150°F).

.3 Ceiling mounted in 102 outlet box.

.4 Detector in elevator shaft to be complete with auxiliary relays and wired to elevator controller.

.4 Area Smoke Detectors

.1 Photoelectric type ceiling smoke detector with the following features:

.1 Sensitivity read-out;

.2 Snap-in base;

.3 Visual indication of detector actuation.

.2 Ceiling mounted in 102mm outlet box.

.3 Smoke detectors in elevator machine rooms, elevator lobbies of 1st floor, P1 level and 2nd floor, and elsewhere indicated shall be provided with auxiliary relays, and wired to elevator controls for supplementary operation of elevators.

.4 Smoke detectors required for door hold openers and fire automatic doors shall be provided with auxiliary relays, and wired to door hold openers.

.5 Addressable Circuit Interface Modules

.1 Addressable Circuit Interface Modules: Modules shall be used for monitoring of non-addressable devices and/or circuit, and for control of evacuation indicating appliances and AHU systems.

.2 Addressable Circuit Interface Modules will be capable of mounting in a standard electric outlet box. Modules will include cover plates to allow surface or flush mounting. Modules will receive their operating power from the signalling line or a separate two-wire pair running from an appropriate power supply as required.

.3 All Circuit Interface Modules shall be supervised and uniquely identified by the control unit. Module identification shall be transmitted to the control unit for processing according to the program instructions. Modules shall have an on-board LED to provide an indication that the module is powered and communicating with the FACP. The LEDs shall provide a troubleshooting aid since the LED blinks on poll whenever the peripheral is powered and communicating.

.4 There shall be the following types of modules:

.1 Type 1: Monitor Circuit Interface Module:

.1 For conventional 2-wire smoke detector and/or contact device monitoring with Class B or Class A wiring supervision. The supervision of the zone wiring will be Class B. This module will communicate status (normal, alarm, trouble) to the FACP.

.2 For conventional 4-wire smoke detector with Class B wiring supervision. The module will provide detector reset capability and over-current power protection for the 4-wire detector. This module will communicate status (normal, alarm, trouble) to the FACP.

.2 Type 2: Line Powered Monitor Circuit Interface Module

.1 This type of module is an individually addressable module that has both its power and its communications supplied by the two wire multiplexing signaling line circuit. It provides location specific addressability to an initiating device by monitoring normally open dry contacts. This module shall have the capability of communicating four zone status conditions (normal, alarm, current limited, trouble) to the FACP.

.2 This module shall provide location specific addressability for up to five initiating devices by monitoring normally closed or normally open dry contact security devices. The module shall communicate four zone status conditions (open, normal,

abnormal, and short). The two-wire signaling line circuit shall supply power and communications to the module.

.3 Type 3: Single Address Multi-Point Interface Modules

.1 This multipoint module shall provide location specific addressability for four initiating circuits and control two output relays from a single address. Inputs shall provide supervised monitoring of normally open, dry contacts and be capable of communicating four zone status conditions (normal, open, current limited, and short). The input circuits and output relay operation shall be controlled independently and disabled separately.

.2 This dual point module shall provide a supervised multi-state input and a relay output, using a single address. The input shall provide supervised monitoring of two normally open, dry contacts with a single point and be capable of communicating four zone status conditions (normal, open, current limited, and short). The two-wire signaling line circuit shall supply power and communications to the module.

.3 This dual point module shall monitor an unsupervised normally open, dry contact with one point and control an output relay with the other point, using a single address. The two-wire signaling line circuit shall supply power and communications to the module.

.4 Type 4: Line Powered Control Circuit Interface Module

.1 This module shall provide control and status tracking of a Form "C" contact. The two-wire signaling line circuit shall supply power and communications to the module.

.5 Type 5: 4-20 mA Analog Monitor Circuit Interface Module

.1 This module shall communicate the status of a compatible 4-20 mA sensor to the FACP. The FACP shall annunciate up to three threshold levels, each with custom action message; display and archive actual sensor analog levels; and permit sensor calibration date recording.

.6 End-of-Line Devices

.1 Mount end of line devices in box with last device or separate box wall mounted, adjacent to last device.

.7 Horns:

.1 Temporal horns rated at 98 dba to 75dba at 3m, finished in red and operated on 24V DC. Mounted in 102mm or single gang outlet box. High, medium and Low field selectable sound output level setting.

.2 Wall mounting height: not less than 2300mm AFF, and at least 150mm below ceiling measured to the top edge of the device.

.8 Fire Alarm Strobe

.1 Provide surface wall mounted (or ceiling mounted) synchronized high strobe lights to indicate alarm condition. The strobe maybe part of audio-visual assembly.

.2 The strobe light shall consist of a xenon tube with red lens. 75cd to 110 cd flash intensity.

.3 Mounted in 102mm or single gang outlet box.

.4 Wall mounting height: 2400mm AFF. Ceiling mounting height: not more than 9000mm AFF, otherwise shall be suspended.

.9 Hold Open Devices

.1 24VDC Supplied by others. Refer to drawings for more installation details.

2.3 WIRING

.1 Install all wiring in conduit.

.2 Fire alarm system wiring shall be run in separate conduit.

.3 Provide shielded wiring when recommended by the manufacturer's specifications.

.4 Wires shall be CSA-FAS Type 105 copper conductor, 105°C rating, not less than 300V. Wiring shall be sized not less than requirement of Section 32-100 of the Electrical Safety Code, Class 1 or Class 2 circuits as required, with screw-terminal wiring connections.

.5 Stranded conductors with more than 7 strands shall be bunched-tinned or terminated in compression connectors.

.6 Provide watertight fittings for conduits entering the top or sides of surface mounted terminal cabinets, annunciator transponders and control panels.

2.4 SPECIAL ENVIRONMENT

.1 Devices shall be moisture-proof where located in moisture area. Devices shall be weather-proof where located outside.

.2 Provide heater and power to heater including breaker and wiring, (break may not be shown on drawing), for devices located in cold area as required by manufacturer.

.3 Where the devices located in cold and/ or hot area, locate addressable module in warm area, and conventional devices in cold and/ or hot area.

.4 Provide tamper proof wire guard where required.

2.5 SMOKE ALARMS AND CARBON MONOXIDE DETECTORS

.1 Smoke alarms, carbon monoxide detectors and their combinations in suites shall not be connected to the fire alarm system.

.2 Ceiling mounted ionization type smoke alarms shall be activated by the presence of combustion products. The unit shall contain dual ionization chambers (one for fire detection, one for reference), solid state "Power On" indicator, sensitivity test button, visual signaling component, alarm sound level of minimum 85 dB at 3 meters, and the unit shall operate from 120 volt ac power circuit. Where more than one (1) smoke alarm is provided in a suite, the operation of one smoke alarm shall operate the alarm of all other

smoke alarms within the suite. Each smoke alarm shall be complete with additional signal contact and wired to monitoring panel as required.

.3 Ceiling mounted carbon monoxide detectors shall operate from a hard-wired 120 volt AC source. The detector's chemical sensor to respond to CO concentrations and when dangerous levels are reached, trigger an internal alarm rated at a minimum of 85 dB at 3 meters. Detector shall be complete with visual signaling component, LED light to indicate unit is receiving power and test button. Where more than one detector is provided in a suite, the operation of one detector shall operate the alarm of all other CO detectors within the suite. Each detector shall be complete with additional signal contact and wired to monitoring panel as required.

.4 Ceiling mounted combination smoke alarm and carbon monoxide detectors shall be activated by the presence of combustion products and the dangerous levels of CO concentration. The unit shall contain ionization chamber and chemical CO sensor, visual signaling component, alarm sound level of minimum 85 dB at 3 meters, "POWER ON" indicator, test/reset button, and the unit shall operate from 120 VAC power circuit. Where more than one unit is provided in a suite, the operation of one unit shall operate the alarm of all other units within the suite. Each detector shall be complete with additional signal contact and wired to monitoring panel as required.

Part 3 Execution

3.1 INSTALLATION

.1 Install all equipment in accordance with CAN/ULC-S524 "Standard for the Installation of Fire Alarm Systems", the manufacturer's instructions, Ontario Building Code, Underwriter's Laboratory of Canada, Electrical Safety Code, these Documents and requirements of Local Authority Having Jurisdiction. This shall include appropriate settings for speaker transformer taps.

.2 In the event that the information given in the Specification and/or shown on the Drawings is in conflict with the Code and/or the requirement of authorities having jurisdiction, bring this to the attention of the Consultant, and do not proceed with the work until the matter is clarified.

.3 Connections to Other Systems

.1 Door Device Connections

.1 Provide power, wiring, conduit and connections to electrical door hardware, door hold-open devices and door control (Maglocks) devices for proper release operation. Co-ordinate installation with the hardware installer.

3.2 TESTING AND CERTIFICATION

.1 Arrange with the manufacturer to conduct a complete inspection and test of all installed fire alarm and voice communication equipment including all components such as manual stations, signaling devices, heat detectors, smoke detectors, speakers, fire fighters handsets, controls, etc. Test and verify connections to equipment of other Division such as sprinkler valves, elevators, etc. Coordinate with and arrange for staff of other divisions to be present where required.

.2 Provide staff to test devices and all operational features of the system for witness by the Consultant and authority having jurisdiction. Provide 2-way radio communication at each annunciator, control point and other areas in the building as required. All testing must be witnessed by Owner's representative prior to acceptance.

.3 Test and verify the total system to ensure satisfactory operation in conformance with latest version of CAN/ULC-S536 and CAN/ULC-S537, "Standard for the Verification of Fire Alarm System Installations".

.4 Carry out testing, verification and certification as follow:

.1 System test in conjunction with the manufacturer

.2 Correction of all deficiencies

.3 Submission of test results to Consultant for review including letter of certification from the manufacturer(s)

.4 Witness of complete system by Consultant and/or his representatives

.5 Correction of any deficiencies noted

.6 Acceptance of the system by the Consultant

.7 Witness of system test by authority having jurisdiction

.8 Correction of any deficiencies requested by authority having jurisdiction

.9 Submission of manuals with final verification sheets

.5 All costs involved in the testing and certification shall be included in the Tender Price.

END OF SECTION

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

ASBESTOS-CONTAINING BUILDING MATERIALS RE-ASSESSMENT REPORT

Cardiff Elementary School

2 Short Road
Cardiff, Ontario

Presented to:

Trillium Lakelands District School Board

Box 420, County Road 36
Lindsay, Ontario
K9V 4S4

Attention: Daniel Whalen

September 2019

Maple Project No. 18021-12

Executive Summary
2019 Asbestos-Containing Building Materials Re-Assessment Report

Maple Project	School Name	Address
18021-12	Cardiff Elementary School	2 Short Road, Cardiff, Ontario

Maple Environmental Inc. was retained by Trillium Lakelands District School Board to perform a re-assessment of known asbestos-containing building materials within the subject building.

The findings and recommendations of the current assessment are summarized below. Please refer to the main body of the report for details.

FINDINGS

No major sources of asbestos-containing materials were identified within the building.

RECOMMENDATIONS

As no known major sources of asbestos-containing materials have been identified within the building, no immediate recommendations are warranted.

General Statement

This report should be read in its entirety and is not a stand-alone report. Please refer to the Trillium Lakelands District School Board Overview Report provided under a separate cover to review information relevant to Regulations, Inventory Scope and Methodology, Sampling Strategies, Analytical Methods, Assessment Criteria, and the assessment limitations. Further, this Executive Summary must be read in conjunction with the main body of this report below.

TABLE OF CONTENTS

1.0 INTRODUCTION

MAPLE Environmental Inc. ("MAPLE") was retained by the Trillium Lakelands District School Board (TLDSB) to perform a re-assessment of known asbestos-containing building materials within all TLDSB schools where asbestos was previously confirmed to be present (by others).

The assessment was competed in accordance with the requirement of Ontario Regulation 278/05 to complete a re-assessment on an annual basis.

The following report presents the findings and recommendations of the assessment for the specific building listed.

SUMMARY OF BUILDING INFORMATION	
School Name:	Cardiff Elementary School
Building Address:	2 Short Road, Cardiff, Ontario
Number of Floors:	1
Approximate Square Footage:	15,800
Assessed by:	Richards Reboks
Assessment Date:	July 2, 2019

2.0 APPLICABLE ONTARIO REGULATIONS

Applicable Ontario Regulations for each of the materials included in the investigation are briefly described below.

2.1 Ontario Regulation 278/05 (Asbestos)

The Ontario Ministry of Labour Regulation 278/05 requires a detailed asbestos inventory be performed in all buildings where friable and non-friable asbestos-containing materials (ACM) are present. The inventory must be available at the work place and must identify the type and location of asbestos-containing materials on a room-by-room basis, where necessary.

Each individual building report prepared by MAPLE meets or exceeds the requirements for an asbestos survey under Ontario Regulation 278/05.

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovation or demolition work where ACM is present and may be disturbed. The regulation requires all buildings where asbestos is known to be part of the building materials to implement an Asbestos Management Program (AMP). TLDSB has prepared and maintains an AMP of which the current Re-Assessment report is part of.

2.2 Ontario Regulation 347

Ontario Regulation 347 applies to the transport of waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

The major requirements of the building owner and the person(s) removing the waste are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placard; and
- The waste is to be transported as directly as possible to the landfill site once it leaves the site.

Some wastes require the Owner to register a Generator (of waste) number and many wastes require classification that can restrict or even prohibit their disposal in landfill.

It is important to note that the building owner can be held responsible for the waste until the waste disposal site accepts it.

3.0 SURVEY SCOPE AND METHODOLOGY

The surveys were performed on a Room-by-Room basis within each building included in the scope of the assessment where asbestos was previously identified (by others).

The scope of the surveys included all friable and major non-friable materials suspected to contain asbestos. The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Asbestos materials that are friable have a much greater potential to release airborne asbestos fibres when disturbed.

Typical friable asbestos materials include; sprayed fireproofing or thermal insulation, textured (stippled) plaster, and thermal mechanical insulation. Typical non-friable materials include: asbestos cement (transite) products, caulking, vinyl floor tiles, asbestos textiles and gaskets. Additional materials such as ceiling tiles and drywall joint compounds are classified as non-friable, but because of their ability to release dust when disturbed they are considered as "potentially friable" for the purpose of this report.

3.1 Inventory Methodology

In order to determine the location of the materials included in the assessment, each room or area was entered where practical (i.e.: where access was possible without the demolition of walls, roof or ceilings or destruction of flooring) where asbestos materials were previously identified. An investigation of areas of the building where asbestos was not previously identified was not included in the scope of the current project.

Representative views were made above accessible suspended ceiling systems. Drywall or plaster ceilings were accessed via existing ceiling access panels only. The inventory did not include destructive testing of building systems or finishes to observe possible hidden conditions.

3.2 Asbestos Assessment Criteria

The recommendations and suggestions made as part of this report with respect to asbestos have taken into consideration the condition and accessibility of the asbestos-containing material as well as other factors such as water damage, vibration, air movement, and general activities in the area.

Where ACM is found to be in GOOD condition and not likely to deteriorate or fall, the general recommendation would be to re-evaluate the condition of the material on an annual basis (required by Regulation 278/05). This recommendation can be subject to change if the material is located in a manner that persons untrained in asbestos awareness could physically damage it.

Where the ACM is found to be damaged (i.e. FAIR or POOR condition), a recommendation to have the material cleaned-up, repaired, removed, enclosed, or encapsulated is offered. The recommendation will also indicate which asbestos procedure should be used to perform the remedial work (i.e. Type 1, Type 2, Type 3, or Glove Bag Removal Methods).

In each area or room inventoried, the quantity, condition (GOOD, FAIR, or POOR) and accessibility (A, B, C, D or E) of each suspect material was recorded.

The definitions for condition and accessibility items are as follows:

GOOD	Material is intact with no visible signs of damage.
FAIR	Material is visibly damaged but can be repaired.
POOR	Material is damaged beyond repair and likely needs to be removed.
Access A	Accessible to all occupants of the building.

Access B	Accessible to Maintenance personnel without the use of a ladder (i.e. Mechanical Room, pipe chase etc.).
Access C	Accessible to Maintenance personnel with the use of a ladder and is exposed to view without removing building components.
Access D	Accessible to Maintenance personnel with the use of a ladder and is concealed from viewing due to a building component (i.e. above a removable ceiling).
Access E	Not accessible without demolition of a building component (i.e. above a fixed ceiling system).

The asbestos related information collected during the previous assessments was confirmed and the room-by-room data updated to reflect the current information.

3.3 Limitations and Omissions from Scope

Due to the nature of building construction, some limitations exist in regards to the possible thoroughness of any building materials inventory. The field observations, measurements, and analysis are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. MAPLE warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the inventory.

It is possible that conditions may exist which could not be reasonably identified within the scope of the inventory or which were not apparent during the site investigation. MAPLE believes that the information collected during the inventory period concerning the property is reliable. No other warranties are implied or expressed.

In addition, during a standard asbestos assessment, performed for the purposes of regulatory compliance, it is industry practice to exclude some non-friable materials in the inventory. Examples of such assumptions include; elevator brakes, roofing felts and mastics, high voltage wiring, mechanical packing and gaskets, underground services or piping, fire-doors, window caulking, levelling compound, and/or materials used in operating equipment. As such, these materials were not sampled at the time of this survey and where present are assumed to be asbestos containing until proven otherwise.

3.4 Sampling Strategy and Analytical Methods

As the majority of materials were previously sampled by others, the requirement for sampling during the current survey was limited. Where samples were collected, they conformed to the criteria outlined below and in compliance with O. Reg. 278/05.

A small volume of the material was removed either from a damaged section or cut out of intact material and then repaired by sealing with tape to prevent the release of fibres. The collected samples were placed in plastic bags, sealed and labelled and then sent to an independent laboratory for analysis. To ensure quality results, the independent laboratory chosen is NVLAP accredited and successfully participates in an "Asbestos Proficiency Analytical Testing Program" and as such, these laboratories are responsible for their findings.

The collection of samples was performed in accordance with regulatory sampling requirements and with sufficient frequency to obtain a general pattern of asbestos use within the building. Due to building renovations or modifications that have occurred, the consistency of the application of asbestos materials may not be uniform throughout the entire building. It is important to note that without sampling every wall, pipe section, ceiling tile etc. it is not possible to identify the possible asbestos content in every material present in the building. For this reason, materials similar in appearance to those sampled elsewhere in the building were visually identified as being homogeneous and thus are assumed to be composed of the same material, thus additional sampling is not required.

In accordance with Reg. 278/05, samples were collected at the following frequency.

Material Type	No. Samples
Sprayed Fireproofing	Up to 7
Texture Coat	Up to 7
Pipe Fitting Insulation	3
Pipe Straight Insulation	3
Ductwork Insulation	3
Ceiling Tiles	3
Vinyl Sheeting Flooring	3
Vinyl Floor Tile	3
Plaster Finishes	Up to 7
Drywall Compound	Up to 7

An independent NVLAP accredited laboratory, was used to analyse the collected samples. Analysis was performed following the Code of Practice for the identification of asbestos in bulk material, as detailed in Ontario Regulation 278/05. Bulk samples were analysed using the Polarized Light Microscopy ("PLM") Technique with Dispersion Staining. The identification of asbestos fibre in bulk material is based on a collective set of parameters dependent on the unique shape and crystallographic properties of each fibre as viewed through the microscope. This method is useful for the qualitative identification of asbestos and the semi-quantitative determination of asbestos content in bulk materials expressed as a percent of projected area. The method identifies types of asbestos and also measures percent of asbestos as perceived by the analyst in comparison to standard area projections or trained experience.

Given the composition of some vinyl floor products, the PLM analysis method is often prone to yielding false negative analysis results. Therefore it may be prudent that the Transmission Electron Microscopy (TEM) analysis method be used to determine the asbestos content in the vinyl floor products, if negative results are obtain from the laboratory analysis.

3.5 Drawings

Drawings provided for each building indicate the following (where present):

- ◊ Location Numbers (reference to Room-by-Room asbestos data)
- ◊ Asbestos-Containing Sprayed Fireproofing
- ◊ Asbestos-Containing Texture Finishes
- ◊ Asbestos Containing Ceiling Tiles
- ◊ Asbestos-Containing Flooring Materials
- ◊ Presence of Asbestos-Containing Mechanical Insulations will not be specifically indicated on the drawings; however, a general statement regarding the presence of ACM mechanical insulations, where present, has been indicated on the drawings.
- ◊ Presence of asbestos-containing drywall joint compound and hard plaster will not be specifically identified on the drawings; however, a general statement regarding the presence of these ACM materials, where present, has been indicated on the drawings.

4.0 INVENTORY FINDINGS

The following is a brief discussion of the extent to which Asbestos-Containing Materials (ACM) was identified in the building. The discussion is organized under the headings of materials that are generally suspected of containing asbestos. Refer to the Room-by-Room Survey Inventory in Appendix I for a detailed description and location of all ACM.

Destructive testing was not conducted and as such some areas within the building were not accessible for an assessment (i.e. above solid ceilings, behind walls). Access for viewing within wall and ceiling cavities was not always possible. Suspect asbestos materials may be present within ceiling and wall cavities that were not identified in this report. This comment is particularly important for materials such as mechanical insulation. Caution should be taken when demolishing solid wall finishes within the building.

4.1 Sprayed Fireproofing (Friable)

No sprayed fireproofing was observed in the building.

4.2 Thermal Mechanical Insulation (Friable)

No asbestos-containing mechanical insulations are present in the building. It is important to note that mechanical systems may be present within walls and ceiling cavities or pipe chases that were not accessible during this assessment. The presence of ACM mechanical insulations in these locations should be suspected.

Pipe Systems:

Pipe Fittings, where insulated are insulated with non-asbestos fibreglass and/or armaflex materials.

Pipe Straights, where insulated are insulated with non-asbestos fibreglass and/or armaflex materials.

Ductwork:

Duct systems were either insulated with non-asbestos fibreglass or were un-insulated.

Mechanical Equipment:

Mechanical equipment was observed to be externally un-insulated.

4.3 Texture Finish (Friable)

No asbestos-containing texture finishes were identified to be present within the building.

4.4 Acoustic Ceiling Tiles (Potentially Friable)

No asbestos-containing ceiling tiles were identified to be present within the building.

4.5 Vinyl Sheet Flooring (Potentially Friable)

No asbestos-containing vinyl sheet flooring was identified to be present within the building.

4.6 Vinyl Floor Tile (Non-Friable)

No asbestos-containing vinyl floor tiles were identified to be present within the building.

4.7 Asbestos Cement Products "Transite" (Non-Friable)

Asbestos cement products were not observed to be present within the building.

4.8 Drywall Joint Compound (DJC)

While previous sample results indicated drywall joint compound sampled at the Site does not contain asbestos, it should be noted that the concentration of asbestos within drywall joint compound is historically known to be potentially inconsistently distributed. Further, it is possible that various phases of construction and renovations have occurred at the Site. Therefore, the number of samples previously collected may not be representative of all drywall joint compound finishes in the building.

4.9 Plaster

No plaster finishes were identified in the building.

5.0 RECOMMENDATIONS

5.1 General Recommendations

As no known major sources of asbestos-containing materials have been identified within the building, no immediate recommendations are warranted.

Prior to major renovation or demolition, additional investigation should be completed. In the interim, the requirement for an annual asbestos re-assessment is not required.

6.0 LIMITATIONS

Due to the nature of building construction some limitations exist as to the possible thoroughness of the subject investigation. The field observations are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. MAPLE warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the assessment.

It is possible that conditions may exist which could not be reasonably identified within the scope of the investigation or which were not apparent during the site investigation. MAPLE believes that the information collected during the investigation period concerning the property is reliable. No other warranties are implied or expressed.

Information provided by Maple is intended for Client use only. Any use by a third party, of reports or documents authored by Maple, or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Maple accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

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Please contact Maple Environmental Inc. at (905) 257-4408 for inquiries regarding this project.

Sincerely,

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants

Prepared By:

Richards Reboks
Senior Project Technologist

Reviewed By:

Kyle Prosser
Senior Project Manager

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APPENDIX I

ROOM-BY-ROOM ASBESTOS INVENTORY

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
51352	Cardiff Elementary School	-	NA	PORTABLE ONE	-	No	FL	VFT	9	-	50 SF	G	-			A			Demolished 2013
51353	Cardiff Elementary School	-	NA	PORTABLE ONE	-	No	FL	VFT	10	-	50 SF	G	-			A			Demolished 2013
51354	Cardiff Elementary School	-	NA	PORTABLE ONE	-	No	FL	VFT	11	-	2000 SF	G	-			A			Demolished 2013
51355	Cardiff Elementary School	-	NA	PORTABLE ONE	No	No	CL	CT	3	N/D	-	-	12578-02A-C			-			Demolished 2013
51356	Cardiff Elementary School	-	NA	PORTABLE ONE	No	No	CL	CT	4	N/D	2000 SF	G	12578-03A-C			C			Demolished 2013
51350	Cardiff Elementary School	1	102	CORRIDOR	No	No	CL	CT	1	N/D	-	-	BS18-14A-C			-			
51351	Cardiff Elementary School	1	102	CORRIDOR	No	No	WL	DJC		N/D	-	-	BS18-07A-C			-			
51337	Cardiff Elementary School	1	103	MAIN OFFICE	No	No	FL	VFT		2% Chrysotile	0 SF	G	V/C BS18-02			A			Abated 2016.
51338	Cardiff Elementary School	1	104	OFFICE SUPPLY ROOM	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51342	Cardiff Elementary School	1	105	PRINCIPLES OFFICE	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51339	Cardiff Elementary School	1	106	ROOM 11	No	No	FL	VFT	7	N/D	-	-	BS18-10A-C			-			
51340	Cardiff Elementary School	1	106	ROOM 11	No	No	FL	VFT	3	2% CHRYSOTILE	-	-	V/C BS18-03			-			Removed Summer 2013
51341	Cardiff Elementary School	1	106	ROOM 11	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51343	Cardiff Elementary School	1	107	LIBRARY	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51344	Cardiff Elementary School	1	108	SUPPLY ROOM	No	No	FL	VFT	6	2% CHRYSOTILE	0 SF	G	BS18-06A-C			A			Abated 2016.
51345	Cardiff Elementary School	1	108	SUPPLY ROOM	No	No	FL	VFT	4	2% CHRYSOTILE	0 SF	G	V/C BS18-04			A			Abated 2016.
51346	Cardiff Elementary School	1	109	ROOM 9	No	No	FL	VFT	2	3% CHRYSOTILE	-	-	V/C BS18-02			-			VFT was removed. New rubber flooring system
51347	Cardiff Elementary School	1	109	ROOM 9	No	No	FL	VFT	4	2% CHRYSOTILE	-	-	BS18-04A-C			-			VFT was removed. New rubber flooring system
51348	Cardiff Elementary School	1	109	ROOM 9	No	No	FL	VFT	5	4% CHRYSOTILE	0 SF	G	BS18-05A			-			Abated 2016.
51349	Cardiff Elementary School	1	109	ROOM 9	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51292	Cardiff Elementary School	1	111	SCIENCE	No	No	FL	VFT	1	N/D	-	-	BS18-01A-B			-			
51293	Cardiff Elementary School	1	111	SCIENCE	No	No	FL	VFT	2	3% CHRYSOTILE	0 SF	-	BS18-02A-C			A			Abated 2016
51294	Cardiff Elementary School	1	111	SCIENCE	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	-	BS18-03A-C			A			Abated 2016
51295	Cardiff Elementary School	1	111	SCIENCE	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51296	Cardiff Elementary School	1	112	ROOM 7	No	No	FL	VFT	1	N/D	-	-	BS18-01C			-			
51297	Cardiff Elementary School	1	112	ROOM 7	No	No	FL	VFT	2	3% CHRYSOTILE	0 SF	G	V/C BS18-02			A			Abated 2016.
51298	Cardiff Elementary School	1	112	ROOM 7	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51299	Cardiff Elementary School	1	112	ROOM 7	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51300	Cardiff Elementary School	1	113	MECHANICAL ROOM	No	No	CL	DJC		N/D	-	-	V/C BS18-07			-			
51301	Cardiff Elementary School	1	114	CUSTODIAN STORAGE	No			No ACM											
51302	Cardiff Elementary School	1	115	ROOM 6	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51303	Cardiff Elementary School	1	115	ROOM 6	No	No	FL	VFT	4	2% CHRYSOTILE	0 SF	G	V/C BS18-04			A			Abated 2016.
51304	Cardiff Elementary School	1	115	ROOM 6	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51305	Cardiff Elementary School	1	116	GIRLS WASHROOM	No	No	CL	CT	2	N/D	-	-	12578-01A-C			-			
51309	Cardiff Elementary School	1	117	MENS WASHROOM	No	No	FL	VSF	1	N/D	-	-	V/C BS18-11			-			
51310	Cardiff Elementary School	1	117	MENS WASHROOM	No	No	CL	CT	2	N/D	-	-	V/C 12578-01			-			
51307	Cardiff Elementary School	1	118	WOMENS WASHROOM	No	No	FL	VSF	1	N/D	-	-	BS18-11A-C			-			
51308	Cardiff Elementary School	1	118	WOMENS WASHROOM	No	No	CL	CT	2	N/D	-	-	V/C 12578-01			-			
51306	Cardiff Elementary School	1	119	BOYS WASHROOM	No	No	CL	CT	2	N/D	-	-	V/C 12578-01			-			
51315	Cardiff Elementary School	1	120	STAFF CORRIDOR	No	No	CL	CT	2	N/D	-	-	V/C 12578-01			-			
51316	Cardiff Elementary School	1	120	STAFF CORRIDOR	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51311	Cardiff Elementary School	1	121	STAFF WASHROOM 1	No	No	CL	CT	2	N/D	-	-	V/C 12578-01			-			
51312	Cardiff Elementary School	1	121	STAFF WASHROOM 1	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51313	Cardiff Elementary School	1	122	STAFF WASHROOM 2	No	No	CL	CT	2	N/D	-	-	V/C 12578-01			-			
51314	Cardiff Elementary School	1	122	STAFF WASHROOM 2	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51317	Cardiff Elementary School	1	123	CUSTODIAN	No			No ACM											
51318	Cardiff Elementary School	1	124	STAFF ROOM	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51319	Cardiff Elementary School	1	124	STAFF ROOM	No	No	CL	CT	1	N/D	-	-	V/C BS18-14			-			
51320	Cardiff Elementary School	1	125	ROOM 5	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51321	Cardiff Elementary School	1	125	ROOM 5	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51322	Cardiff Elementary School	1	125	ROOM 5	No	No	CL	CT	1	N/D	-	-	V/C BS18-14			-			
51323	Cardiff Elementary School	1	125	ROOM 5	No	No	WL	DJC		N/D	-	-	V/C BS18-07			-			
51324	Cardiff Elementary School	1	126	ROOM 4	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51325	Cardiff Elementary School	1	126	ROOM 4	No	No	FL	VSF	1	N/D	-	-	V/C BS18-11			-			
51326	Cardiff Elementary School	1	126	ROOM 4	No	No	CL	CT	1	N/D	-	-	V/C BS18-14			-			
51327	Cardiff Elementary School	1	127	ROOM 3	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51328	Cardiff Elementary School	1	127	ROOM 3	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51329	Cardiff Elementary School	1	127	ROOM 3	No	No	CL	CT	1	N/D	-	-	V/C BS18-14			-			
51333	Cardiff Elementary School	1	128	ROOM 2	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51334	Cardiff Elementary School	1	128	ROOM 2	No	No	FL	VFT	2	3% CHRYSOTILE	0 SF	G	V/C BS18-02			A			Abated 2016.
51335	Cardiff Elementary School	1	128	ROOM 2	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

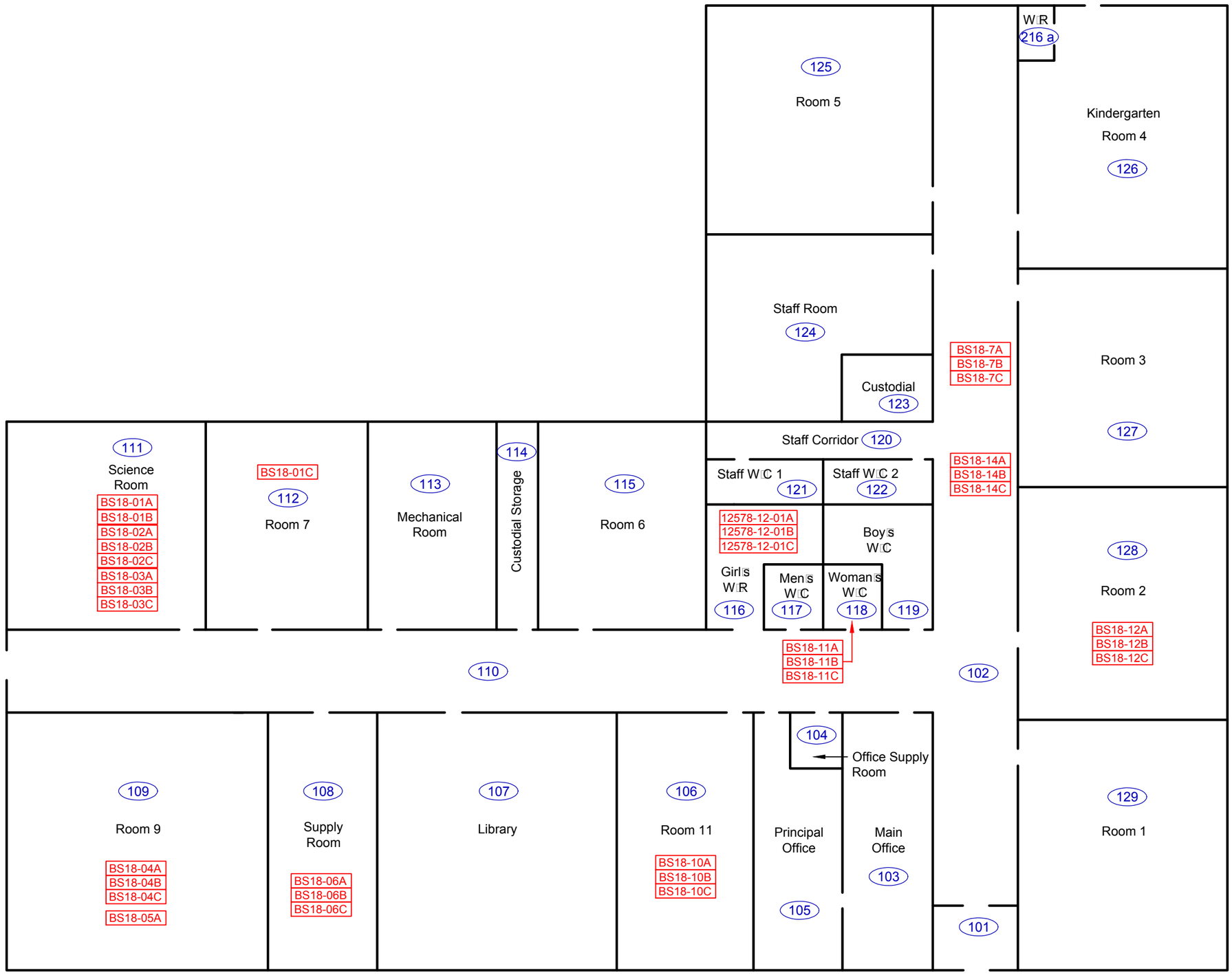
ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
51336	Cardiff Elementary School	1	128	ROOM 2	No	Yes	WL	VSF	2	N/D	-	-	BS18-12A-C			-			ON WINDOW LEDGE
51330	Cardiff Elementary School	1	129	ROOM 1	No	No	FL	VFT	1	N/D	-	-	V/C BS18-01			-			
51331	Cardiff Elementary School	1	129	ROOM 1	No	No	FL	VFT	2	3% CHRYSOTILE	0 SF	G	V/C BS18-02			A			Abated 2016.
51332	Cardiff Elementary School	1	129	ROOM 1	No	No	FL	VFT	3	2% CHRYSOTILE	0 SF	G	V/C BS18-03			A			Abated 2016.
51290	Cardiff Elementary School	2		EXTERIOR	No	No	NA	RM		ASSUMED ACM	1	G	-			C			SAMPLE PRIOR TO RENOVATION
51291	Cardiff Elementary School	2		EXTERIOR	No	No	NA	WC		ASSUMED ACM	1	G	-			A, C			SAMPLE PRIOR TO RENOVATION

APPENDIX II

DRAWINGS



LEGEND

12578-12-01A	ECOH Sample Locations
01-BS-01A	Jacques Whitford Sample Locations
#	Ebase Number

CONFIRMED ACM

SYMBOL	DESCRIPTION
	Friable Asbestos-Containing Material
	Non-Friable Asbestos-Containing Material

For Detailed Information as to Location, Type, Quantity, Condition and Access to ACM, Please Refer to the Room-by-Room Sheets Provided in the Report.

Cardiff Elementary School

2 Short Road,
Cardiff, Ontario

First Floor Plan

Asbestos Materials Re-Assessment Survey

CLIENT: Trillium Lakelands District School Board

PROJECT NUMBER:	DATE:	DRW BY:
18021-12	July 2019	S. Prosser
	SCALE: Not to Scale	CHK BY: K. Prosser

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

APPENDIX III

POTENTIAL ASBESTOS-CONTAINING MATERIAL IDENTIFICATION SHEET

APPENDIX III - POTENTIAL ASBESTOS-CONTAINING MATERIALS INFORMATION SHEET

MIN	*Material*	*Material Description*	*Size*	*Sample Number*	*Sample Location*	*Asbestos Containing*
VFT 1	Vinyl Floor Tiles	White and black	12" x 12"	BS18-01	Multiple	No
VFT 2	Vinyl Floor Tiles	Brown, white and red	9" x 9"	BS18-02	Science Room	Yes
VFT 3	Vinyl Floor Tiles	Beige with brown and red	9" x 9"	BS18-03	Science Room	Yes
VFT 4	Vinyl Floor Tiles	Dark brown	9" x 9"	BS18-04	Room 9	Yes
VFT 5	Vinyl Floor Tiles	Beige	9" x 9"	BS18-05	Room 9	Yes
VFT 6	Vinyl Floor Tiles	Black, white, and red	9" x 9"	BS18-06	Supply Room	Yes
VFT 7	Vinyl Floor Tiles	White with grey	12" x 12"	BS18-10	Room 11	No
VFT 8	Vinyl Floor Tiles	Green	12" x 12"	BS18-13	Custodial Room	Yes
VFT 9	Vinyl Floor Tiles	Beige Solid	12" x 12"	-	-	Assumed ACM
VFT 10	Vinyl Floor Tiles	White Mosaic	12" x 12"	-	-	Assumed ACM
VFT 11	Vinyl Floor Tiles	Beige Mosaic	12" x 12"	-	-	Assumed ACM
VSF 1	Vinyl Sheet Floor	Checker Pattern		BS18-11	Women's Staff Washroom	No
VSF 2	Vinyl Sheet Floor	Light Blue		BS18-12	Room 2	No
CT 1	Ceiling Tile	White holed pattern	1' x 1'	BS18-14	Hallway	No
CT 2	Ceiling Tile	Pinhole	2' x 4'	12578-12-01	Girls Washroom	No
CT 3	Ceiling Tile	Pinhole Fissure	1' x 1'	12578-12-02	Portable One	No
CT 4	Ceiling Tile	Pinhole	1' x 1'	12578-12-03	Portable One	No

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

ASBESTOS-CONTAINING BUILDING MATERIALS RE-ASSESSMENT REPORT

J Douglas Hodgson Elementary School

1020 Grass Lake Road
Haliburton, Ontario

Presented to:

Trillium Lakelands District School Board

Box 420, County Road 36
Lindsay, Ontario
K9V 4S4

Attention: Daniel Whalen

September 2019

Maple Project No. 18021-15

Executive Summary
2019 Asbestos-Containing Building Materials Re-Assessment Report

Maple Project	School Name	Address
18021-15	J Douglas Hodgson Elementary School	1020 Grass Lake Road, Haliburton, Ontario

Maple Environmental Inc. was retained by Trillium Lakelands District School Board to perform a re-assessment of known asbestos-containing building materials within the subject building.

The findings and recommendations of the current assessment are summarized below. Please refer to the main body of the report for details.

FINDINGS

Asbestos-containing materials (ACM) identified within the building at the time of the assessment are as follows:

ASBESTOS BUILDING MATERIALS SUMMARY								
MATERIAL		ASBESTOS			FRIABILITY			Remedial Work Required
		Yes	No	Suspect	Friable	Non-Friable	Potentially	
Sprayed Fireproofing			X		X			NO
Textured Finish			X		X			NO
Mechanical Insulations	Pipe Fittings	X			X			YES
	Pipe Straight		X		X			NO
	Ductwork		X		X			NO
	Mechanical Equip.		X		X			NO
Ceiling Tiles			X				X	NO
Vinyl Sheet Flooring			X				X	NO
Vinyl Floor Tiles		X				X		YES
Asbestos Cement (Transite)		X				X		NO
Plaster		X		X			X	NO
Drywall Joint Compound		X				X		NO
Other (roofing, caulking, etc.)				X				NO

Please refer to Room by Room Inventory in Appendix I to view location, quantities, and condition of ACM observed within the building at the time of the assessment.

RECOMMENDATIONS

As asbestos-containing materials were found to be present within the building, Ontario Regulation 278/05 requires that the Trillium Lakelands District School Board's Asbestos Management Plan must apply to this building. In addition, an annual re-assessment of all ACM must be performed.

The following asbestos remedial work is recommended for compliance with O. Reg. 278/05:

- Remove and replace damaged asbestos-containing vinyl floor tiles observed in POOR condition within Room 312 (eBase 128) using Type 1 Asbestos procedures.
- Repair one (1) damaged asbestos-containing parging cement insulation on the pipe fitting in FAIR condition within Gym A (eBase 217) using Type 2 asbestos abatement procedures.

As the remaining asbestos-containing materials identified within the building were observed to be in GOOD condition and no additional immediate remedial work was warranted.

General Statement

This report should be read in its entirety and is not a stand-alone report. Please refer to the Trillium Lakelands District School Board Overview Report provided under a separate cover to review information relevant to Regulations, Inventory Scope and Methodology, Sampling Strategies, Analytical Methods, Assessment Criteria, and the assessment limitations. Further, this Executive Summary must be read in conjunction with the main body of this report below.

TABLE OF CONTENTS

1.0 INTRODUCTION

MAPLE Environmental Inc. ("MAPLE") was retained by the Trillium Lakelands District School Board (TLDSB) to perform a re-assessment of known asbestos-containing building materials within all TLDSB schools where asbestos was previously confirmed to be present (by others).

The assessment was competed in accordance with the requirement of Ontario Regulation 278/05 to complete a re-assessment on an annual basis.

The following report presents the findings and recommendations of the assessment for the specific building listed.

SUMMARY OF BUILDING INFORMATION	
School Name:	J Douglas Hodgson Elementary School
Building Address:	1020 Grass Lake Road, Haliburton, Ontario
Number of Floors:	2 (no basement)
Approximate Square Footage:	47,400
Assessed by:	Richards Reboks
Assessment Date:	July 3, 2019

2.0 APPLICABLE ONTARIO REGULATIONS

Applicable Ontario Regulations for each of the materials included in the investigation are briefly described below.

2.1 Ontario Regulation 278/05 (Asbestos)

The Ontario Ministry of Labour Regulation 278/05 requires a detailed asbestos inventory be performed in all buildings where friable and non-friable asbestos-containing materials (ACM) are present. The inventory must be available at the work place and must identify the type and location of asbestos-containing materials on a room-by-room basis, where necessary.

Each individual building report prepared by MAPLE meets or exceeds the requirements for an asbestos survey under Ontario Regulation 278/05.

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovation or demolition work where ACM is present and may be disturbed. The regulation requires all buildings where asbestos is known to be part of

the building materials to implement an Asbestos Management Program (AMP). TLDSB has prepared and maintains an AMP of which the current Re-Assessment report is part of.

2.2 Ontario Regulation 347

Ontario Regulation 347 applies to the transport of waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

The major requirements of the building owner and the person(s) removing the waste are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placard; and
- The waste is to be transported as directly as possible to the landfill site once it leaves the site.

Some wastes require the Owner to register a Generator (of waste) number and many wastes require classification that can restrict or even prohibit their disposal in landfill.

It is important to note that the building owner can be held responsible for the waste until the waste disposal site accepts it.

3.0 SURVEY SCOPE AND METHODOLOGY

The surveys were performed on a Room-by-Room basis within each building included in the scope of the assessment where asbestos was previously identified (by others).

The scope of the surveys included all friable and major non-friable materials suspected to contain asbestos. The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Asbestos materials that are friable have a much greater potential to release airborne asbestos fibres when disturbed.

Typical friable asbestos materials include; sprayed fireproofing or thermal insulation, textured (stippled) plaster, and thermal mechanical insulation. Typical non-friable materials include: asbestos cement (transite) products, caulking, vinyl floor tiles, asbestos textiles and gaskets. Additional materials such as ceiling tiles and drywall joint compounds are classified as non-friable, but because of their ability to release dust when disturbed they are considered as "potentially friable" for the purpose of this report.

3.1 Inventory Methodology

In order to determine the location of the materials included in the assessment, each room or area was entered where practical (i.e.: where access was possible without the demolition of walls, roof or ceilings or destruction of flooring) where asbestos materials were previously identified. An investigation of areas of the building where asbestos was not previously identified was not included in the scope of the current project.

Representative views were made above accessible suspended ceiling systems. Drywall or plaster ceilings were accessed via existing ceiling access panels only. The inventory did not include destructive testing of building systems or finishes to observe possible hidden conditions.

3.2 Asbestos Assessment Criteria

The recommendations and suggestions made as part of this report with respect to asbestos have taken into consideration the condition and accessibility of the asbestos-containing material as well as other factors such as water damage, vibration, air movement, and general activities in the area.

Where ACM is found to be in GOOD condition and not likely to deteriorate or fall, the general recommendation would be to re-evaluate the condition of the material on an annual basis (required by Regulation 278/05). This recommendation can be subject to change if the material is located in a manner that persons untrained in asbestos awareness could physically damage it.

Where the ACM is found to be damaged (i.e. FAIR or POOR condition), a recommendation to have the material cleaned-up, repaired, removed, enclosed, or encapsulated is offered. The recommendation will also indicate which asbestos procedure should be used to perform the remedial work (i.e. Type 1, Type 2, Type 3, or Glove Bag Removal Methods).

In each area or room inventoried, the quantity, condition (GOOD, FAIR, or POOR) and accessibility (A, B, C, D or E) of each suspect material was recorded.

The definitions for condition and accessibility items are as follows:

GOOD	Material is intact with no visible signs of damage.
FAIR	Material is visibly damaged but can be repaired.
POOR	Material is damaged beyond repair and likely needs to be removed.
Access A	Accessible to all occupants of the building.

Access B	Accessible to Maintenance personnel without the use of a ladder (i.e. Mechanical Room, pipe chase etc.).
Access C	Accessible to Maintenance personnel with the use of a ladder and is exposed to view without removing building components.
Access D	Accessible to Maintenance personnel with the use of a ladder and is concealed from viewing due to a building component (i.e. above a removable ceiling).
Access E	Not accessible without demolition of a building component (i.e. above a fixed ceiling system).

The asbestos related information collected during the previous assessments was confirmed and the room-by-room data updated to reflect the current information.

3.3 Limitations and Omissions from Scope

Due to the nature of building construction, some limitations exist in regards to the possible thoroughness of any building materials inventory. The field observations, measurements, and analysis are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. MAPLE warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the inventory.

It is possible that conditions may exist which could not be reasonably identified within the scope of the inventory or which were not apparent during the site investigation. MAPLE believes that the information collected during the inventory period concerning the property is reliable. No other warranties are implied or expressed.

In addition, during a standard asbestos assessment, performed for the purposes of regulatory compliance, it is industry practice to exclude some non-friable materials in the inventory. Examples of such assumptions include; elevator brakes, roofing felts and mastics, high voltage wiring, mechanical packing and gaskets, underground services or piping, fire-doors, window caulking, levelling compound, and/or materials used in operating equipment. As such, these materials were not sampled at the time of this survey and where present are assumed to be asbestos containing until proven otherwise.

3.4 Sampling Strategy and Analytical Methods

As the majority of materials were previously sampled by others, the requirement for sampling during the current survey was limited. Where samples were collected, they conformed to the criteria outlined below and in compliance with O. Reg. 278/05.

A small volume of the material was removed either from a damaged section or cut out of intact material and then repaired by sealing with tape to prevent the release of fibres. The collected samples were placed in plastic bags, sealed and labelled and then sent to an independent laboratory for analysis. To ensure quality results, the independent laboratory chosen is NVLAP accredited and successfully participates in an "Asbestos Proficiency Analytical Testing Program" and as such, these laboratories are responsible for their findings.

The collection of samples was performed in accordance with regulatory sampling requirements and with sufficient frequency to obtain a general pattern of asbestos use within the building. Due to building renovations or modifications that have occurred, the consistency of the application of asbestos materials may not be uniform throughout the entire building. It is important to note that without sampling every wall, pipe section, ceiling tile etc. it is not possible to identify the possible asbestos content in every material present in the building. For this reason, materials similar in appearance to those sampled elsewhere in the building were visually identified as being homogeneous and thus are assumed to be composed of the same material, thus additional sampling is not required.

In accordance with Reg. 278/05, samples were collected at the following frequency.

Material Type	No. Samples
Sprayed Fireproofing	Up to 7
Texture Coat	Up to 7
Pipe Fitting Insulation	3
Pipe Straight Insulation	3
Ductwork Insulation	3
Ceiling Tiles	3
Vinyl Sheeting Flooring	3
Vinyl Floor Tile	3
Plaster Finishes	Up to 7
Drywall Compound	Up to 7

An independent NVLAP accredited laboratory, was used to analyse the collected samples. Analysis was performed following the Code of Practice for the identification of asbestos in bulk material, as detailed in Ontario Regulation 278/05. Bulk samples were analysed using the Polarized Light Microscopy ("PLM") Technique with Dispersion Staining. The identification of asbestos fibre in bulk material is based on a collective set of parameters dependent on the unique shape and crystallographic properties of each fibre as viewed through the microscope. This method is useful for the qualitative identification of asbestos and the semi-quantitative determination of asbestos content in bulk materials expressed as a percent of projected area. The method identifies types of asbestos and also measures percent of asbestos as perceived by the analyst in comparison to standard area projections or trained experience.

Given the composition of some vinyl floor products, the PLM analysis method is often prone to yielding false negative analysis results. Therefore it may be prudent that the Transmission Electron Microscopy (TEM) analysis method be used to determine the asbestos content in the vinyl floor products, if negative results are obtain from the laboratory analysis.

3.5 Drawings

Drawings provided for each building indicate the following (where present):

- ◊ Location Numbers (reference to Room-by-Room asbestos data)
- ◊ Asbestos-Containing Sprayed Fireproofing
- ◊ Asbestos-Containing Texture Finishes
- ◊ Asbestos Containing Ceiling Tiles
- ◊ Asbestos-Containing Flooring Materials
- ◊ Presence of Asbestos-Containing Mechanical Insulations will not be specifically indicated on the drawings; however, a general statement regarding the presence of ACM mechanical insulations, where present, has been indicated on the drawings.
- ◊ Presence of asbestos-containing drywall joint compound and hard plaster will not be specifically identified on the drawings; however, a general statement regarding the presence of these ACM materials, where present, has been indicated on the drawings.

4.0 INVENTORY FINDINGS

The following is a brief discussion of the extent to which Asbestos-Containing Materials (ACM) was identified in the building. The discussion is organized under the headings of materials that are generally suspected of containing asbestos. Refer to the Room-by-Room Survey Inventory in Appendix I for a detailed description and location of all ACM.

Destructive testing was not conducted and as such some areas within the building were not accessible for an assessment (i.e. above solid ceilings, behind walls). Access for viewing within wall and ceiling cavities was not always possible. Suspect asbestos materials may be present within ceiling and wall cavities that were not identified in this report. This comment is particularly important for materials such as mechanical insulation. Caution should be taken when demolishing solid wall finishes within the building.

4.1 Sprayed Fireproofing (Friable)

No sprayed fireproofing was observed in the building.

4.2 Thermal Mechanical Insulation (Friable)

Asbestos-containing mechanical insulations are present in the building. It is important to note that mechanical systems may be present within walls and ceiling cavities or pipe chases that were not accessible during this assessment. The presence of ACM mechanical insulations in these locations should be suspected.

Pipe Systems:

Pipe Fittings, including elbows, valves, tees, hangers, etc. where insulated are insulated with parging cement previously confirmed to contain Chrysotile asbestos or are insulated with non-asbestos materials (i.e. Fibreglass). All pipe fittings were found to be in GOOD condition with the exception of one (1) parging cement fitting in FAIR condition within Gym A (eBase 217).

Pipe Straights, where insulated are insulated with non-asbestos fibreglass and/or armaflex materials. The insulation on the pipe straights within Gym A (eBase 217) and Gym B (eBase 216) is inaccessible and therefore assumed to contain asbestos until sampling proves otherwise. The pipe straight insulation was observed to be in GOOD condition at the time of the assessment.

Ductwork:

Duct systems were either insulated with non-asbestos fibreglass or were un-insulated.

Mechanical Equipment:

Mechanical equipment was observed to be externally un-insulated.

4.3 Texture Finish (Friable)

No asbestos-containing texture finishes were identified to be present within the building.

4.4 Acoustic Ceiling Tiles (Potentially Friable)

No asbestos-containing ceiling tiles were identified to be present within the building.

4.5 Vinyl Sheet Flooring (Potentially Friable)

No asbestos-containing vinyl sheet flooring was identified to be present within the building.

4.6 Vinyl Floor Tile (Non-Friable)

Vinyl floor tiles containing asbestos are present in various areas of the building. All tiles were found to be in GOOD condition except for five (5SF) square feet of vinyl floor tiles observed to be in POOR condition in Room 312 (eBase location 128). Refer to the Room-by-Room Inventory in Appendix I for details regarding location and quantity.

4.7 Asbestos Cement Products "Transite" (Non-Friable)

Asbestos-containing transite is present in the form of a panel within Room 105 (eBase 130). All transite panels were found to be in GOOD condition at the time of the assessment.

4.8 Drywall Joint Compound (DJC)

Previous sample results indicated drywall joint compound sampled at the Site contains asbestos. All drywall should be assumed to contain asbestos unless testing in specific areas indicates otherwise. The drywall was found to be in Good Condition.

4.9 Plaster

Textured plaster finishes present on the exterior soffits, overhangs and vestibules were sampled (Sample Set 15864-S01-S03) and analysed for asbestos content. The samples were found to contain 0.5% Chrysotile asbestos. At the time of the current assessment, the textured plaster were observed to be in GOOD condition.

5.0 RECOMMENDATIONS

5.1 General Recommendations

Due to the presence of ACM within the building, TLDSB must maintain their existing Asbestos Management Program for this property.

A re-assessment of known ACM is to be conducted at least once annually.

It is important to note that due to the presence of solid walls and ceiling systems, ACM may be present in concealed locations not identified in this report.

The assessment confirmed the presence of ACM mechanical insulations within the building (Refer to room-by-room Inventory for condition and quantities). Should any proposed renovations likely cause disturbance of the mechanical insulations, the materials would require removal using Type 2, Type 3 or Glove Bag Asbestos procedures as appropriate for the work being performed.

If asbestos-containing vinyl floor tiles are likely to be disturbed, the tiles should be removed using Type 1 Asbestos procedures (provided no power tools are used and the material is wetted). The use of power tools would require Type 3 Asbestos procedures.

Removal or disturbance of transite cement products requires the use of Type 1 Asbestos procedures (provided no power tools are used and the material is wetted). If power tools are required Type 3 Asbestos procedures need be applied.

Asbestos-containing drywall joint compound is present within the building. Removal or disturbance of less than 1 m^2 of this material will require the use of Type 1 Asbestos procedures, and the disturbance of greater than less than 1 m^2 will require Type 2 Asbestos procedures.

The removal or disturbance of textured plaster finishes less than 1m^2 will require the use of Type 2 Asbestos procedures; greater than 1m^2 Type 3 Asbestos procedures apply.

Materials suspected of containing asbestos should be sampled prior to disturbance. Suspect materials include; drywall joint compound, plaster, roofing materials, caulking, etc. unless previously confirmed to contain asbestos.

5.2 Specific Recommendations

The following asbestos remedial work is recommended for compliance with O. Reg. 278/05:

- Remove and replace damaged asbestos-containing vinyl floor tiles observed in POOR condition within Room 312 (eBase 128) using Type 1 Asbestos procedures.

- Repair one (1) damaged asbestos-containing parging cement insulation on the pipe fitting in FAIR condition within Gym A (eBase 217) using Type 2 asbestos abatement procedures.

As the remaining asbestos-containing materials identified within the building were observed to be in GOOD condition and no additional immediate remedial work was warranted.

6.0 LIMITATIONS

Due to the nature of building construction some limitations exist as to the possible thoroughness of the subject investigation. The field observations are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. MAPLE warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the assessment.

It is possible that conditions may exist which could not be reasonably identified within the scope of the investigation or which were not apparent during the site investigation. MAPLE believes that the information collected during the investigation period concerning the property is reliable. No other warranties are implied or expressed.

Information provided by Maple is intended for Client use only. Any use by a third party, of reports or documents authored by Maple, or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Maple accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

The liability of Maple or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Maple will not be responsible for any consequential or indirect damages. Maple will only be liable for damages resulting from negligence of Maple; all claims by the Client shall be deemed relinquished if not made within two years after last date of services provided.

Please contact Maple Environmental Inc. at (905) 257-4408 for inquiries regarding this project.

Sincerely,

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants

Prepared By:

Mark Pollock
Project Technologist

Reviewed By:

Kyle Prosser
Senior Project Manager

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APPENDIX I

ROOM-BY-ROOM ASBESTOS INVENTORY

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical
SF:Soffits	

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
49423	J. Douglas Hodgson Elementary School	1	101	Main Foyer	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49424	J. Douglas Hodgson Elementary School	1	101	Main Foyer	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			18143 Sections of Walls Removed
49417	J. Douglas Hodgson Elementary School	1	102	304	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49418	J. Douglas Hodgson Elementary School	1	102	304	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49419	J. Douglas Hodgson Elementary School	1	102	304	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49436	J. Douglas Hodgson Elementary School	1	103	Hallway 2	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49437	J. Douglas Hodgson Elementary School	1	103	Hallway 2	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01B			A			
49392	J. Douglas Hodgson Elementary School	1	104	104	No	No	FL	VFT	4	N/D			20-BS-10C						
49393	J. Douglas Hodgson Elementary School	1	104	104	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49394	J. Douglas Hodgson Elementary School	1	104	104	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49389	J. Douglas Hodgson Elementary School	1	105	103	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49390	J. Douglas Hodgson Elementary School	1	105	103	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49391	J. Douglas Hodgson Elementary School	1	105	103	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49386	J. Douglas Hodgson Elementary School	1	107	301	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49387	J. Douglas Hodgson Elementary School	1	107	301	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49388	J. Douglas Hodgson Elementary School	1	107	301	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49434	J. Douglas Hodgson Elementary School	1	108	Hallway 1	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49435	J. Douglas Hodgson Elementary School	1	108	Hallway 1	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01A			A			
49383	J. Douglas Hodgson Elementary School	1	109	102	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49384	J. Douglas Hodgson Elementary School	1	109	102	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49385	J. Douglas Hodgson Elementary School	1	109	102	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49380	J. Douglas Hodgson Elementary School	1	110	101	No	No	FL	VFT	4	N/D			20-BS-10B						
49381	J. Douglas Hodgson Elementary School	1	110	101	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49382	J. Douglas Hodgson Elementary School	1	110	101	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49376	J. Douglas Hodgson Elementary School	1	112	Boy's Washroom	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49377	J. Douglas Hodgson Elementary School	1	113	Girl's Washroom	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49395	J. Douglas Hodgson Elementary School	1	114	302	No	No	FL	VFT (New)	5	N/A			N/S						Replaced with new VFT
49396	J. Douglas Hodgson Elementary School	1	114	302	No	No	CL	CT	2	N/D			20-BS-06C						
49397	J. Douglas Hodgson Elementary School	1	115	303	No	No	FL	VFT (New)	5	N/A			N/S						Replaced with new VFT
49398	J. Douglas Hodgson Elementary School	1	115	303	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49378	J. Douglas Hodgson Elementary School	1	116	Staff Washroom W/C 1	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49379	J. Douglas Hodgson Elementary School	1	117	Staff Washroom W/C 2	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49425	J. Douglas Hodgson Elementary School	1	118	Garden	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			18143-Sections of Walls Removed
49438	J. Douglas Hodgson Elementary School	1	119	Hallway 3	No	No	CL	CT	2	N/D			V/C 20-BS-06						

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical
SF:Soffits	

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
49439	J. Douglas Hodgson Elementary School	1	119	Hallway 3	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49426	J. Douglas Hodgson Elementary School	1	120	305	No	No	FL	VFT (New)	5	N/A	-	-	N/S			-			Replaced with new VFT
49427	J. Douglas Hodgson Elementary School	1	120	305	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49415	J. Douglas Hodgson Elementary School	1	121	306	No	No	FL	VFT	2	0.5% CHRYSOTILE	-	-	V/C 12578-01			-			Replaced Summer 2013
49416	J. Douglas Hodgson Elementary School	1	121	306	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49428	J. Douglas Hodgson Elementary School	1	122	307	No	No	FL	VFT	2	0.5% CHRYSOTILE	-	-	V/C 12578-01			-			Replaced Summer 2013
49429	J. Douglas Hodgson Elementary School	1	122	307	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49430	J. Douglas Hodgson Elementary School	1	122	307	No	Yes	FTG	PI-PC		15% CHRYSOTILE			20-BS-03A-B						Replaced Summer 2013
49440	J. Douglas Hodgson Elementary School	1	123	Hallway 4	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49441	J. Douglas Hodgson Elementary School	1	123	Hallway 4	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49442	J. Douglas Hodgson Elementary School	1	123	Hallway 4	No	No	PI	PI-SW		N/D	-	-	20-BS-02C			-			
49443	J. Douglas Hodgson Elementary School	1	124	310	No	No	FL	VFT (New)	5	N/A	-	-	N/S			-			Replaced with new VFT
49444	J. Douglas Hodgson Elementary School	1	124	310	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49445	J. Douglas Hodgson Elementary School	1	124	310	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49446	J. Douglas Hodgson Elementary School	1	125	311	No	No	FL	VFT (New)	5	N/A	-	-	N/S			-			Replaced with new VFT
49447	J. Douglas Hodgson Elementary School	1	125	311	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49448	J. Douglas Hodgson Elementary School	1	125	311	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49456	J. Douglas Hodgson Elementary School	1	126	Boy's Washroom 2	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49457	J. Douglas Hodgson Elementary School	1	126	Boy's Washroom 2	No	No	PI	PI-SW		N/D			V/C 20-BS-02						
49454	J. Douglas Hodgson Elementary School	1	127	Girl's Washroom 2	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49455	J. Douglas Hodgson Elementary School	1	127	Girl's Washroom 2	No	No	PI	PI-SW		N/D			20-BS-02A-B						
49458	J. Douglas Hodgson Elementary School	1	128	312	Yes	No	FL	VFT	2	0.5% CHRYSOTILE	495 SF	G	12578-01A-C			A			
49459	J. Douglas Hodgson Elementary School	1	128	312	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49527	J. Douglas Hodgson Elementary School	1	128	312	Yes	No	FL	VFT		0.5% Chrysotile	5 SF	P	12578-01A-C			A			
49453	J. Douglas Hodgson Elementary School	1	129	106	No	No	FL	VFT (New)	5	N/A			N/S						
49449	J. Douglas Hodgson Elementary School	1	130	105	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49450	J. Douglas Hodgson Elementary School	1	130	105	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49451	J. Douglas Hodgson Elementary School	1	130	105 Music Room	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01D			A			
49452	J. Douglas Hodgson Elementary School	1	130	105 Music Room	Yes	No	WL	TRANSITE		VISUALLY ACM	400 SF	G	-			A			
49420	J. Douglas Hodgson Elementary School	1	132	309	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49421	J. Douglas Hodgson Elementary School	1	132	309	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49422	J. Douglas Hodgson Elementary School	1	132	309	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49407	J. Douglas Hodgson Elementary School	1	132A	Staff Washroom 5	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49408	J. Douglas Hodgson Elementary School	1	132A	Staff Washroom 5	No	No	CL	CT	2	N/D			V/C 20-BS-06						

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CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
49411	J. Douglas Hodgson Elementary School	1	133	Custodian Closet	No	No	FL	VFT	2	0.5% CHRYSOTILE	-	-	V/C 12578-01			-			Replaced Summer 2013
49412	J. Douglas Hodgson Elementary School	1	133	Custodian Closet	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49403	J. Douglas Hodgson Elementary School	1	134	Principal's Office	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49404	J. Douglas Hodgson Elementary School	1	134	Principal's Office	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49405	J. Douglas Hodgson Elementary School	1	134A	Staff Washroom 4	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49406	J. Douglas Hodgson Elementary School	1	134A	Staff Washroom 4	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49401	J. Douglas Hodgson Elementary School	1	135	Vice-Principal's Office	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49402	J. Douglas Hodgson Elementary School	1	135	Vice-Principal's Office	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49399	J. Douglas Hodgson Elementary School	1	136	Office 1	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49400	J. Douglas Hodgson Elementary School	1	136	Office 1	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01C			A			
49413	J. Douglas Hodgson Elementary School	1	137	Staff Washroom 3	No	No	FL	VFT	2	0.5% CHRYSOTILE	-	-	V/C 12578-01			-			Replaced Summer 2013
49414	J. Douglas Hodgson Elementary School	1	137	Staff Washroom 3	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49409	J. Douglas Hodgson Elementary School	1	138	Office 2	Yes	No	FL	VFT	2	0.5% CHRYSOTILE	1	G	V/C 12578-01			A			
49410	J. Douglas Hodgson Elementary School	1	138	Office 2	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49431	J. Douglas Hodgson Elementary School	1	139	308	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49432	J. Douglas Hodgson Elementary School	1	139	308	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49433	J. Douglas Hodgson Elementary School	1	139	308	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49515	J. Douglas Hodgson Elementary School	2	202	Hallway 5	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49516	J. Douglas Hodgson Elementary School	2	202	Hallway 5	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01E			A			
49517	J. Douglas Hodgson Elementary School	2	202	Hallway 5	Yes	Yes	FTG	PI-PC		15% CHRYSOTILE	2	G	V/C 20-BS-03			D			
49507	J. Douglas Hodgson Elementary School	2	203	Kitchen	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49508	J. Douglas Hodgson Elementary School	2	203	Kitchen	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49509	J. Douglas Hodgson Elementary School	2	203	Kitchen	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			18143 Sections Removed
49510	J. Douglas Hodgson Elementary School	2	204	211	No	No	FL	VFT	3	N/D			20-BS-09A-C						
49511	J. Douglas Hodgson Elementary School	2	204	211	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49512	J. Douglas Hodgson Elementary School	2	204	211	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49513	J. Douglas Hodgson Elementary School	2	205	Custodian Closet 2	No	No	FL	VFT (New)	5	N/A	-	-	N/S			-			Replaced with new VFT
49514	J. Douglas Hodgson Elementary School	2	205	Custodian Closet 2	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49504	J. Douglas Hodgson Elementary School	2	206	212	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49505	J. Douglas Hodgson Elementary School	2	206	212	No	No	CL	CT	2	N/D			20-BS-06A						
49506	J. Douglas Hodgson Elementary School	2	206	212	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49492	J. Douglas Hodgson Elementary School	2	208	214	No	No	FL	VFT	1	N/D			20-BS-07A-C						
49493	J. Douglas Hodgson Elementary School	2	208	214	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49494	J. Douglas Hodgson Elementary School	2	208	214	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof
WN: Window
FL:Floor
CL:Ceiling
WL:Wall
DK:Deck
SF:Soffits
B/J: Beams/Joists
CB: Chalkboard
PI: Pipe
DT:Duct
BL:Boiler
MC:Mechanical

ACCESSIBILITY

A: All occupants of the facility
B: Maintenance staff without a ladder
C: Maintenance staff with a ladder, exposed to view without moving building components
D: Maintenance staff with a ladder, concealed from view by building components
E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material
CT: Ceiling Tile
DJC: Drywall Joint Compound
FTG: Fitting
LF: Linear Feet
N/A: Not Applicable
N/Anz: Not Analyzed
N/D: None Detected
PI-AC: Pipe Insulation - Aircell
PI-PC: Pipe Insulation-Parging Cement
PI-CP: Pipe Insulation-Caposite
PL: Plaster
RM: Roofing Materials
SFP: Sprayed Fireproofing
SF: Square Feet
TF: Texture Finish
TB: Transite Board
TP: Transite Pipe
VI: Vermiculite Insulation
VFT: Vinyl Floor Tile
VSF: Vinyl Sheet Flooring
V/C: Visually Consistent w/ Other Sampled Material
WC: Window Caulking

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
49501	J. Douglas Hodgson Elementary School	2	209	213	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49502	J. Douglas Hodgson Elementary School	2	209	213	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49503	J. Douglas Hodgson Elementary School	2	209	213	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49498	J. Douglas Hodgson Elementary School	2	210	210	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49499	J. Douglas Hodgson Elementary School	2	210	210	No	No	CL	CT	1	N/D			20-BS-05C						
49500	J. Douglas Hodgson Elementary School	2	210	210	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49495	J. Douglas Hodgson Elementary School	2	211	209	No	No	FL	VFT	4	N/D			V/C 20-BS-10						
49496	J. Douglas Hodgson Elementary School	2	211	209	No	No	CL	CT	1	N/D			20-BS-05A-B						
49497	J. Douglas Hodgson Elementary School	2	211	209	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49518	J. Douglas Hodgson Elementary School	2	212	Hallway 6	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49519	J. Douglas Hodgson Elementary School	2	212	Hallway 6	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01F			A			
49490	J. Douglas Hodgson Elementary School	2	213	407	Yes	No	FL	VFT	2	0.5% CHRYSOTILE	250 SF	G	V/C 12578-01			A			
49491	J. Douglas Hodgson Elementary School	2	213	407	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49489	J. Douglas Hodgson Elementary School	2	214	Boy's Washroom 3	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49488	J. Douglas Hodgson Elementary School	2	215	Girl's Washroom 3	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49473	J. Douglas Hodgson Elementary School	2	216	Gym B	Yes	Yes	PI	PI		VISUALLY ACM	40 LF	G	-			C			NO ACCESS DUE TO HEIGHT - ASSUMED ACM
49475	J. Douglas Hodgson Elementary School	2	216	Gym B	Yes	Yes	FTG	PI-PC		15% CHRYSOTILE	7	G	20-BS-03C			C			
49472	J. Douglas Hodgson Elementary School	2	217	Gym A	Yes	Yes	PI	PI		VISUALLY ACM	40 LF	G	-			C			NO ACCESS DUE TO HEIGHT - ASSUMED ACM
49474	J. Douglas Hodgson Elementary School	2	217	Gym A	Yes	Yes	FTG	PI-PC		15% CHRYSOTILE	6	G	20-BS-03C			C			Fitting Removed by bleachers
49526	J. Douglas Hodgson Elementary School	2	217	Gym A	Yes	Yes	PI	PI-PC		15% Chrysotile	1	F	V/C 20-BS-03C			C			Above stands
49476	J. Douglas Hodgson Elementary School	2	217A	405	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49477	J. Douglas Hodgson Elementary School	2	217A	405	Yes	No	CL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			C			
49478	J. Douglas Hodgson Elementary School	2	217A	405	No	No	PI	PI-SW		N/D			V/C 20-BS-02						
49479	J. Douglas Hodgson Elementary School	2	217A	405	Yes	Yes	FTG	PI-PC		15% CHRYSOTILE	1	G	V/C 20-BS-03			D			
49480	J. Douglas Hodgson Elementary School	2	218	406	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49481	J. Douglas Hodgson Elementary School	2	218	406	Yes	No	CL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			C			
49486	J. Douglas Hodgson Elementary School	2	219	Stage	No	No	FL	VFT	2	0.5% CHRYSOTILE	-	-	V/C 12578-01			-			Replaced Summer 2013
49487	J. Douglas Hodgson Elementary School	2	219	Stage	No	No	CL	DJC		3% CHRYSOTILE	-	-	V/C 20-BS-01			-			Replaced Summer 2013
49484	J. Douglas Hodgson Elementary School	2	220	Library	No	No	CL	CT	2	N/D			20-BS-06B						
49485	J. Douglas Hodgson Elementary School	2	220	Library	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49471	J. Douglas Hodgson Elementary School	2	221	404	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49482	J. Douglas Hodgson Elementary School	2	222	403	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49483	J. Douglas Hodgson Elementary School	2	222	403	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49470	J. Douglas Hodgson Elementary School	2	225	402	No	No	FL	CT	2	N/D			V/C 20-BS-06						

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical
SF:Soffits	

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

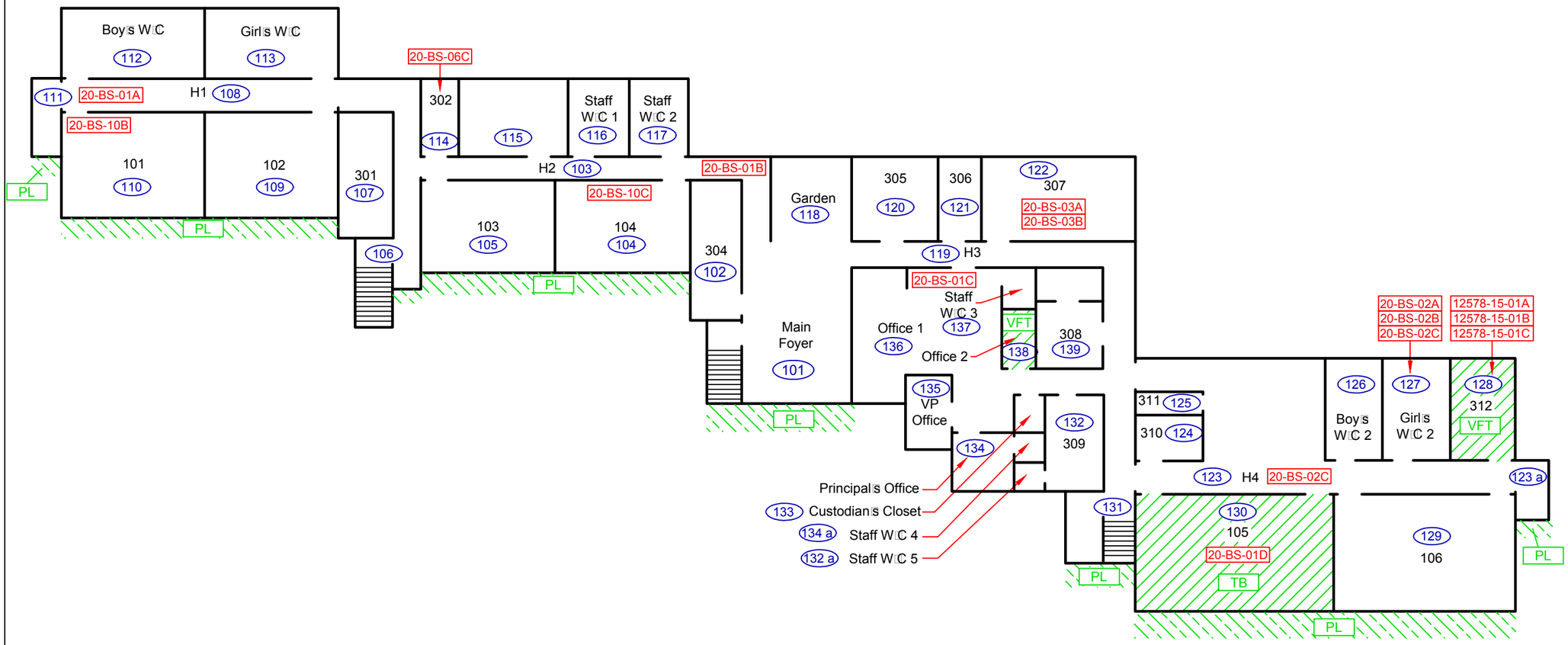
CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
49520	J. Douglas Hodgson Elementary School	2	226	Hallway 7	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49521	J. Douglas Hodgson Elementary School	2	226	Hallway 7	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	V/C 20-BS-01			A			
49522	J. Douglas Hodgson Elementary School	2	226	Hallway 7	Yes	Yes	FTG	PI-PC		15% CHRYSOTILE	3	G	V/C 20-BS-03			D			
49468	J. Douglas Hodgson Elementary School	2	227	206	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49466	J. Douglas Hodgson Elementary School	2	228	205	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49469	J. Douglas Hodgson Elementary School	2	230	401	No	No	DT	CT	2	N/D			V/C 20-BS-06						
49523	J. Douglas Hodgson Elementary School	2	231	Hallway 8	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49524	J. Douglas Hodgson Elementary School	2	231	Hallway 8	Yes	No	WL	DJC		3% CHRYSOTILE	1	G	20-BS-01G			A			
49525	J. Douglas Hodgson Elementary School	2	231	Hallway 8	Yes	Yes	FTG	PI-PC		15% CHRYSOTILE	3	G	V/C 20-BS-03			D			
49462	J. Douglas Hodgson Elementary School	2	232	202	No	No	CL	CT	2	N/D			V/C 20-BS-05						
49460	J. Douglas Hodgson Elementary School	2	233	201	No	No	CL	CT	2	N/D			V/C 20-BS-04						
49461	J. Douglas Hodgson Elementary School	2	233	201	No	No	FL	VFT	4	N/D			20-BS-10A						
49463	J. Douglas Hodgson Elementary School	2	235	203	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49464	J. Douglas Hodgson Elementary School	2	236	204	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49465	J. Douglas Hodgson Elementary School	2	237	207	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49467	J. Douglas Hodgson Elementary School	2	238	208	No	No	CL	CT	2	N/D			V/C 20-BS-06						
49374	J. Douglas Hodgson Elementary School	NA		EXTERIOR	No	No	RF	RM	NA	ACM ASSUMED	1	G	NS			C			sample prior to renovation
49375	J. Douglas Hodgson Elementary School	NA		EXTERIOR	No	No	WN	WC	NA	ACM ASSUMED	1	G	NS			A, C			sample prior to renovation
49528	J. Douglas Hodgson Elementary School	NA		EXTERIOR	Yes	Yes	SF	PL		0.5% CHRYSOTILE	1000 SF	G	15864-S01A-C			C			Present on vestibules, overhangs and soffits

APPENDIX II

DRAWINGS

Please Note
Dry all Joint Compound (DJC) has been indentified as ASBESTOS CONTAINING throughout the building.



LEGEND

12578-□□-01A	ECOH Sample Locations
01-BS-01A	Jacques Whitford Sample Locations
#	Ebase Number

CONFIRMED ACM

SYMBOL	DESCRIPTION
	Friable Asbestos-Containing Material
	Non-Friable Asbestos-Containing Material
VFT	Vinyl Floor Tile (Non-Friable Asbestos-Containing Material)
PI	Pipe Insulation (Friable Asbestos-Containing Material)
TB	Te□ture Board (Non-Friable Asbestos-Containing Material)
PL	Te□tured Plaster (Friable Asbestos-Containing Material)
NOTE	Dry□all Joint Compound

For Detailed Information as to Location, Type, Quantity, Condition and Access to ACM, Please Refer to the Room-by-Room Sheets Provided in the Report.

J. Douglas Hodgson Elementary School
HWY 121 AT CTY RD 1,
Haliburton, Ontario

First Floor Plan

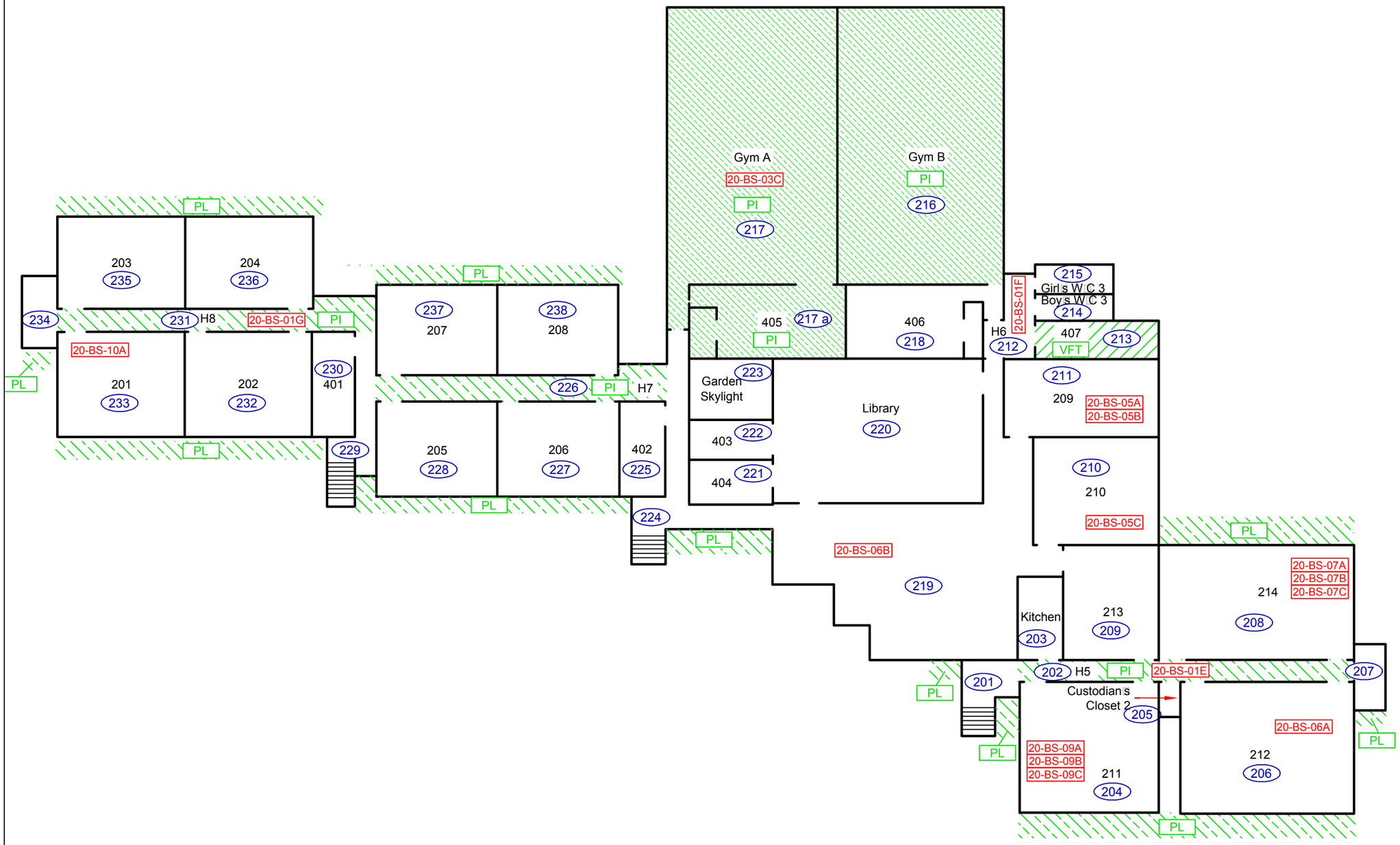
Asbestos Materials Re-Assessment Survey

CLIENT: Trillium Lakelands District School Board

PROJECT NUMBER:	DATE:	DRW BY:
18021-15	July 2019	S. Prosser
	SCALE: Not to Scale	CHK BY: K. Prosser

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

Please Note
Dry all Joint Compound (DJC) has been indentified as ASBESTOS CONTAINING throughout the building.



LEGEND

12578-□□-01A	ECOH Sample Locations
01-BS-01A	Jacques Whitford Sample Locations
#	Ebase Number

CONFIRMED ACM

SYMBOL	DESCRIPTION
	Friable Asbestos-Containing Material
	Non-Friable Asbestos-Containing Material
VFT	Vinyl Floor Tile (Non-Friable Asbestos-Containing Material)
PI	Pipe Insulation (Friable Asbestos-Containing Material)
TB	Te□ture Board (Non-Friable Asbestos-Containing Material)
PL	Te□tured Plaster (Friable Asbestos-Containing Material)
NOTE	Dry□all Joint Compound

For Detailed Information as to Location, Type, Quantity, Condition and Access to ACM, Please Refer to the Room-by-Room Sheets Provided in the Report.

J. Douglas Hodgson Elementary School
HWY 121 AT CTY RD 1,
Haliburton, Ontario

Second Floor Plan

Asbestos Materials Re-Assessment Survey

CLIENT: Trillium Lakelands District School Board

PROJECT NUMBER:	DATE:	DRW BY:
18021-15	July 2019	S. Prosser
	SCALE: Not to Scale	CHK BY: K. Prosser

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

APPENDIX III

POTENTIAL ASBESTOS-CONTAINING MATERIAL IDENTIFICATION SHEET

APPENDIX III - POTENTIAL ASBESTOS-CONTAINING MATERIALS INFORMATION SHEET

MIN	*Material*	*Material Description*	*Size*	*Sample Number*	*Sample Location*	*Asbestos Containing*
VFT-1	Vinyl Floor Tile	Grey with black and white specks	12 x 12	07A-C	Room 214	None
VFT-2	Vinyl Floor Tile	White with grey smears	12 x 12	12578-01A-C	Room 312	0.5% Chrysotile
VFT-3	Vinyl Floor Tile	Green with grey smears	12 x 12	09A-C	Room 211	None
VFT-4	Vinyl Floor Tile	White with beige smears	12 x 12	10A-C	Rooms 210, 101, 104	None
VFT-5	Vinyl Floor Tile	New Vinyl Floor Tiles	12 x 12	N/S	NA	None
CT-1	Ceiling Tile	Long fissure pinhole pattern	2 x 4	05A-C	Rooms 209, 210	None
CT-2	Ceiling Tile	Pinhole pattern	2 x 4	06A-C	Rooms 212, 302, Library	None

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

ASBESTOS-CONTAINING BUILDING MATERIALS RE-ASSESSMENT REPORT

MONCK PUBLIC SCHOOL

250 Wellington Street
Bracebridge, Ontario

Presented to:

Trillium Lakelands District School Board

Box 420, County Road 36
Lindsay, Ontario
K9V 4S4

Attention: Daniel Whalen

September 2019

Maple Project No. 18021-07

Executive Summary
2019 Asbestos-Containing Building Materials Re-Assessment Report

Maple Project	School Name	Address
18021-07	Monck Public School	250 Wellington St, Bracebridge, Ontario

Maple Environmental Inc. was retained by Trillium Lakelands District School Board to perform a re-assessment of known asbestos-containing building materials within the subject building.

The findings and recommendations of the current assessment are summarized below. Please refer to the main body of the report for details.

FINDINGS

Asbestos-containing materials (ACM) identified within the building at the time of the assessment are as follows:

ASBESTOS BUILDING MATERIALS SUMMARY								
MATERIAL		ASBESTOS			FRIABILITY			Remedial Work Required
		Yes	No	Suspect	Friable	Non-Friable	Potentially	
Sprayed Fireproofing			X		X			NO
Textured Finish			X		X			NO
Mechanical Insulations	Pipe Fittings		X		X			NO
	Pipe Straight		X		X			NO
	Ductwork		X		X			NO
	Mechanical Equip.		X		X			NO
Ceiling Tiles			X				X	NO
Vinyl Sheet Flooring			X				X	NO
Vinyl Floor Tiles		X				X		NO
Asbestos Cement (Transite)			X			X		NO
Plaster			X				X	NO
Drywall Joint Compound.				X		X		NO
Other (roofing, caulking etc.)				X				NO

Please refer to Room by Room Inventory in Appendix I to view location, quantities, and condition of ACM observed within the building at the time of the assessment.

RECOMMENDATIONS

As asbestos-containing materials were found to be present within the building, Ontario Regulation 278/05 requires that the Trillium Lakelands District School Board's Asbestos Management Plan must apply to this building. In addition, an annual re-assessment of all ACM must be performed.

All asbestos-containing materials identified within the building were observed to be in GOOD condition and therefore no recommendations are warranted.

General Statement

This report should be read in its entirety and is not a stand-alone report. Please refer to the Trillium Lakelands District School Board Overview Report provided under a separate cover to review information relevant to Regulations, Inventory Scope and Methodology, Sampling Strategies, Analytical Methods, Assessment Criteria, and the assessment limitations. Further, this Executive Summary must be read in conjunction with the main body of this report below.

TABLE OF CONTENTS

1.0 INTRODUCTION

MAPLE Environmental Inc. ("MAPLE") was retained by the Trillium Lakelands District School Board (TLDSB) to perform a re-assessment of known asbestos-containing building materials within all TLDSB schools where asbestos was previously confirmed to be present (by others).

The assessment was competed in accordance with the requirement of Ontario Regulation 278/05 to complete a re-assessment on an annual basis.

The following report presents the findings and recommendations of the assessment for the specific building listed.

SUMMARY OF BUILDING INFORMATION	
School Name:	Monck Public School
Building Address:	250 Wellington St, Bracebridge, Ontario
Number of Floors:	1
Approximate Square Footage:	53,000
Assessed by:	Kyle Prosser
Assessment Date:	July 3, 2019

2.0 APPLICABLE ONTARIO REGULATIONS

Applicable Ontario Regulations for each of the materials included in the investigation are briefly described below.

2.1 Ontario Regulation 278/05 (Asbestos)

The Ontario Ministry of Labour Regulation 278/05 requires a detailed asbestos inventory be performed in all buildings where friable and non-friable asbestos-containing materials (ACM) are present. The inventory must be available at the work place and must identify the type and location of asbestos-containing materials on a room-by-room basis, where necessary.

Each individual building report prepared by MAPLE meets or exceeds the requirements for an asbestos survey under Ontario Regulation 278/05.

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovation or demolition work where ACM is present and may be disturbed. The regulation requires all buildings where asbestos is known to be part of the building materials to implement an Asbestos Management Program

(AMP). TLDSB has prepared and maintains an AMP of which the current Re-Assessment report is part of.

2.2 Ontario Regulation 347

Ontario Regulation 347 applies to the transport of waste from the location of generation to a landfill site authorized to receive specific wastes. The regulation also prescribes procedures on how the specific wastes are to be handled at the landfill site.

The major requirements of the building owner and the person(s) removing the waste are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placard; and
- The waste is to be transported as directly as possible to the landfill site once it leaves the site.

Some wastes require the Owner to register a Generator (of waste) number and many wastes require classification that can restrict or even prohibit their disposal in landfill.

It is important to note that the building owner can be held responsible for the waste until the waste disposal site accepts it.

3.0 SURVEY SCOPE AND METHODOLOGY

The surveys were performed on a Room-by-Room basis within each building included in the scope of the assessment where asbestos was previously identified (by others).

The scope of the surveys included all friable and major non-friable materials suspected to contain asbestos. The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Asbestos materials that are friable have a much greater potential to release airborne asbestos fibres when disturbed.

Typical friable asbestos materials include; sprayed fireproofing or thermal insulation, textured (stippled) plaster, and thermal mechanical insulation. Typical non-friable materials include: asbestos cement (transite) products, caulking, vinyl floor tiles, asbestos textiles and gaskets. Additional materials such as ceiling tiles and drywall joint compounds are classified as non-friable, but because of their ability to release dust when disturbed they are considered as "potentially friable" for the purpose of this report.

3.1 Inventory Methodology

In order to determine the location of the materials included in the assessment, each room or area was entered where practical (i.e.: where access was possible without the demolition of walls, roof or ceilings or destruction of flooring) where asbestos materials were previously identified. An investigation of areas of the building where asbestos was not previously identified was not included in the scope of the current project.

Representative views were made above accessible suspended ceiling systems. Drywall or plaster ceilings were accessed via existing ceiling access panels only. The inventory did not include destructive testing of building systems or finishes to observe possible hidden conditions.

3.2 Asbestos Assessment Criteria

The recommendations and suggestions made as part of this report with respect to asbestos have taken into consideration the condition and accessibility of the asbestos-containing material as well as other factors such as water damage, vibration, air movement, and general activities in the area.

Where ACM is found to be in GOOD condition and not likely to deteriorate or fall, the general recommendation would be to re-evaluate the condition of the material on an annual basis (required by Regulation 278/05). This recommendation can be subject to change if the material is located in a manner that persons untrained in asbestos awareness could physically damage it.

Where the ACM is found to be damaged (i.e. FAIR or POOR condition), a recommendation to have the material cleaned-up, repaired, removed, enclosed, or encapsulated is offered. The recommendation will also indicate which asbestos procedure should be used to perform the remedial work (i.e. Type 1, Type 2, Type 3, or Glove Bag Removal Methods).

In each area or room inventoried, the quantity, condition (GOOD, FAIR, or POOR) and accessibility (A, B, C, D or E) of each suspect material was recorded.

The definitions for condition and accessibility items are as follows:

GOOD	Material is intact with no visible signs of damage.
FAIR	Material is visibly damaged but can be repaired.
POOR	Material is damaged beyond repair and likely needs to be removed.
Access A	Accessible to all occupants of the building.

Access B	Accessible to Maintenance personnel without the use of a ladder (i.e. Mechanical Room, pipe chase etc.).
Access C	Accessible to Maintenance personnel with the use of a ladder and is exposed to view without removing building components.
Access D	Accessible to Maintenance personnel with the use of a ladder and is concealed from viewing due to a building component (i.e. above a removable ceiling).
Access E	Not accessible without demolition of a building component (i.e. above a fixed ceiling system).

The asbestos related information collected during the previous assessments was confirmed and the room-by-room data updated to reflect the current information.

3.3 Limitations and Omissions from Scope

Due to the nature of building construction, some limitations exist in regards to the possible thoroughness of any building materials inventory. The field observations, measurements, and analysis are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. MAPLE warrants that the findings and conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the inventory.

It is possible that conditions may exist which could not be reasonably identified within the scope of the inventory or which were not apparent during the site investigation. MAPLE believes that the information collected during the inventory period concerning the property is reliable. No other warranties are implied or expressed.

In addition, during a standard asbestos assessment, performed for the purposes of regulatory compliance, it is industry practice to exclude some non-friable materials in the inventory. Examples of such assumptions include; elevator brakes, roofing felts and mastics, high voltage wiring, mechanical packing and gaskets, underground services or piping, fire-doors, window caulking, levelling compound, and/or materials used in operating equipment. As such, these materials were not sampled at the time of this survey and where present are assumed to be asbestos containing until proven otherwise.

3.4 Sampling Strategy and Analytical Methods

As the majority of materials were previously sampled by others, the requirement for sampling during the current survey was limited. Where samples were collected, they conformed to the criteria outlined below and in compliance with O. Reg. 278/05.

A small volume of the material was removed either from a damaged section or cut out of intact material and then repaired by sealing with tape to prevent the release of fibres. The collected samples were placed in plastic bags, sealed and labelled and then sent to an independent laboratory for analysis. To ensure quality results, the independent laboratory chosen is NVLAP accredited and successfully participates in an "Asbestos Proficiency Analytical Testing Program" and as such, these laboratories are responsible for their findings.

The collection of samples was performed in accordance with regulatory sampling requirements and with sufficient frequency to obtain a general pattern of asbestos use within the building. Due to building renovations or modifications that have occurred, the consistency of the application of asbestos materials may not be uniform throughout the entire building. It is important to note that without sampling every wall, pipe section, ceiling tile etc. it is not possible to identify the possible asbestos content in every material present in the building. For this reason, materials similar in appearance to those sampled elsewhere in the building were visually identified as being homogeneous and thus are assumed to be composed of the same material, thus additional sampling is not required.

In accordance with Reg. 278/05, samples were collected at the following frequency.

Material Type	No. Samples
Sprayed Fireproofing	Up to 7
Texture Coat	Up to 7
Pipe Fitting Insulation	3
Pipe Straight Insulation	3
Ductwork Insulation	3
Ceiling Tiles	3
Vinyl Sheeting Flooring	3
Vinyl Floor Tile	3
Plaster Finishes	Up to 7
Drywall Compound	Up to 7

An independent NVLAP accredited laboratory, was used to analyse the collected samples. Analysis was performed following the Code of Practice for the identification of asbestos in bulk material, as detailed in Ontario Regulation 278/05. Bulk samples were analysed using the Polarized Light Microscopy ("PLM") Technique with Dispersion Staining. The identification of asbestos fibre in bulk material is based on a collective set of parameters dependent on the unique shape and crystallographic properties of each fibre as viewed through the microscope. This method is useful for the qualitative identification of asbestos and the semi-quantitative determination of asbestos content in bulk materials expressed as a percent of projected area. The method identifies types of asbestos and also measures percent of asbestos as perceived by the analyst in comparison to standard area projections or trained experience.

Given the composition of some vinyl floor products, the PLM analysis method is often prone to yielding false negative analysis results. Therefore it may be prudent that the Transmission Electron Microscopy (TEM) analysis method be used to determine the asbestos content in the vinyl floor products, if negative results are obtain from the laboratory analysis.

3.5 Drawings

Drawings provided for each building indicate the following (where present):

- ◊ Location Numbers (reference to Room-by-Room asbestos data)
- ◊ Asbestos-Containing Sprayed Fireproofing
- ◊ Asbestos-Containing Texture Finishes
- ◊ Asbestos Containing Ceiling Tiles
- ◊ Asbestos-Containing Flooring Materials
- ◊ Presence of Asbestos-Containing Mechanical Insulations will not be specifically indicated on the drawings; however, a general statement regarding the presence of ACM mechanical insulations, where present, has been indicated on the drawings.
- ◊ Presence of asbestos-containing drywall joint compound and hard plaster will not be specifically identified on the drawings; however, a general statement regarding the presence of these ACM materials, where present, has been indicated on the drawings.

4.0 INVENTORY FINDINGS

The following is a brief discussion of the extent to which Asbestos-Containing Materials (ACM) was identified in the building. The discussion is organized under the headings of materials that are generally suspected of containing asbestos. Refer to the Room-by-Room Survey Inventory in Appendix I for a detailed description and location of all ACM.

Destructive testing was not conducted and as such some areas within the building were not accessible for an assessment (i.e. above solid ceilings, behind walls). Access for viewing within wall and ceiling cavities was not always possible. Suspect asbestos materials may be present within ceiling and wall cavities that were not identified in this report. This comment is particularly important for materials such as mechanical insulation. Caution should be taken when demolishing solid wall finishes within the building.

4.1 Sprayed Fireproofing (Friable)

No asbestos-containing sprayed fireproofing is present in the building. The sprayed fireproofing present within eBase 165 was previously sampled by others and found not to contain asbestos.

4.2 Thermal Mechanical Insulation (Friable)

No asbestos-containing mechanical insulations are present in the building. As ACM mechanical insulations were known to exist previously in the building (removed), it is important to note that mechanical systems may be present within walls and ceiling cavities or pipe chases that were not accessible during this assessment. The presence of ACM mechanical insulations in these locations should be suspected.

4.3 Texture Finish (Friable)

No asbestos-containing texture finishes were identified to be present within the building.

4.4 Acoustic Ceiling Tiles (Potentially Friable)

No asbestos-containing ceiling tiles were identified to be present within the building.

4.5 Vinyl Sheet Flooring (Potentially Friable)

No asbestos-containing vinyl sheet flooring was identified to be present within the building.

4.6 Vinyl Floor Tile (Non-Friable)

Vinyl floor tiles containing asbestos are present in the Music Storage Room (eBase 139A). The vinyl floor tiles were found to be in GOOD condition. Refer to the Room-by-Room Inventory in Appendix I for details regarding location and quantity.

4.7 Asbestos Cement Products "Transite" (Non-Friable)

Asbestos cement products were not observed to be present within the building.

4.8 Drywall Joint Compound (DJC)

While previous sample results indicated drywall joint compound sampled at the Site does not contain asbestos, it should be noted that the concentration of asbestos within drywall joint compound is historically known to be potentially inconsistently distributed. Further, it is possible that various phases of construction and renovations have occurred at the Site. Therefore, the number of samples previously collected may not be representative of all drywall joint compound finishes in the building.

4.9 Plaster

Plaster finishes were not identified in the building.

5.0 RECOMMENDATIONS

5.1 General Recommendations

Due to the presence of ACM within the building, TLDSB must maintain their existing Asbestos Management Program for this property.

A re-assessment of known ACM is to be conducted at least once annually.

It is important to note that due to the presence of solid walls and ceiling systems, ACM may be present in concealed locations not identified in this report.

If asbestos-containing vinyl floor tiles are likely to be disturbed, the tiles should be removed using Type 1 Asbestos procedures (provided no power tools are used and the material is wetted). The use of power tools would require Type 3 Asbestos procedures.

Materials suspected of containing asbestos should be sampled prior to disturbance. Suspect materials include; drywall joint compound, plaster, roofing materials, caulking, etc. unless previously confirmed to contain asbestos.

5.2 Specific Recommendations

All asbestos-containing materials identified within the building were observed to be in GOOD condition and therefore no immediate recommendations are warranted.

6.0 LIMITATIONS

Due to the nature of building construction some limitations exist as to the possible thoroughness of the subject investigation. The field observations are considered sufficient in detail and scope to form a reasonable basis for the findings presented in this report. MAPLE warrants that the findings and

conclusions contained herein have been made in accordance with generally accepted evaluation methods in the industry and applicable regulations at the time of the performance of the assessment.

It is possible that conditions may exist which could not be reasonably identified within the scope of the investigation or which were not apparent during the site investigation. MAPLE believes that the information collected during the investigation period concerning the property is reliable. No other warranties are implied or expressed.

Information provided by Maple is intended for Client use only. Any use by a third party, of reports or documents authored by Maple, or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Maple accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

The liability of Maple or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Maple will not be responsible for any consequential or indirect damages. Maple will only be liable for damages resulting from negligence of Maple; all claims by the Client shall be deemed relinquished if not made within two years after last date of services provided.

Please contact Maple Environmental Inc. at (905) 257-4408 for inquiries regarding this project.

Sincerely,

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants

Prepared By:

Mark Pollock
Project Technologist

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APPENDIX I

ROOM-BY-ROOM ASBESTOS INVENTORY

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
32088	Monck Public School	NA		EXTERIOR	No	No	RF	RM	NA	ACM ASSUMED	1	G	NS			C			Sample prior to renovation
32089	Monck Public School	NA		EXTERIOR	No	No	WN	WC	NA	ACM ASSUMED	1	G	NS			A, C			Sample prior to renovation
32090	Monck Public School	NA		EXTERIOR	No	No	CL	TF	NA	N/D	-	-	14398-07-PR4-01A-C			-			
32091	Monck Public School	1	101	ROOM 41 - VESTIBULE	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32092	Monck Public School	1	101	ROOM 41 - VESTIBULE	No	No	FL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32208	Monck Public School	1	102	AREA 40 - HALLWAY	No	No	FL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32209	Monck Public School	1	102	AREA 40 - HALLWAY	No	No	WL	DJC	NA	N/D	-	-	7-BS-17D, E			-			
32282	Monck Public School	1	103	ROOM 43 - STAFF ROOM	No	No	FL	VFT	2	N/D	-	-	7-BS-05A			-			
32283	Monck Public School	1	103	ROOM 43 - STAFF ROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32284	Monck Public School	1	103	ROOM 43 - STAFF ROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32285	Monck Public School	1	103A	ROOM 42 - OFFICES	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32286	Monck Public School	1	103A	ROOM 42 - OFFICES	No	No	WL	DJC	NA	N/D	-	-	7-BS-17G			-			
32279	Monck Public School	1	103B	ROOM 45 - GIRLS W/R	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32280	Monck Public School	1	103B	ROOM 45 - GIRLS W/R	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32281	Monck Public School	1	103B	ROOM 45 - GIRLS W/R	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32276	Monck Public School	1	103C	ROOM 46 - BOYS W/R	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32277	Monck Public School	1	103C	ROOM 46 - BOYS W/R	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32278	Monck Public School	1	103C	ROOM 46 - BOYS W/R	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32261	Monck Public School	1	104	ROOM 39 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32262	Monck Public School	1	104	ROOM 39 - HALLWAY	No	No	CL	DJC	NA	N/D	-	-	7-BS-15E			-			
32273	Monck Public School	1	105	ROOM 47 - DETENTION ROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32274	Monck Public School	1	105	ROOM 47 - DETENTION ROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32275	Monck Public School	1	105	ROOM 47 - DETENTION ROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32270	Monck Public School	1	106	ROOM 48 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	7-BS-05B			-			
32271	Monck Public School	1	106	ROOM 48 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32272	Monck Public School	1	106	ROOM 48 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-17F			-			
32267	Monck Public School	1	107	ROOM 44 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32268	Monck Public School	1	107	ROOM 44 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32269	Monck Public School	1	107	ROOM 44 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32265	Monck Public School	1	109	ROOM 38 - KINDERGARTEN CLASSROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32266	Monck Public School	1	109	ROOM 38 - KINDERGARTEN CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32263	Monck Public School	1	110	ROOM 37 - KINDERGARTEN CLASSROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32264	Monck Public School	1	110	ROOM 37 - KINDERGARTEN CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32230	Monck Public School	1	111	ROOM 86 - CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32231	Monck Public School	1	111	ROOM 86 - CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32227	Monck Public School	1	112	AREA 31 - HALLWAY	No	No	CL	CT	7	N/D	-	-	12578-07-02C			-			
32259	Monck Public School	1	113	AREA 75 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32260	Monck Public School	1	114	ROOM 85 - MECH ROOM	-	-	-	-	-	-	-	-	-			-			
32256	Monck Public School	1	115	ROOM 84 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32257	Monck Public School	1	115	ROOM 84 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32258	Monck Public School	1	115	ROOM 84 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32253	Monck Public School	1	116	ROOM 83 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32254	Monck Public School	1	116	ROOM 83 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32255	Monck Public School	1	116	ROOM 83 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32250	Monck Public School	1	117	ROOM 82 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical

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A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

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	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
32251	Monck Public School	1	117	ROOM 82 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32252	Monck Public School	1	117	ROOM 82 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32247	Monck Public School	1	118	ROOM 81 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32248	Monck Public School	1	118	ROOM 81 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32249	Monck Public School	1	118	ROOM 81 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32244	Monck Public School	1	119	ROOM 80 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32245	Monck Public School	1	119	ROOM 80 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32246	Monck Public School	1	119	ROOM 80 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32241	Monck Public School	1	120	ROOM 79 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32242	Monck Public School	1	120	ROOM 79 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32243	Monck Public School	1	120	ROOM 79 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32238	Monck Public School	1	121	ROOM 78 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32239	Monck Public School	1	121	ROOM 78 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32240	Monck Public School	1	121	ROOM 78 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32235	Monck Public School	1	122	ROOM 77 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32236	Monck Public School	1	122	ROOM 77 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32237	Monck Public School	1	122	ROOM 77 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32232	Monck Public School	1	123	ROOM 76 - NEW CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32233	Monck Public School	1	123	ROOM 76 - NEW CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32234	Monck Public School	1	123	ROOM 76 - NEW CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32228	Monck Public School	1	124	ROOM 30 - CLASSROOM	No	No	FL	VFT	3	N/D	-	-	V/C: 7-BS-08			-			
32229	Monck Public School	1	124	ROOM 30 - CLASSROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32225	Monck Public School	1	126	ROOM 29 - GIRLS W/R	No	No	CL	CT	3	N/D	-	-	V/C: 7-BS-07			-			
32226	Monck Public School	1	126A	ROOM 28 - OUTDOOR STORAGE	-	-	-	-	-	-	-	-	-			-			
32201	Monck Public School	1	127	ROOM 25 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32202	Monck Public School	1	127	ROOM 25 - CLASSROOM	No	No	CL	CT	8	N/D	-	-	NS			-			CT Manufactured between 2007-2011
32199	Monck Public School	1	128	ROOM 24 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32200	Monck Public School	1	128	ROOM 24 - CLASSROOM	No	No	CL	CT	8	N/D	-	-	NS			-			CT Manufactured between 2007-2011
32196	Monck Public School	1	129	ROOM 21 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32197	Monck Public School	1	129	ROOM 21 - CLASSROOM	No	No	CL	CT	8	N/D	-	-	NS			-			CT Manufactured between 2007-2011
32198	Monck Public School	1	129	ROOM 21 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-17A			-			
32186	Monck Public School	1	130	ROOM 20 - STORAGE	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32187	Monck Public School	1	130	ROOM 20 - STORAGE	No	No	CL	CT	6	8% CHRYSOTILE	-	-	V/C: 7-BS-18			-			Removed Summer 2013
32204	Monck Public School	1	131	ROOM - 22 LIBRARY OFFICE	No	No	CL	CT	3	N/D	-	-	7-BS-07C			-			
32203	Monck Public School	1	132	ROOM 23 - LIBRARY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			Active water leak and water stains
32205	Monck Public School	1	132A	ROOM 68 - UPPER STORAGE AND LIBRAR	No	No	CL	CT	6	8% CHRYSOTILE	-	-	V/C: 7-BS-18			-			Removed Summer 2013
32206	Monck Public School	1	132A	ROOM 68 - UPPER STORAGE AND LIBRAR	No	Yes	PI	PI-PC	NA	65% CHRYSOTILE	-	-	V/C: 7-BS-12			-			Removed Summer 2013
32207	Monck Public School	1	133	ROOM 69 - CONFERENCE ROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32219	Monck Public School	1	134	ROOM 26 - VISUAL STIMULATION ROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32220	Monck Public School	1	134	ROOM 26 - VISUAL STIMULATION ROOM	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32221	Monck Public School	1	134	ROOM 26 - VISUAL STIMULATION ROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-17B			-			
32217	Monck Public School	1	135	ROOM 27 - TECH CLASSROOM	No	No	CL	CT	8	N/D	-	-	NS			-			CT Manufactured between 2007-2011
32218	Monck Public School	1	135	ROOM 27 - TECH CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32222	Monck Public School	1	136	ROOM 33 - CUSTODIANS ROOM	No	No	CL	CT	6	8% CHRYSOTILE	-	-	7-BS-18C			-			Fully abated and replaced with new CT in April 2013
32223	Monck Public School	1	136	ROOM 33 - CUSTODIANS ROOM	No	No	CL	CT	8	N/D	-	-	NS			-			CT Manufactured between 2007-2011

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

STRUCTURAL ELEMENT

RF: Roof	B/J: Beams/Joists
WN: Window	CB: Chalkboard
FL:Floor	PI: Pipe
CL:Ceiling	DT:Duct
WL:Wall	BL:Boiler
DK:Deck	MC:Mechanical

ACCESSIBILITY

A: All occupants of the facility

B: Maintenance staff without a ladder

C: Maintenance staff with a ladder, exposed to view without moving building components

D: Maintenance staff with a ladder, concealed from view by building components

E: No access without demolition or removal of fixed building components or systems

TERMINOLOGY

ACM: Asbestos Containing Material	N/A: Not Applicable	PL: Plaster	TB: Transite Board	VSF: Vinyl Sheet Flooring
CT: Ceiling Tile	N/Anz: Not Analyzed	RM: Roofing Materials	TP: Transite Pipe	V/C: Visually Consistent w/ Other Sampled Material
DJC: Drywall Joint Compound	N/D: None Detected	SFP: Sprayed Fireproofing	VI: Vermiculite Insulation	
FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
32224	Monck Public School	1	137	ROOM 34 - BOYS W/R	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32215	Monck Public School	1	138	ROOM 36 - MUSIC STORAGE	No	No	FL	VFT	1	N/D	-	-	7-BS-03B			-			
32216	Monck Public School	1	138	ROOM 36 - MUSIC STORAGE	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32210	Monck Public School	1	139	ROOM 32 - MUSIC ROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32211	Monck Public School	1	139	ROOM 32 - MUSIC ROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32212	Monck Public School	1	139A	ROOM 75 - MUSIC STORAGE	Yes	No	FL	VFT	5	3% CHRYSOTILE	149 SF	G	7-BS-11A, B			A			
32213	Monck Public School	1	139A	ROOM 75 - MUSIC STORAGE	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32214	Monck Public School	1	139A	ROOM 75 - MUSIC STORAGE	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32287	Monck Public School	1	139A	ROOM 75 - MUSIC STORAGE	No	No	FL	VFT	5	3% CHRYSOTILE	-					A			1 tile replaced in 2016.
32194	Monck Public School	1	140	AREA 16 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32195	Monck Public School	1	140	AREA 16 - HALLWAY	No	No	WL	DJC	NA	N/D	-	-	7-BS-15A			-			
32184	Monck Public School	1	141	ROOM 19 - BREAK ROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32185	Monck Public School	1	141	ROOM 19 - BREAK ROOM	No	No	CL	CT	6	8% CHRYSOTILE	-	-	V/C: 7-BS-18			-			Removed Summer 2013
32162	Monck Public School	1	142	AREA 49 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32171	Monck Public School	1	143	ROOM 61 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32172	Monck Public School	1	143	ROOM 61 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32167	Monck Public School	1	144	ROOM 62 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32168	Monck Public School	1	144	ROOM 62 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32169	Monck Public School	1	145	ROOM 63 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32170	Monck Public School	1	145	ROOM 63 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32288	Monck Public School	1	146	Vestibule	No	No	WN	WC		ND			16387C-01A-C						Black and brown caulking
32173	Monck Public School	1	147	ROOM 60 - KITCHEN	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32174	Monck Public School	1	147	ROOM 60 - KITCHEN	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32183	Monck Public School	1	148	STAGE	-	-	-	-	-	-	-	-	-			-			
32176	Monck Public School	1	148A	AREA 66 & 67 - STAIRWELL	No	No	FL	VFT	3	N/D	-	-	7-BS-08A, B, C			-			
32178	Monck Public School	1	148A	AREA 66 & 67 - STAIRWELL	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32180	Monck Public School	1	148A	AREA 66 & 67 - STAIRWELL	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32175	Monck Public School	1	149	ROOM 59 - STAGE ROOM	-	-	-	-	-	-	-	-	-			-			
32182	Monck Public School	1	150	AREA 51 -GYM	-	-	-	-	-	-	-	-	-			-			
32154	Monck Public School	1	150A	ROOM 50 - Gym Storage	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32155	Monck Public School	1	150A	ROOM 50 - Gym Storage	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32177	Monck Public School	1	151	AREA 66 & 67 - STAIRWELL	No	No	FL	VFT	3	N/D	-	-	7-BS-08A, B, C			-			
32179	Monck Public School	1	151	AREA 66 & 67 - STAIRWELL	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32181	Monck Public School	1	151	AREA 66 & 67 - STAIRWELL	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32165	Monck Public School	1	152	ROOM 57 - GYM STORAGE	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32166	Monck Public School	1	152	ROOM 57 - GYM STORAGE	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32163	Monck Public School	1	153	AREA 49 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32156	Monck Public School	1	154	ROOM 56 - GIRLS W/R	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32157	Monck Public School	1	154	ROOM 56 - GIRLS W/R	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32160	Monck Public School	1	155	ROOM 64 - GIRLS CHANGEROOM	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32161	Monck Public School	1	155	ROOM 64 - GIRLS CHANGEROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-15D			-			
32158	Monck Public School	1	156	ROOM 55 - GIRLS CHANGEROOM	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32159	Monck Public School	1	156	ROOM 55 - GIRLS CHANGEROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32164	Monck Public School	1	157	AREA 54 - GYM HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			

APPENDIX I - ROOM BY ROOM ASBESTOS INVENTORY

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

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FTG: Fitting	PI-AC: Pipe Insulation - Aircell	SF: Square Feet	VFT: Vinyl Floor Tile	WC: Window Caulking
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
32152	Monck Public School	1	158	ROOM 65 - BOYS CHANGEROOM	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32153	Monck Public School	1	158	ROOM 65 - BOYS CHANGEROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32150	Monck Public School	1	159	ROOM 53 - BOYS CHANGEROOM	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32151	Monck Public School	1	159	ROOM 53 - BOYS CHANGEROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-15C			-			
32148	Monck Public School	1	160	ROOM 52 - BOYS W/R	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32149	Monck Public School	1	160	ROOM 52 - BOYS W/R	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32188	Monck Public School	1	162	ROOM 18 - CLASSROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32189	Monck Public School	1	162	ROOM 18 - CLASSROOM	No	No	CL	CT	6	8% CHRYSOTILE	-	-	V/C: 7-BS-18			-			Removed Summer 2013
32190	Monck Public School	1	162	ROOM 18 - CLASSROOM	No	No	CL	CT	8	N/D	-	-	NS			-			New Ceiling Tile
32191	Monck Public School	1	163	ROOM 17 - CLASSROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32192	Monck Public School	1	163	ROOM 17 - CLASSROOM	No	No	CL	CT	6	8% CHRYSOTILE	-	-	7-BS-18A			-			Removed Summer 2013
32193	Monck Public School	1	163	ROOM 17 - CLASSROOM	No	No	CL	CT	8	N/D	-	-	NS			-			New Ceiling Tile
32103	Monck Public School	1	165	AREA 74 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32104	Monck Public School	1	165	AREA 74 - HALLWAY	No	Yes	DK	SFP	NA	N/D	-	-	7-BS-13A, B, C			-			
32108	Monck Public School	1	166	AREA 14 - HALLWAY	No	No	CL	CT	7	N/D	-	-	12578-07-02A, B			-			
32109	Monck Public School	1	166	AREA 14 - HALLWAY	No	No	WL	DJC	NA	N/D	-	-	7-BS-16G			-			
32119	Monck Public School	1	167	ROOM 13 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32120	Monck Public School	1	167	ROOM 13 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32121	Monck Public School	1	167	ROOM 13 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-16A			-			
32122	Monck Public School	1	167	ROOM 13 - CLASSROOM	No	No	CL	CT	5	7% AMOSITE,2% CHRYSOTILE	-	-	V/C: 7-BS-14			-			Removed Summer 2013
32123	Monck Public School	1	168A	ROOM 12 - STAFF OFFICE	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32124	Monck Public School	1	168A	ROOM 12 - STAFF OFFICE	No	No	WL	DJC	NA	N/D	-	-	7-BS-16F			-			
32125	Monck Public School	1	168A	ROOM 12 - STAFF OFFICE	No	No	CL	CT	5	7% AMOSITE,2% CHRYSOTILE	-	-	V/C: 7-BS-14			-			Removed Summer 2013
32126	Monck Public School	1	169	ROOM 8 - BOYS W/R	No	No	FL	VSF	2	N/D	-	-	12578-07-03A, B			-			
32127	Monck Public School	1	169	ROOM 8 - BOYS W/R	No	No	WL	DJC	NA	N/D	-	-	7-BS-16B			-			
32128	Monck Public School	1	169	ROOM 8 - BOYS W/R	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-16			-			
32129	Monck Public School	1	171	ROOM 7 - GIRLS W/R	No	No	FL	VSF	2	N/D	-	-	12578-07-03C			-			
32130	Monck Public School	1	171	ROOM 7 - GIRLS W/R	No	No	WL	DJC	NA	N/D	-	-	7-BS-16C			-			
32131	Monck Public School	1	171	ROOM 7 - GIRLS W/R	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-16			-			
32132	Monck Public School	1	172	ROOM 6- CUSTODIAN ROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32133	Monck Public School	1	172	ROOM 6- CUSTODIAN ROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32147	Monck Public School	1	173	AREA 15 - HALLWAY	No	No	CL	CT	7	N/D	-	-	V/C: 12578-07-02			-			
32145	Monck Public School	1	174	ROOM 1 - CLASSROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32146	Monck Public School	1	174	ROOM 1 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32142	Monck Public School	1	175	ROOM 2 - CLASSROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32143	Monck Public School	1	175	ROOM 2 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32144	Monck Public School	1	175	ROOM 2 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-15B			-			
32140	Monck Public School	1	176	ROOM 3 - CUSTODIANS SUPPLY ROOM	No	No	FL	VFT	1	N/D	-	-	V/C: 7-BS-03			-			
32141	Monck Public School	1	176	ROOM 3 - CUSTODIANS SUPPLY ROOM	No	No	CL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32137	Monck Public School	1	177	ROOM 4 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32138	Monck Public School	1	177	ROOM 4 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32139	Monck Public School	1	177	ROOM 4 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32134	Monck Public School	1	178	ROOM 5 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32135	Monck Public School	1	178	ROOM 5 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32136	Monck Public School	1	178	ROOM 5 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32115	Monck Public School	1	180	ROOM 9 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	7-BS-05C			-			

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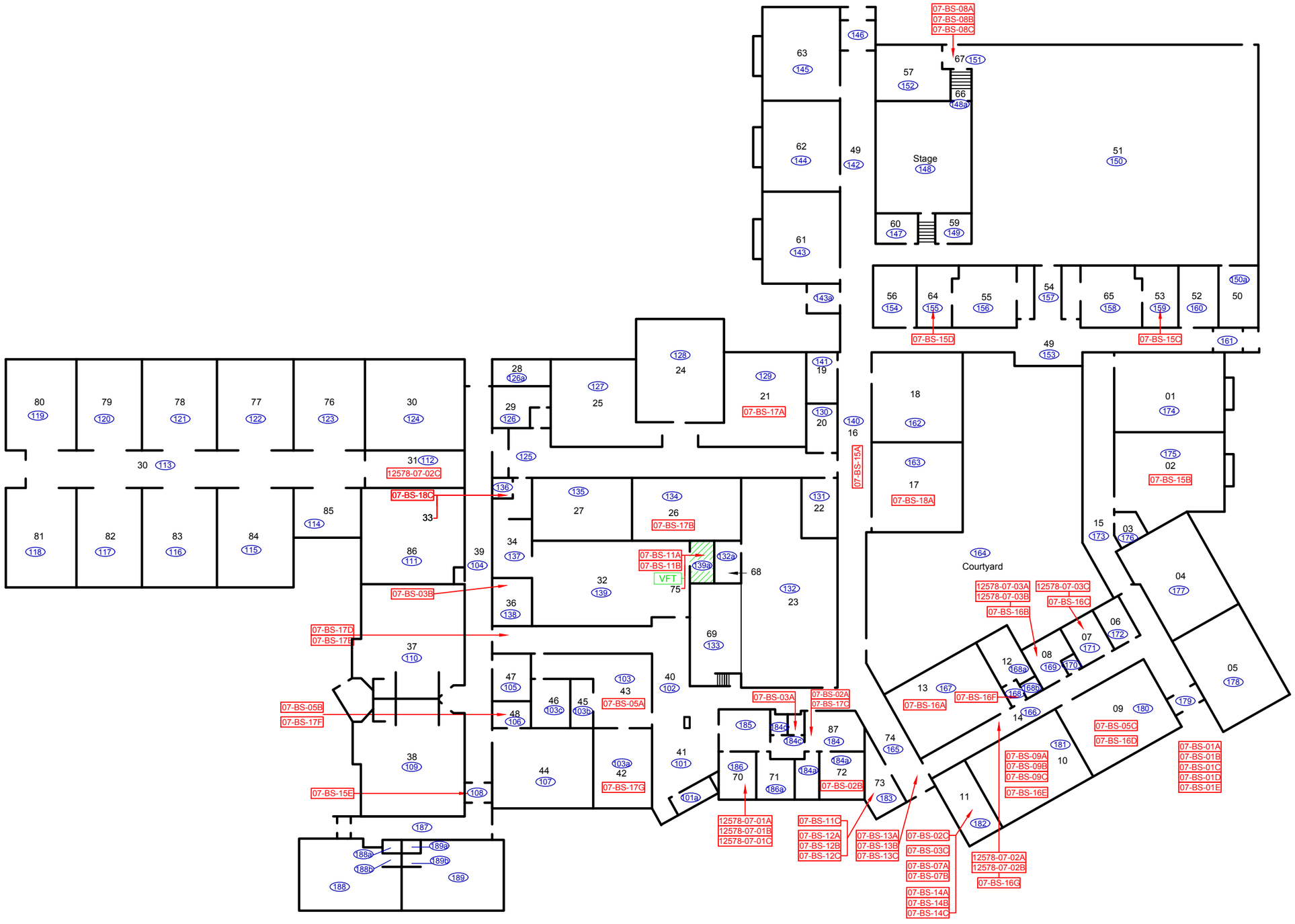
LF: Linear Feet	PI-PC: Pipe Insulation-Parging Cement	TF: Texture Finish		
	PI-CP: Pipe Insulation-Caposite			

CONDITION G: Good F: Fair P: Poor

ID	Facility	Floor #	Room #	Room name	Has ACM	Friable	Struct. Elem.	Application	Material	Type	Qty	Condition	Sample #	Action	Ref #	Comments 1	Comments 2	Comments 3	Notes
32116	Monck Public School	1	180	ROOM 9 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32117	Monck Public School	1	180	ROOM 9 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-16D			-			
32118	Monck Public School	1	180	ROOM 9 - CLASSROOM	No	No	CL	CT	5	7% AMOSITE,2% CHRYSOTILE	-	-	V/C: 7-BS-14			-			Removed Summer 2013
32110	Monck Public School	1	181	ROOM 10 - CLASSROOM	No	No	FL	VFT	2	N/D	-	-	V/C: 7-BS-05			-			
32111	Monck Public School	1	181	ROOM 10 - CLASSROOM	No	No	CL	CT	2	N/D	-	-	V/C: 7-BS-04			-			
32112	Monck Public School	1	181	ROOM 10 - CLASSROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-16E			-			
32113	Monck Public School	1	181	ROOM 10 - CLASSROOM	No	No	CL	CT	4	N/D	-	-	7-BS-09A, B, C			-			CEILING TILE MASTIC
32114	Monck Public School	1	181	ROOM 10 - CLASSROOM	No	No	CL	CT	5	7% AMOSITE,2% CHRYSOTILE	-	-	V/C: 7-BS-14			-			Removed Summer 2013
32105	Monck Public School	1	182	ROOM 11 - CUSTODIANS OFFICE	No	No	FL	VFT	1	N/D	-	-	7-BS-03C			-			
32106	Monck Public School	1	182	ROOM 11 - CUSTODIANS OFFICE	No	No	CL	CT	1	N/D	-	-	7-BS-02C			-			
32107	Monck Public School	1	182	ROOM 11 - CUSTODIANS OFFICE	No	No	CL	CT	5	7% AMOSITE,2% CHRYSOTILE	-	-	7-BS-14A, B, C			-			Removed Summer 2013
32101	Monck Public School	1	183	ROOM 73 - CUSTODIANS ROOM	No	No	FL	VFT	5	3% CHRYSOTILE	0 SF		7-BS-11C						Removed July 2017
32102	Monck Public School	1	183	ROOM 73 - CUSTODIANS ROOM	No	Yes	PI	PI-PC	NA	65% CHRYSOTILE	-	-	7-BS-12A, B, C			-			Removed
32094	Monck Public School	1	184	ROOM 87 - GUIDANCE ROOM	No	No	FL	VFT	1	N/D	-	-	7-BS-03A			-			
32095	Monck Public School	1	184	ROOM 87 - GUIDANCE ROOM	No	No	CL	CT	1	N/D	-	-	7-BS-02A			-			
32096	Monck Public School	1	184	ROOM 87 - GUIDANCE ROOM	No	No	WL	DJC	NA	N/D	-	-	7-BS-17C			-			
32099	Monck Public School	1	184A	ROOM 72 - PRINCIPAL	No	No	CL	CT	1	N/D	-	-	7-BS-02B			-			
32100	Monck Public School	1	184A	ROOM 72 - PRINCIPAL	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			
32093	Monck Public School	1	186	ROOM 70 - RECEPTION	No	No	FL	VSF	1	N/D	-	-	12578-07-01A, B, C			-			
32097	Monck Public School	1	186A	ROOM 71 - VICE PRINCIPAL	No	No	CL	CT	1	N/D	-	-	V/C: 7-BS-02			-			
32098	Monck Public School	1	186A	ROOM 71 - VICE PRINCIPAL	No	No	WL	DJC	NA	N/D	-	-	V/C: 7-BS-17			-			

APPENDIX II

DRAWINGS



LEGEND

12578-04-01A	ECOH Sample Locations
01-BS-01A	Jacques Whitford Sample Locations
#	Ebase Number

CONFIRMED ACM

SYMBOL	DESCRIPTION
	Friable Asbestos-Containing Material
	Non-Friable Asbestos-Containing Material
VFT	Vinyl Floor Tile (Non-Friable Asbestos-Containing Material)

For Detailed Information as to Location, Type, Quantity, Condition and Access to ACM, Please Refer to the Room-by-Room Sheets Provided in the Report.

Monck Public School

250 Wellington Street,
Bracebridge, Ontario

First Floor Plan

Asbestos Materials Re-Assessment Survey

CLIENT: Trillium Lakelands District School Board

PROJECT NUMBER:	DATE:	DRW BY:
18021-07	July 2019	S. Prosser
	SCALE: Not to Scale	CHK BY: K. Prosser

MAPLE ENVIRONMENTAL INC.
ENVIRONMENT, HEALTH & SAFETY CONSULTANTS

APPENDIX III

POTENTIAL ASBESTOS-CONTAINING MATERIAL IDENTIFICATION SHEET

APPENDIX III - POTENTIAL ASBESTOS-CONTAINING MATERIALS INFORMATION SHEET

MIN	*Material*	*Material Description*	*Size*	*Sample Number*	*Sample Location**	*Asbestos Containing*
CT-1	Ceiling Tile	Square Pinhole	2' x 2'	7-BS-02A, B, C	Guidance Room 87, Principals Room 72, Custodians Room 11	No
CT-2	Ceiling Tile	Four Strip w Small Fissure	2' x 4'	7-BS-04A, B, C	Hallway 40 (3)	No
CT-3	Ceiling Tile	Medium Thin Fissure	2' x 4'	7-BS-07A, B, C	Custodians Office 11 (2), Library Office 22	No
CT-4	Ceiling Tile	Tile Mastic	NA	7-BS-09A, B, C	Room 10 (3)	No
CT-5	Ceiling Tile	Grey Pinhole	1' x 1'	7-BS-14A, B, C	Custodians Office 11(3)	7% Amosite, 2% Chrysotile
CT-6	Ceiling Tile	Small Pinhole with Textured Finish	2' x 4'	7-BS-18A, B, C	Room 17, Boys Washroom 34, Janitors Closet 33 (All ACM CT abated April 2013)	8% Chrysotile
CT-7	Ceiling Tile	Small and Large Pinhole	2' x 4'	12578-07-02A, B, C	Hallway 14 (2), Hallway 31	No
CT-8	Ceiling Tile	Small, Dense Pinhole with Textured Finish	2' x 4'	NS: Manufactured 2007-2011	Classrooms 21, 24, 25, and 27	No
VFT-1	Vinyl Floor Tiles	White w Grey Dark grey Smudges	12" x 12"	7-BS-03A, B, C	Guidance Washroom 87 Music Storage 36, Custodians Room 11,	No
VFT-2	Vinyl Floor Tiles	Cream and Beige Mix	12" x 12"	7-BS-05A, B, C	Staff Lounge 43, Room 48, Room 9	No
VFT-3	Vinyl Floor Tiles	White w Blue Specks	12" x 12"	7-BS-08A, B, C	Gym Stairwell (3)	No
VFT-4	Vinyl Floor Tiles	Light and Dark Grey Mix	12" x 12"	7-BS-10A, B, C	Girls W/R 7 (3)	No
VFT-5	Vinyl Floor Tiles	Beige w Brown Streaks	12" x 12"	7-BS-11A, B, C	Music Storage 75(2), Custodian Storage 73	3% Chrysotile
VSF-1	Vinyl Sheet Flooring	Beige w Brown Streaks	NA	12578-01A, B, C	Reception 70 (2), Guidance 87	No
VSF-2	Vinyl Sheet Flooring	Grey w Black Mosaic	NA	12578-03A, B, C	Boys W/R 8 (2), Girls W/R 7	No

Jacques Whitford

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REPORT

Asbestos Containing Building Material Assessment

TRILLIUM LAKELANDS DISTRICT SCHOOL BOARD

RIVERSIDE PUBLIC SCHOOL

PROJECT NO. 1019853

PROJECT NO. 1019853

REPORT TO	Trillium Lakelands District School Board Bracebridge Board Office 76 Pine Street Bracebridge, Ontario P1L 1N4
FOR	Asbestos-Containing Building Materials Assessment
ON	Trillium Lakelands District School Board Riverside Public School 755 Brunel Road Huntsville, Ontario

January 11, 2007

Jacques Whitford
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Jacques Whitford

EXECUTIVE SUMMARY

Jacques Whitford Limited (Jacques Whitford) was commissioned by Trillium Lakelands District School Board (TLDSB) to conduct an Asbestos-Containing Building Materials Assessment of Riverside Public School located at 755 Brunel Road in Huntsville, Ontario. As the subject facility was constructed in 1993, the assessment was limited to building materials that are typically expected to be present in buildings constructed in 1990 or later that may contain asbestos (i.e., cement board, cement pipe products and gasket material). The subject facility consists of a single storey building with concrete block walls, a concrete foundation, exterior brick finish and flat roof.

The purpose of the assessment was to assist TLDSB to meet the requirements of the new asbestos regulation, Ontario Regulation 278/05 made under the Occupational Health and Safety Act, effective November 1, 2005. The assessment also includes the identification of asbestos-containing materials (ACMs) that may require special attention.

All work was carried out in accordance with the requirements of the OHSA. Site work was conducted on November 22, 2006 by Rabi Gautam of Jacques Whitford.

Table 1 below provides a summary of the observation and recommendations with regards to asbestos containing materials at the subject facility.

Table 1 – Summary of Findings and Recommendations

Issue	Comments	Recommendation
Asbestos	Asbestos-containing materials were not identified to be present at the subject facility.	Should a material suspected to contain asbestos fibres become uncovered during demolition activities, all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if asbestos fibres are present. Confirmed asbestos materials should be handled in accordance with O. Reg. 278/05.

The statements made in this Executive Summary text are subject to the same limitations included in the Closure Section 8.0, and are to be read in conjunction with the remainder of this report.

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ASBESTOS-CONTAINING BUILDING MATERIALS ASSESSMENT

1.0 INTRODUCTION

Jacques Whitford Limited (Jacques Whitford) was commissioned by Trillium Lakelands District School Board (TLDSB) to conduct an Asbestos-Containing Building Materials Assessment of Riverside Public School located at 755 Brunel Road in Huntsville, Ontario. As the subject facility was constructed in 1993, the assessment was limited to building materials that are typically expected to be present in buildings constructed in 1990 or later that may contain asbestos (i.e., cement board, cement pipe products and gasket material). The subject facility consists of a single storey building with concrete block walls, a concrete foundation, exterior brick finish and flat roof.

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All work was carried out in accordance with the requirements of the OHSA. Site work was conducted on November 22, 2006 by Rabi Gautam of Jacques Whitford.

1.1 Assessment Objectives

The objective of the assessment was to:

- prepare an assessment report that identifies asbestos-containing materials present at the subject facility; and,
- provide recommendations for the management of these materials.

1.2 Scope of Work

The scope of work for this assessment involved the following:

- a “room-by-room” visual assessment of readily accessible room spaces of the subject facility for the presence of building materials that are suspected to be ACM in buildings constructed in 1990 or later (i.e. cement board, cement pipe products and gasket material);
- an inventory of building materials/components that are suspected to contain asbestos;
- the collection of representative bulk samples from building materials suspected of containing asbestos fibres in post 1990 buildings (i.e., cement products and gasket material) (where applicable);
- laboratory analysis for the determination of the type and concentration of asbestos present in the samples submitted (where applicable); and,
- preparation of a report documenting the results of the assessment, providing an interpretation of the laboratory analysis results and recommendations for the management of any asbestos containing materials (ACMs).

2.0 DOCUMENT REVIEW

No document was provided to Jacques Whitford for review.

3.0 ASSESSMENT METHODOLOGY

A room-by-room visual assessment of the subject facility was made in order to check for the presence of materials suspected of containing asbestos in buildings constructed in 1990 or later.

During the assessment, locations to collect discrete bulk samples of suspect building materials were identified (where applicable). The building materials suspected of containing asbestos fibres in building constructed post 1990 is limited to cement board, cement pipe products and gasket material.

An assessment of the condition, accessibility and exposure risk was completed for each occurrence of an asbestos-containing material. The Public Works and Government Services Canada (PWGSC) document entitled “Deputy Ministers Directive 057 – Asbestos Management” (Last Revised June 16th, 1999) was used as the basis for the criteria that was applied in evaluating the presence of asbestos-containing materials at the subject areas, where applicable.

No samples of suspect ACMs from various building materials were collected and submitted for laboratory analysis.

4.0 ASSESSMENT LIMITATIONS

This report reflects the observations made within the selected subject building only, and the results of analyses performed on specific materials sampled during the assessment (if any). The voluntary reduction of friable asbestos in building materials manufactured in Canada and the United States started in 1986 with non-friable asbestos building materials such as floor tiles, ceiling tiles and drywall joint-fill compound included after 1990.

Due to access restrictions imposed by working in occupied and operational spaces, the presence and asbestos content of some building materials could not be determined. Where applicable, building materials that were not sampled but that may contain asbestos include, but are not limited to the following:

- concealed cement board;
- cement pipe straight-run products within wall cavities or crawlspaces; and,
- heat protection materials inside mechanical equipment and flanges.

If encountered during renovation or other activities, any suspected ACMs not identified within this report should be presumed to contain asbestos and handled as such until otherwise shown to be non asbestos-containing through analytical testing.

5.0 REGULATORY FRAMEWORK

Asbestos is included in the Designated Substances Regulations prescribed under Ontario's OHSA.

The Designated Substance Regulation respecting Asbestos (R.R.O. 1990, O. Reg. 837, amended to 279/05) primarily regulates worker exposure to asbestos during manufacturing of asbestos containing products, but also includes requirements related to respiratory equipment, measurement of airborne fibres, and medical surveillance of exposed workers.

The Ontario Regulation 278/05, made under the OHSA, is for Asbestos on Construction Projects and in Buildings and Repair Operations, and clearly indicates ACM as a material that contains 0.5% per cent or more asbestos by dry weight.

The General-Waste Management Regulation (O. Reg. 347/90), under the Environmental Protection Act (EPA) of Ontario, sets out the requirements for the proper disposal of asbestos waste in Ontario.

6.0 ASSESSMENT RESULTS AND DISCUSSION

The result of the assessment for asbestos-containing building materials is discussed below. The evaluation criterion for assessing asbestos-containing materials is provided in **Appendix 1.** A list of definitions for technical terms used in this report is provided in **Appendix 2.**

Asbestos-containing materials are grouped into two classifications, friable and non-friable materials. Friable ACMs are those that can easily be crumbled or broken apart by mere hand pressure. When these materials break apart asbestos fibres are then released into the atmosphere. Non-friable ACMs or “manufactured products” are materials that by the nature of their manufacturing/construction do not readily allow the release of asbestos fibres. These materials should not be cut or shaped with power tools, since this procedure may allow for the release of the asbestos fibres.

O. Reg. 278/05 requires that an Asbestos Management Plan (AMP) be implemented in buildings that have been identified to contain friable ACMs. The regulation also requires that an AMP be implemented in buildings that contain non-friable asbestos; however building owners have until November 1, 2007 to update the AMP to include non-friable ACM.

6.1 Asbestos-Containing Materials

During the site reconnaissance, ACMs were not identified to be present at the subject facility.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on visual assessment, ACMs were not identified to be present in the building. Jacques Whitford recommends that should a material suspected to contain asbestos fibres become uncovered during demolition activities, all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if asbestos fibres are present. Confirmed asbestos materials should be handled in accordance with Ont. Reg. 278/05.

8.0 CLOSURE

This report has been prepared for the sole benefit of Trillium Lakelands District School Board. The report may not be used by any other person or entity without the express written consent of Jacques Whitford Limited and Trillium Lakelands District School Board.

Any use which a third party makes of this report, or any reliance on decisions based on it, are the responsibility of such third parties. Jacques Whitford Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Conclusions presented in this report should not be construed as legal advice.

The conclusions presented in this report represent the best technical judgment of Jacques Whitford Limited based on the data obtained from the work. The conclusions are based on the site conditions encountered by Jacques Whitford Limited at the time the work was performed at the specific assessment and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on building construction and conditions, weather, building usage and other factors. Due to the nature of the investigation and the limited data available, Jacques Whitford Limited cannot warrant against undiscovered environmental liabilities.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

We trust that the above is satisfactory for your purposes at this time. Should you have any questions or concerns, or require additional information, please do not hesitate to contact the undersigned at your convenience.

This report was prepared by Rabi Gautam and reviewed by Martin Ling and Steven D. Fulford.

Respectfully submitted,

JACQUES WHITFORD LIMITED

ORIGINAL SIGNED BY:

Rabi Gautam
Report Author

ORIGINAL SIGNED BY:

Steven D. Fulford
Senior Technical Reviewer

ORIGINAL SIGNED BY:

Martin Ling
Project Manager

RG/eu

Enclosures
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APPENDIX 1

Evaluation Criteria for Assessing Asbestos Containing Materials

Jacques Whitford

Criteria for Assessing Asbestos Containing Materials

A description of the criteria used in evaluating the condition, accessibility and exposure risk of asbestos-containing materials is provided below. The criteria is generally based on the Public Works and Government Services Canada (PWGSC) document entitled "Deputy Ministers Directive 057 – Asbestos Management" (Last Revised 1999/07/16) and industry standards of practice.

Assessment of Condition

Non-Friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos cement products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material will be treated as a friable product.

Evaluation of Accessibility

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

Access (A)

Areas of the building within reach of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM not normally within reach from floor level.

Access (B)

Frequently entered maintenance areas within reach of maintenance staff, without the need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, i.e., tops of equipment, mezzanines.

Access (C) Exposed

Areas of the building above 8'0" where use of a ladder is required to reach the ACM. Only refers to ACM materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently accessed service areas of the building.

Access (C) Concealed

Areas of the building which require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces, etc. Observations are limited to the extent visible from the access points.

Access (D)

Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc. where demolition of the ceiling, wall or equipment, etc., is required to reach the ACM. Evaluation of the condition and extent of ACM is limited or impossible, depending on the Assessmentor's ability to visually examine the materials In Access D.

APPENDIX 2

Terms and Definitions

Jacques Whitford

Terms and Definitions

Asbestos

Any of the following asbestiform silicate minerals: actinolite asbestos, anthophyllite asbestos, chrysotile, crocidolite, cumming tonite-grunerite asbestos (amosite), tremolite asbestos with a dry weight concentration greater than 0.5%.

Friable

Capable of being crumbled, pulverized or reduced to powder by hand pressure.

HEPA Filter

A high efficiency particulate aerosol filter that is at least 99.97 per cent efficient in collecting a 0.3 micrometre aerosol.

Homogeneous Material

A material that is uniform in colour and texture

Polarized Light Microscopy (PLM)

Polarized Light Microscopy is a technique accepted by the US Environmental Protection Agency as a screening method for detecting asbestos fibres in bulk material samples.

Presumed Asbestos Containing Materials (PACMs)

Materials that are known to have been manufactured contain asbestos. Testing of the material is required to determine if the material contains asbestos fibres.

Recommended Corrective Actions (RCAs)

Areas identified to consist of asbestos-containing or presumed asbestos-containing materials that require attention to repair or remove damaged materials.

Building

Any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel.

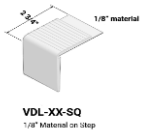
LENNOX ARCHITECTS LIMITED

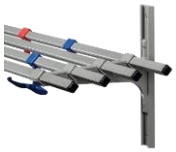
Schedule A - List of Materials

Project: Millwork Renovations
Client: Trillium Lakelands District School Board **Date:** November 15, 2021

SPECIFICATION SECTION	CODE	SPECIFICATION	ALTERNATE APPROVED SUPPLIERS	GENERAL NOTES *(Refer to RFS and drawings for details)*	SAMPLES
Division 6 - Wood, Plastics and Composites					
Section 06 15 36 **Composite Plastic Lumber**	PL-1	**Plastic Lumber** PLASTIC LUMBER DEPOT Type: Ultraplast / Wood grain finish Colour: Sienna Size: Varies 50% 37X86 and 50% 37X62 (refer to drawings)	Re-Plast	Location: Kindergarten Cubbies various schools. Refer to s millwork drawings A500's, Schedule B and Specifications. **Schools:** Cardiff ES, J. Douglas Hodgson E.S., Monck P.S.	
Section 06 20 00 **Finish Carpentry**	WD-1	**Solid Wood Floor Base** Species & Colour: to match existing wood floor base size: 100mm High		Location: J.Douglas Hodgson Daycare 208. **Schools**: J. Douglas Hodgson E.S.	
Section 06 41 00 **Cabinet Work**	MEL-1	**Melamine** PANOLAM Colour: Birch (TBD from a sample of 3) Edging: Hardwood edging on all exposed faces Finish: Satin	Uniboard Formica	Location: All millwork (see millwork drawings A500's, Schedule B and Specifications) **Schools:** All Schools	
Section 06 61 16 **Solid Surfacing**	SS-1	**Solid Surfacing** Formica Colour: Blanco Terrazo Number: #742	Hanex T-500 Toffee Crunch	Location: Counters, sills & wall cap. Refer to A500's drawings, Schedule B and Specifications **Schools:** All Schools	
Division 9 - Finishes					
Section 09 30 13 **Ceramic and Porcelain Tile**	GR-1 & GR-2	**Grouting** Type: GR-1 Wall - Laticrete 600 Series Type: GR-2 Floor - Laticrete Spectra Lock Pro Grout (epoxy) Colour: To be selected by Consultant	MAPEI	Location: All Wall and Floor Tile Refer to interior elevation drawings for locations. **Schools:** All Schools	
Section 09 30 13 **Ceramic and Porcelain Tile**	CT-1	**Ceramic Tile: Wall Tile (Field Colour)** OLYMPIA TILE Series: Colour & Dimension Series Size: 100mmx400mm Colour: Artic Bright White Finish: Gloss	DALTILE	Locations: Backsplash area tile at all sink locations. At J. Douglas Hodgson Washrooms field wall colour. Refer to elevations A400's and Schedule B. Note: **Wall finishing edge** **Schools:** All Schools	

SPECIFICATION SECTION	CODE	SPECIFICATION	ALTERNATE APPROVED SUPPLIERS	GENERAL NOTES *(Refer to RFS and drawings for details)*	SAMPLES
Section 09 30 13 **Ceramic and Porcelain Tile**	CT-2	**Ceramic Tile: Wall Tile (Accent Colour)** OLYMPIA TILE Series: Colour & Dimension Series Size: 100mmx400mm Colour: Dusk Bright Finish: Gloss	DALTILE	Locations: Washrooms accent wall colour . Refer to elevations A400's and Schedule B. Note: **Wall finishing edge protection: Stainless Steel "Rondec" by Schluter.** **Schools**: J. Douglas Hodgson E.S.	
Section 09 30 13 **Ceramic and Porcelain Tile**	CT-3	**Ceramic Tile: Ceiling Tile** OLYMPIA TILE Series: Colour & Dimension Series Size: 100mmx400mm Joints : Joints to align with wall tile Colour: Artic Bright White Finish: Gloss	DALTILE	Locations: Shower ceiling area in universal washroom 204A. Refer to RCP Plan. **Schools**: J. Douglas Hodgson E.S.	
Section 09 30 13 **Ceramic and Porcelain Tile**	PCT-1	**Porcelain Tile: Floor Tile and Base** OLYMPIA TILE Series: To match adjacent washroom Size: 300mmx300mm Colour: To match adjacent washroom Finish: Anti-Slip Base: c/w 100mm matching PCT base (bullnose top)	DALTILE	Locations: Cardiff ES Kindergarten exit corridor. Refer to plans A and Schedule B. Note that all existing terrazzo to be removed prior to installing **Schools**: Cardiff ES	
Section 09 30 13 **Ceramic and Porcelain Tile**	PCT-2	**Porcelain Tile: Floor Tile (field)** OLYMPIA TILE Series: Quebec Series unglazed Mosaic Size: 50mmx50mm Colour: Gold Granite Finish: Matte Base: PCT-4	DALTILE	Locations: Filed floor tile in Universal Washroom 204A. Refer to floor plans. **Schools**: J. D. Hodgson E.S.	
Section 09 30 13 **Ceramic and Porcelain Tile**	PCT-3	**Porcelain Tile: Floor Tile (Accent)** OLYMPIA TILE Series: Quebec Series unglazed Mosaic Size: 50mmx50mm Colour: Galaxy Speer FS Finish: Matte Base: PCT-4	DALTILE	Locations: Accent floor tile in Universal Washroom 204A. Refer to floor plans. **Schools**: J. D. Hodgson E.S.	
Section 09 30 13 **Ceramic and Porcelain Tile**	PCT-4	**Porcelain Tile: Built up base** OLYMPIA TILE Series: Quebec Series unglazed Mosaic Size: 50mmx50mm Colour: Galaxy Speer FS Finish: Matte Type: MT-6A (flat top)	DALTILE	Locations: Built up floor base in Universal Washroom 204A. **Schools**: J. Douglas Hodgson E.S.	
Section 09 65 16 **Resilient Flooring**	VCT-1	**Floor Tile (Field Colour)** ARMSTRONG FLOORING Series: Standard Excelon Imperial Texture Size: 300mm x 300mm Colour: 51839 Fortress White Base: c/w 100mm Rubber Base (RB)	JOHNSONITE	Location: At classrooms. Refer to floor plans and Schedule B - Room Finish Schedule. **Schools:** All Schools	

SPECIFICATION SECTION	CODE	SPECIFICATION	ALTERNATE APPROVED SUPPLIERS	GENERAL NOTES *(Refer to RFS and drawings for details)*	SAMPLES
Section 09 65 16 **Resilient Flooring**	VCT-2	**Floor Tile (Accent Colour)** ARMSTRONG FLOORING Series: Standard Excelon Imperial Texture Size: 300mm x 300mm Colour: 51836 Shelter White Base: c/w 100mm Rubber Base (RB)	JOHNSONITE	Location: At classrooms. Refer to floor plans and Schedule B - Room Finish Schedule. **Schools:** Riverside P.S.	
Section 09 65 16 **Resilient Flooring**	VCT-3	**Floor Tile (Accent Colour)** ARMSTRONG FLOORING Series: Standard Excelon Imperial Texture Size: 300mm x 300mm Colour: 51830 Cottage Tan Base: c/w 100mm Rubber Base (RB)	JOHNSONITE	Location: At classrooms. Refer to floor plans and Schedule B - Room Finish Schedule. **Schools:** Cardiff E.S., J. Douglas Hodgson E.S., Monck P.S.	
Section 09 65 16 **Resilient Flooring**	VCT-4	**Not Used**			
Section 09 65 16 **Resilient Flooring**	VCT-5	**Floor Tile (Field / Accent Colour)** ARMSTRONG FLOORING Series: Standard Excelon Imperial Texture Size: 300mm x 300mm Colour: 51903 Blue Gray Base: c/w 100mm Rubber Base (RB)	JOHNSONITE	Location: At classrooms. Refer to floor plans and Schedule B - Room Finish Schedule. **Schools:** Riverside P.S.	
Section 09 65 16 **Resilient Flooring**	RB-1	**Resilient Floor Base** ARMSTRONG FLOORING Series: Coved Wall Base Size: 100mm high x 3mm thick Colour: Black	JOHNSONITE	Location: At classrooms. Refer to floor plans and Schedule B - Room Finish Schedule. **Schools:** All Schools	
Section 09 65 16 **Resilient Flooring**	RN-1	**Rubber Nosing** TARKETT Series: Profile VDL xx-sq Colour: Black	JOHNSONITE	Location: At JD Hodgson Music Room. Refer to floor plans and Schedule B - Room Finish Schedule. **Schools:** J. Douglas Hodgson E.S.	
Section 09 65 16 **Resilient Flooring**	SFT-1	**Safety Sheet Flooring (Field & Base)** ALTRO RELIANCE 25 Series: 25 Colour: D2514 Ice Rink Thickness: 2.5 mm Size: Sheet Base: Cove. Colour to match floor		Location: JD Hodgson DAYCARE 204, WASHROOM 204A & STORAGE 206A. Refer to room finish schedule. **Schools:** J. Douglas Hodgson E.S.	
Section 09 91 00 **Painting**	PT-1	**Paint (Field Colour)** SHERWIN WILLIAMS Colour: SW7004 Snowbound	BENJAMIN MOORE ICI PAINTS	Location: All walls ,unless otherwise noted. Refer to Room Finish Schedule **Schools:** All Schools	
Section 09 91 00 **Painting**	PT-2	**Paint (Accent Colour)** SHERWIN WILLIAMS Colour: Beige (TBD)	BENJAMIN MOORE ICI PAINTS	Location: At existing Control panels. **Schools:** Monck P.S.	

SPECIFICATION SECTION	CODE	SPECIFICATION	ALTERNATE APPROVED SUPPLIERS	GENERAL NOTES *(Refer to RFS and drawings for details)*	SAMPLES
Section 09 91 00 **Painting**	PT-3	**Paint (Accent Colour)** SHERWIN WILLIAMS Colour: Grey (TBD)	BENJAMIN MOORE ICI PAINTS	Location: At existing Control panels. **Schools:** Riverside P.S.	
Section 10 19 13 **High Density Polyethylene Partions**	PD-1	**High Density Polyethylene Partitions** SCRANTON Type: Hiny Hider Solid Plastic Size: 72" (1828mm) High Colour & Texture: Desert beige		Location: Washrooms. Refer to floor plans. **Schools:** J. Douglas Hodgson E.S.	
Section 10 95 00 **Miscellaneous Specialities**	CP-1	**Control Panel** Interspec Frame: Aluminum frame Plam: Natural Birch (to match Millwork)		Location: Various schools **Schools:** Cardiff ES, J. Douglas Hodgson E.S.	
Section 10 95 00 **Miscellaneous Specialities**	KCR	**Kindergarten Coat Racks** ASI Type: Student Line Model STL101 Hook Colours: TBD by Consultant		Location: Various schools **Schools:** Cardiff ES, J. Douglas Hodgson E.S., Monck P.S., Riverside P.S.	

GENERAL NOTES:

1. General notes apply unless otherwise noted on drawings.
2. See Drawings for extent of wall and floor finishes.
3. Change in floor finish shall occur in the centre line of doors when in the closed position, unless otherwise noted.
4. Paint all exposed surfaces unless otherwise noted.
5. Do not paint plastic partitions, aluminium, stainless steel, prefinished surfaces, fire-rated dampers, or shutter assemblies.
6. Paint all access panels, fire cabinets, etc. the colour of the wall in which they occur.
7. At outside and inside corners, paint accent colour on flat wall stopping 1/4" short of corner to meet the non-accent colour.
8. Provide thresholds at change in floor levels within the room. Threshold colour to be comfirmed.
9. Material list to be read in conjunction with drawings, specifications and Schedule B -Room Finish Schedule.

LEGEND

ACT: Acoustic Ceiling Tile
CT: Ceramic Wall Tile
CP: Control Panel
GR: Grout
KCR: Kindergarten Coat Racks
MEL: Melamine
PCT: Porcelain Floor Tile
PD: Hign Density Polyethylene Partitions
PL: Plastic Lumber
PT: Paint
RB: Rubber base
RN Rubber Nosing
SFT: Safety Sheet Flooring
SS: Solid Surfacing
VCT: Vinyl Flooring
ACT: Acoustic Ceiling tiles

LENNOX ARCHITECTS LIMITED

Schedule B - Room Finish Schedules

Project: Cardiff ES Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20001
Date: November 15, 2021

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West					
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent		CABINET FINISH	COUNTER FINISH	
102	CORRIDOR	EX. TERRAZZO	-	EX. TERRAZZO	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	[1] VCT ACCENT AT LOCATIONS OF MILLWORK REMOVAL (REFER TO FLOOR PLANS). [2] VCT ACCENT LOCATIONS IN KINDERGATEN & PORCELAIN TILE IN NEW CUBBIE / EXIT CORRIDOR. [3] TILE BACKSPLASH AREA AT ALL SINK LOCATIONS (REFER TO ELEVATIONS). [4] EXISTING CEILING TILES TO BE REMOVED AND REPLACED AS REQUIRED TO COMPLETE SERVICE WORK. ANY DAMAGED TILES TO BE REPLACED WITH NEW. [5] RADIATOR COVERS TO BE REFINISHED REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS. [6] NEW CONTROL PANEL, REFER TO SPECIFICATION SECTION 10 95 00 MISCELLANEOUS SPECIALTIES. [7] ALL AREAS WITH PCT FLOORING TO HAVE MATCHING PCT-1 (100mm HIGH) BASE.
106	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1		-	[5] REFINISHED RADIATOR	[4] EX. ACT	MEL-1	SS-1	
107	CLASSROOM	EX. CPT	[1] VCT-3	RB-1	PT-1	-	PT-1	[6] CP-1	PT-1	[3] CT-1	-	[5] REFINISHED RADIATOR	[4] EX. ACT	MEL-1	SS-1	
109	GYM	EX. SFT	-	RB-1	EX.	-	EX.	[6] CP-1	PT-1	-	-	[5] REFINISHED RADIATOR	[4] EX. ACT	MEL-1	-	
110	CORRIDOR	EX. TERRAZZO	-	EX. TERRAZZO	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	
111	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	-	-	[5] REFINISHED RADIATOR	PT-1	[3] CT-1	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	
112	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	-	[5] REFINISHED RADIATOR	PT-1	-	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	
114	CUSTODIAL ROOM	EX.CONC.	-	-	PT-1	-	PT-1	-	PT-1	[6] MOP HOLDER	PT-1	-	[4] EX. ACT	MEL-1	-	
115	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	-	[5] REFINISHED RADIATOR	PT-1	-	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	
125	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	-	[5] REFINISHED RADIATOR	PT-1	-	PT-1	[6] CP-1	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
126	KINDERGARTEN	EX. VCT & TERRAZZO	[2] VCT-3 & PCT-1	RB-1/ PCT-1 [7]	PT-1	[6] CP-1	PT-1	-	PT-1	[5] REFINISHED RADIATOR	PT-1	[3] CT-1 & [5] REFINISHED RADIATOR	[4] EX. ACT	MEL-1 & PL-1	SS-1	
127	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	[3] CT-1	-	[5] REFINISHED RADIATOR	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
128	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	-	-	[5] REFINISHED RADIATOR	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West			CABINET FINISH	COUNTER FINISH	
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent				
129	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	-	PT-1	[3] CT-1 & CP-1 [6]	PT-1	-	-	[5] REFINISHED RADIATOR	[4] EX. ACT	MEL-1	SS-1	

General Finish Notes:

1. For wall & floor accent locations see Floor finishes plan & Interior Elevations.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. Refer to Specifications and Schedule A for material selection and colours.
4. For Millwork types and locations refer to Floor Plans (A300's), Interior Elevations (A400's) & Millwork Drawings (A500's)

Abbreviations:

ACT	Acoustic Ceiling Tile	**MEL**	Melamine	**PT**	Paint	**SFT**	Safety Sheet Flooring
CT	Ceramic Wall Tile	**PCT**	Porcelain Floor Tile	**GB**	Gypsum Board	**SS**	Solid Surfacing
CP	Control Panel	**PD**	High Density Polyethylene Partitions	**RB**	Rubber Base	**VCT**	Vinyl Flooring
EX.	Existing	**PL**	Plastic Lumber	**RN**	Rubber Nosing	**CONC.**	Concrete
						CPT	Carpet

LENNOX ARCHITECTS LIMITED

Schedule B - Room Finish Schedules

Project: JD Hodgson Door / Screen & Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20002
Date: November 15, 2021

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West					
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent		CABINET FINISH	COUNTER FINISH	
101	FOYER	EX.PCT	PCT MATCH[15]	PCT MATCH[15]	EX.	-	PT MATCH[15]	-	PT MATCH[15]	-	EX.	-	[4] EX. ACT	-	-	[1] VCT ACCENT AT LOCATIONS OF MILLWORK REMOVAL (REFER TO FLOOR PLANS). [2] VCT ACCENT LOCATIONS IN KINDERGATEN & PORCELAIN TILE IN NEW CUBBIE / EXIT CORRIDOR. [3] TILE BACKSPLASH AREA (REFER TO ELEVATIONS). [4] EXISTING CEILING TILES TO BE REMOVED AND REPLACED AS REQUIRED TO COMPLETE SERVICE WORK. ANY DAMAGED TILES TO BE REPLACED WITH NEW. [5] NEW BASE BOARD HEATER REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS. [6] REFER TO SPECIFICATION SECTION 10 95 00 MISCELLANEOUS SPECIALTIES. [7] VCT FIELD COLOUR ON ALL STEPS, RISERS AND AT BOTTOM OF THE ROOM (REFER TO FLOOR PLANS). [8] RUBBER NOSING ON ALL STEPS (SEE FLOOR PLANS FOR LOCATIONS). [9] ACCENT WALL TILE UP TO 900mm AFF. REFER TO INTERIOR ELEVATIONS. [10] FIELD WALL TILE FORM 900mm AFF TO U/S OF EXISTING FASCIA OR CEILING REFER TO INTERIOR ELEVATIONS. [11] ACCENT TILE IN SHOWER AREA, REFER TO FLOOR PLANS. [12] CERAMIC TILE IN SHOWER AREA REFER TO FLOOR PLANS. 13 NEW 100mm WOOD BASE AT LOCATIONS WITH EXISTING WOOD FLOOR. [14] REFINISH EXISTING WOOD FLOOR [15] 'MATCH' MEANS TO MATCH EXISTING
101A	VESTIBULE	EX.PCT	PCT MATCH[15]	PCT MATCH[15]	PT MATCH[15]	-	PT MATCH[15]	-	EX.	-	EX.	-	[4] EX. ACT	-	-	
102	CONFERENCE ROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1	-	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
103	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	
104	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
105	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
108	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	
109	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
110	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
125	STORAGE	VCT-1	-	RB-1	PT-1	[3] CT-1	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
129	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	
130	MUSIC ROOM	[7] VCT-1	[1] VCT-3	RB-1 & [8] RN-1	PT-1	[3] CT-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	
132	STAFF ROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1	-	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
136	ADMIN.	EX.PCT	-	EX.	EX.	-	EX.	-	EX.	-	PT MATCH[15]	-	[4] EX. ACT	-	-	

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West					
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent		CABINET FINISH	COUNTER FINISH	
202	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	[1] VCT ACCENT AT LOCATIONS OF MILLWORK REMOVAL (REFER TO FLOOR PLANS).
204	P.A.L.S. ROOM	VCT-1	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	[2] VCT ACCENT LOCATIONS IN KINDERGATEN & PORCELAIN TILE IN NEW CUBBIE / EXIT CORRIDOR.
204A	UNIVERSAL WASHROOM	PCT-2	[11]PCT-3	PCT-4	[10] CT-1	[9] CT-2	[10] CT-1	[9] CT-2	[10] CT-1	[9] CT-2	[10] CT-1	[9] CT-2	GYP. PT-1 / [12]CT-3	-	-	[3] TILE BACKSPLASH AREA (REFER TO ELEVATIONS).
205	CUSTODIAN	EX.	-	EX.	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	[4] EXISTING CEILING TILES TO BE REMOVED AND REPLACED AS REQUIRED TO COMPLETE SERVICE WORK. ANY DAMAGED TILES TO BE REPLACED WITH NEW.
206A	STORAGE	SFT-1	-	SFT-1	PT-1	-	PT-1	-	PT-1	-	PT-1	-	[4] EX. ACT	MEL-1	-	[5] NEW BASE BOARD HEATER REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS.
206	ART ROOM	VCT-1	[1] VCT-3	RB-1	PT-1	-	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	[6] REFER TO SPECIFICATION SECTION 10 95 00 MISCELLANEOUS SPECIALTIES.
208	DAYCARE	[14]EX. WOOD REFINISHED	SFT-1	SFT-1/ [13]WD-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	PT-1	[3] CT-1	PT-1	[6] CP-1	[4] EX. ACT	MEL-1	SS-1	[7] VCT FIELD COLOUR ON ALL STEPS, RISERS AND AT BOTTOM OF THE ROOM (REFER TO FLOOR PLANS).
208A	WASHROOM	SFT-1	-	SFT-1	[10] CT-1	[9] CT-2	[10] CT-1	[9] CT-2	[10] CT-1	[9] CT-2	[10] CT-1	[9] CT-2	GYP. PT-1	-	-	[8] RUBBER NOSING ON ALL STEPS (SEE FLOOR PLANS FOR LOCATIONS).
209	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	-	PT-1	[5] BASE BOARD HEATER & [6] CP-1	PT-1	[3] CT-1	PT-1	-	[4] EX. ACT	MEL-1	SS-1	[9] ACCENT WALL TILE UP TO 900mm AFF. REFER TO INTERIOR ELEVATIONS.
210	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	[6] CP-1	PT-1	-	[4] EX. ACT	MEL-1	SS-1	[10] FIELD WALL TILE FORM 900mm AFF TO U/S OF EXISTING FASCIA OR CEILING REFER TO INTERIOR ELEVATIONS.
211	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1 & [6] CP-1	PT-1	-	[4] EX. ACT	MEL-1	SS-1	[11] ACCENT TILE IN SHOWER AREA, REFER TO FLOOR PLANS.
219	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	[12] CERAMIC TILE IN SHOWER AREA REFER TO FLOOR PLANS.
226	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	[13] NEW 100mm WOOD BASE AT LOCATIONS WITH EXISTING WOOD FLOOR.
227	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	[14] REFINISH EXISTING WOOD FLOOR
228	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	[15] 'MATCH' MEANS TO MATCH EXISTING
230	MEETING ROOM	EX. VCT	-	RB-1	PT-1	[6] CP-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
231	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	
232	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
233	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[6] CP-1	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West					
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent		CABINET FINISH	COUNTER FINISH	
235	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
236	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	PT-1	[6] CP-1	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
237	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	PT-1	[6] CP-1	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
238	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	PT-1	[6] CP-1	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	

General Finish Notes:

1. For wall & floor accent locations see Floor finishes plan & Interior Elevations.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. Refer to Specifications and Schedule A for material selection and colours.
4. For Millwork types and locations refer to Floor Plans (A300's), Interior Elevations (A400's) & Millwork Drawings (A500's)

Abbreviations:

ACT	Acoustic Ceiling Tile	**MEL**	Melamine	**PT**	Paint	**SFT**	Safety Sheet Flooring
CT	Ceramic Wall Tile	**PCT**	Porcelain Floor Tile	**GB**	Gypsum Board	**SS**	Solid Surfacing
CP	Control Panel	**PD**	High Density Polyethylene Partitions	**RB**	Rubber Base	**VCT**	Vinyl Flooring
EX.	Existing	**PL**	Plastic Lumber	**RN**	Rubber Nosing	**CONC.**	Concrete

LENNOX ARCHITECTS LIMITED

Schedule B - Room Finish Schedules

Project: Monck PS Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20003
Date: November 15, 2021

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West			CABINET FINISH	COUNTER FINISH	
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent				
107	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[2] PT-2	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	[1] VCT ACCENT AT LOCATIONS OF MILLWORK REMOVAL (REFER TO FLOOR PLANS). [2] REPAINT EXISTING CONTROL PANEL. [3] TILE BACKSPLASH AREA AT ALL SINK LOCATIONS (REFER TO ELEVATIONS). [4] EXISTING CEILING TILES TO BE REMOVED AND REPLACED AS REQUIRED TO COMPLETE SERVICE WORK. ANY DAMAGED TILES TO BE REPLACED WITH NEW. [5] NEW BASE BOARD HEATER REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS. [6] REFER TO SPECIFICATION SECTION 10 95 00 MISCELLANEOUS SPECIALTIES. [7] RADIATOR COVERS TO BE REFINISHED REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS.
109	KINDERGARTEN	VCT-1	[1] VCT-3	RB-1	PT-1	[3] CT-1 & [2] PT-2	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
110	KINDERGARTEN	VCT-1	[1] VCT-3	RB-1	PT-1	[3] CT-1 & [2] PT-2	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
111	SENIOR LAB.	VCT-1	[1] VCT-3	RB-1	PT-1	[2] PT-2	PT-1	-	PT-1	[7] REFINISHED RADIATOR	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
124	JUNIOR LAB.	VCT-1	[1] VCT-3	RB-1	PT-1	[2] PT-2	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
143	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1 & [2] PT-2	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
144	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1 & [2] PT-2	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
145	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1 & [2] PT-2	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
162	CLASSROOM	EX. VCT	-	-	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	MEL-1	SS-1	
163	CLASSROOM	EX. VCT	-	-	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	MEL-1	SS-1	
166	CORRIDOR	EX.PCT	-	EX.PCT	EX.	-	EX.	-	EX.	-	EX.	-	[4] EX. ACT	-	-	
167	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	-	PT-1	[2] PT-2	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	[4] EX. ACT	MEL-1	SS-1	
174	CLASSROOM	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	PT-1	[2] PT-2	PT-1	-	[4] EX. ACT	MEL-1	SS-1	

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West			CABINET FINISH	COUNTER FINISH	
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent				
175	**CLASSROOM**	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	PT-1	[2] PT-2	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	[1] VCT ACCENT AT LOCATIONS OF MILLWORK REMOVAL (REFER TO FLOOR PLANS). [2] REPAINT EXISTING CONTROL PANEL. [3] TILE BACKSPLASH AREA AT ALL SINK LOCATIONS (REFER TO ELEVATIONS). [4] EXISTING CEILING TILES TO BE REMOVED AND REPLACED AS REQUIRED TO COMPLETE SERVICE WORK. ANY DAMAGED TILES TO BE REPLACED WITH NEW. [5] NEW BASE BOARD HEATER REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS. [6] REFER TO SPECIFICATION SECTION 10 95 00 MISCELLANEOUS SPECIALTIES. [7] RADIATOR COVERS TO BE REFINISHED REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS.
177	**CLASSROOM**	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	PT-1	[2] PT-2	PT-1	-	[4] EX. ACT	MEL-1	SS-1	
178	**CLASSROOM**	EX. VCT	[1] VCT-3	RB-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	PT-1	[2] PT-2	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
180	**CLASSROOM**	EX. VCT	[1] VCT-3	RB-1	PT-1	-	PT-1	[5] BASE BOARD HEATER	PT-1	[3] CT-1	PT-1	[2] PT-2	[4] EX. ACT	MEL-1	SS-1	
181	**CLASSROOM**	EX. VCT	[1] VCT-3	RB-1	PT-1	[3] CT-1	PT-1	[5] BASE BOARD HEATER	PT-1	-	PT-1	[2] PT-2	[4] EX. ACT	MEL-1	SS-1	

General Finish Notes:

1. For wall & floor accent locations see Floor finishes plan & Interior Elevations.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. Refer to Specifications and Schedule A for material selection and colours.
4. For Millwork types and locations refer to Floor Plans (A300's), Interior Elevations (A400's) & Millwork Drawings (A500's)

Abbreviations:

ACT	Acoustic Ceiling Tile	**MEL**	Melamine	**PT**	Paint	**SFT**	Safety Sheet Flooring
CT	Ceramic Wall Tile	**PCT**	Porcelain Floor Tile	**GB**	Gypsum Board	**SS**	Solid Surfacing
CP	Control Panel	**PD**	High Density Polyethylene Partitions	**RB**	Rubber Base	**VCT**	Vinyl Flooring
EX.	Existing	**PL**	Plastic Lumber	**RN**	Rubber Nosing	**CONC.**	Concrete

LENNOX ARCHITECTS LIMITED

Schedule B - Room Finish Schedules

Project: Riverside PS Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20004
Date: November 15, 2021

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West			CABINET FINISH	COUNTER FINISH	
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent				
111	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[3] CT-1	PT-1	-	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	[1] VCT ACCENT AT LOCATIONS OF MILLWORK REMOVAL (REFER TO FLOOR PLANS).
112	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[3] CT-1	PT-1	-	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	[2] REPAINT EXISTING CONTROL PANEL.
113	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[3] CT-1	PT-1	[2] PT-3	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	[3] TILE BACKSPLASH AREA AT ALL SINK LOCATIONS (REFER TO ELEVATIONS).
114	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[3] CT-1	PT-1	-	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	[4] EXISTING CEILING TILES TO BE REMOVED AND REPLACED AS REQUIRED TO COMPLETE SERVICE WORK. ANY DAMAGED TILES TO BE REPLACED WITH NEW.
115	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[3] CT-1	PT-1	[2] PT-3	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	[5] SOLID SURFACE WINDOW SILL (REFER TO 1/A512)
117	CLASSROOM	VCT-5	[1] VCT-2	RB-1	PT-1	-	PT-1	[3] CT-1	PT-1	[2] PT-3	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	[6] NEW BASE BOARD HEATER REFER TO MECHANICAL DRAWINGS & SPECIFICATIONS.
118	PREP.ROOM	VCT-2	-	RB-1	PT-1	-	PT-1	-	PT-1	-	PT-1	-	ACT	MEL-1	SS-1	
119	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[3] CT-1	PT-1	-	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	
120	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[3] CT-1	PT-1	-	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	
121	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[3] CT-1	PT-1	[2] PT-3	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	
123	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[5] SS-1	PT-1	[2] PT-3	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
124	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[5] SS-1	PT-1	-	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
131	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[3] CT-1	PT-1	-	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	
132	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[3] CT-1	PT-1	[2] PT-3	PT-1	[5] SS-1	[4] EX. ACT	MEL-1	SS-1	
134	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[5] SS-1	PT-1	[2] PT-3	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
135	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[5] SS-1	PT-1	-	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
136	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[5] SS-1	PT-1	[2] PT-3	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
137	CLASSROOM	VCT-5	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[5] SS-1	PT-1	-	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
138	CLASSROOM	VCT-5	[1] VCT-2	RB-1	PT-1	-	PT-1	[5] SS-1	PT-1	[2] PT-3	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
140	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	-	PT-1	[5] SS-1	PT-1	[2] PT-3	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
141	CLASSROOM	EX. VCT	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[5] SS-1	PT-1	-	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
142	KINDERGARTEN	VCT-5	[1] VCT-2	RB-1	PT-1	-	PT-1	[5] SS-1 & [6] BASE BOARD HEATER	PT-1	[2] PT-3	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	
147	KINDERGARTEN	VCT-5	[1] VCT-2	RB-1	PT-1	[2] PT-3	PT-1	[5] SS-1 & [6] BASE BOARD HEATER	PT-1	[5] SS-1	PT-1	[3] CT-1	[4] EX. ACT	MEL-1	SS-1	

ROOM		FLOOR			WALLS								CEILING	MILLWORK		REMARKS
					North		East		South		West					
#	Name	Field	Accents	Base	Finish	Accent	Finish	Accent	Finish	Accent	Finish	Accent		CABINET FINISH	COUNTER FINISH	

General Finish Notes:

1. For wall & floor accent locations see Floor finishes plan & Interior Elevations.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. Refer to Specifications and Schedule A for material selection and colours.
4. For Millwork types and locations refer to Floor Plans (A300's), Interior Elevations (A400's) & Millwork Drawings (A500's)

Abbreviations:

ACT	Acoustic Ceiling Tile	**MEL**	Melamine	**PT**	Paint	**SFT**	Safety Sheet Flooring
CT	Ceramic Wall Tile	**PCT**	Porcelain Floor Tile	**GB**	Gypsum Board	**SS**	Solid Surfacing
CP	Control Panel	**PD**	High Density Polyethylene Partitions	**RB**	Rubber Base	**VCT**	Vinyl Flooring
EX.	Existing	**PL**	Plastic Lumber	**RN**	Rubber Nosing	**CONC.**	Concrete

LENNOX ARCHITECTS LIMITED

Schedule C - Accessories

Project: Cardiff ES Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20001
Date: November 15, 2021

ROOM		ACCESSORY TYPE							REMARKS
#	Name	NOT USED	NOT USED	PTD	*PTD	SD	*SD	NOT USED	
106	CLASSROOM				1	1			
107	CLASSROOM			1		1			
109	GYM								
111	CLASSROOM				1	1			
112	CLASSROOM				1		1		
114	CUSTODIAL ROOM								
115	CLASSROOM			1		1			
125	CLASSROOM			1		1			
126	KINDERGARTEN			1	1	1	1		
127	CLASSROOM				1	1			
128	CLASSROOM			1		1			
129	CLASSROOM			1		1			
TOTAL		0	0	6	5	9	2	0	

Accessories Schedule Notes:

1. *And Shaded, means existing accessory relocated by Contractor.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. All new stainless steel accessories to be of **GRADE 316.**
4. Refer to drawing A512 for Accessories mounting heights.

Abbreviations:

PTD	Paper Towel Dispenser	Supplied by owner and installed by contractor
SD	Soap Dispenser	Supplied by owner and installed by contractor

LENNOX ARCHITECTS LIMITED

Schedule C - Accessories

Project: JD Hodgson Door/Screen & Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20002
Date: November 15, 2021

ROOM		ACCESSORY TYPE															REMARKS
#	Name	BR	CCH	GB1	GB2	GB3	GB4	HD	MR	PTD	*PTD	SD	*SD	SB	SF	TPD	
101	FOYER																
101A	VESTIBULE																
102	CONFERENCE ROOM										1		1				
104	CLASSROOM									1		1					
105	CLASSROOM									1		1					
109	CLASSROOM									1		1					
110	CLASSROOM									1		1					
125	STORAGE 125																
129	CLASSROOM									1			1				
130	MUSIC CLASSROOM										1		1				
132	STAFF ROOM										1		1				
136	ADMIN.																
204	P.A.L.S ROOM									2		2					
204A	UNIVERSAL WASHROOM	1	2	1	1	1	2	1	1			2		1	1	1	
206A	STORAGE																
206	ART ROOM										1		1				
208	DAYCARE									1	1	1	1				
208A	WASHROOM								1	1		1				1	
209	CLASSROOM									1		1					
210	CLASSROOM									1		1					
211	CLASSROOM									1		1					
227	CLASSROOM									1		1					
228	CLASSROOM									1		1					
230	MEETING ROOM																
232	CLASSROOM									1		1					
233	CLASSROOM									1		1					
235	CLASSROOM									1		1					
236	CLASSROOM									1		1					
237	CLASSROOM									1		1					
238	CLASSROOM									1		1					
TOTAL		1	2	1	1	1	2	1	2	20	5	21	6	1	1	2	

ROOM		ACCESSORY TYPE														REMARKS
#	Name	BR	CCH	GB1	GB2	GB3	GB4	HD	MR	PTD	*PTD	SD	*SD	SB	SF	TPD	

Accessories Schedule Notes:

1. *And Shaded, means existing accessory relocated by Contractor.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. All new stainless steel accessories to be of **GRADE 316.**
4. Refer to drawing A513 for Accessories mounting heights.

Abbreviations:

BR	Back Rest	Frost 1028: grab rail w/bracket (stainless/white)
CCH	Collapsible Coat Hook	Henkel Safety Hook: Colour to be determined
GB1	610mm Horizontal Grab Bar	Bobrick B6000 Series: 38mm diameter - stainless steel
GB2	760mm x 760mm 'L' Shaped Grab Bar	Bobrick B6000 Series: 38mm diameter - stainless steel
GB3	920mm L Shaped grab bar	Bobrick B6000 Series: 38mm diameter - stainless steel
GB4	760mm Vertical grab bar	Bobrick B6000 Series: 38mm diameter - stainless steel
HD	Hand Dryer	As per electrical drawings and specifications
MR	Mirror	BOBRICK: B-165 Series, 610mmW x 910mm H c/w Tempered Glass Mirror, Nº4 Finish, Stainless Steel Frame (Grade 316)
PTD	Paper Towel Dispenser	Supplied by owner and installed by contractor
SB	Shower Bench	Bobrick B5181: Folding Shower Seat
SD	Soap Dispenser	Supplied by owner and installed by contractor
SF	Shelf	BOBRICK B-295 x 16: Surface Mounted Stainless Steel
TPD	Toilet Paper Dispenser	Supplied by owner and installed by contractor

LENNOX ARCHITECTS LIMITED

Schedule C - Accessories

Project: Monck PS Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20003
Date: November 15, 2021

ROOM		ACCESSORY TYPE							REMARKS
#	Name	NOT USED	NOT USED	PTD	*PTD	SD	*SD	NOT USED	
107	CLASSROOM				2		2		
109	KINDERGARTEN			1	1	1	1		
110	KINDERGARTEN			1	1	1	1		
111	SENIOR LAB.			1	2	2	1		
124	JUNIOR LAB.				2	1	1		
143	CLASSROOM				1		1		
144	CLASSROOM				1		1		
145	CLASSROOM				1		1		
162	CLASSROOM								
163	CLASSROOM								
167	CLASSROOM				1		1		
174	CLASSROOM				1		1		
175	CLASSROOM				1		1		
177	CLASSROOM			1		1			
178	CLASSROOM			1		1			
180	CLASSROOM			1		1			
181	CLASSROOM				1		1		
TOTAL		0	0	6	15	8	13	0	

Accessories Schedule Notes:

1. *And Shaded, means existing accessory relocated by Contractor.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. All new stainless steel accessories to be of **GRADE 316.**
4. Refer to drawing A512 for Accessories mounting heights.

Abbreviations:

PTD	Paper Towel Dispenser	Supplied by owner and installed by contractor
SD	Soap Dispenser	Supplied by owner and installed by contractor

LENNOX ARCHITECTS LIMITED

Schedule C - Accessories

Project: Riverside PS Millwork Renovations
Client: Trillium Lakelands District School Board

Project Number: 20004
Date: November 15, 2021

ROOM		ACCESSORY TYPE							REMARKS
#	Name	NOT USED	NOT USED	PTD	*PTD	SD	*SD	NOT USED	
111	CLASSROOM				1		1		
112	CLASSROOM				1		1		
113	CLASSROOM				1		1		
114	CLASSROOM				1		1		
115	CLASSROOM				1		1		
117	SR. LABORATORY				1		1		
118	PREP.ROOM								
119	CLASSROOM				1		1		
120	CLASSROOM				1		1		
121	CLASSROOM				1		1		
123	CLASSROOM				1		1		
124	CLASSROOM				1		1		
131	CLASSROOM				1		1		
132	CLASSROOM				1		1		
134	CLASSROOM				1		1		
135	CLASSROOM				1		1		
136	CLASSROOM				1		1		
137	JR. LABORATORY				1		1		
138	CLASSROOM				1		1		
140	CLASSROOM				1		1		
141	CLASSROOM				1		1		
142	KINDERGARTEN			1	1	1	1		
147	KINDERGARTEN			1	1	1	1		
TOTAL		0	0	2	22	2	22	0	

Accessories Schedule Notes:

1. *And Shaded, means existing accessory relocated by Contractor.
2. This schedule is to be read in conjunction with, plans, elevations and millwork details.
3. All new stainless steel accessories to be of **GRADE 316.**
4. Refer to drawing A512 for Accessories mounting heights.

Abbreviations:

PTD	Paper Towel Dispenser	Supplied by owner and installed by contractor
SD	Soap Dispenser	Supplied by owner and installed by contractor