P02082 Hess Street ES Ground Floor Corridor Renovation and RTU Replacement

107 Hess Street North, Hamilton, ON

AMRA J
ARCHITECTS INC.

Pages

INTRODUCTORY INFORMATION

Hamilton Wentworth District School Board – RFT Document

Division 01 – General Requirements

Division 02 – Existing Conditions

Division 03 – Concrete (n/a)

Division 04 – Masonry (refer to drawings)

Division 05 – Metals (n/a)

Division 06 – Wood, Plastics, and Composites (n/a)

Division 07 - Thermal and Moisture Protection

Division 08 - Openings

END OF THIS SECTION

1. MTE Designated Substance Audit Report

1. A copy of the following report with respect to the identified portion of the Work is being made available as part of the Bid Documents; files titled as follows:

.1 Titled: Hess Street Elementary School
First Floor Corridor ceiling and Lighting and Gym RTU Replacement

Prepared by: MTE

File No.: 56047-100

Dated: November 29, 2024

No. of Pages: 36

.2 Abatement Specifications (#pages 16)

2. These reports provide detailed descriptions of the assessment criteria, findings, recommendations and limitations with respect to toxic or hazardous materials present at the identified property.

3. The reports, by their nature, cannot reveal all conditions that exist or can occur. Should conditions, in the opinion of the Consultant, be found to vary substantially from the report, changes in the scope of Work will be made, with resulting credits or expenditures to the Contract Price accruing to the Owner.

4. HWDSB Construction School Specific Information Sheet

1. Refer to attached HWDSB Appendix A instructions and information sample sheet, of construction site specific protocols the contractor will be required to follow. (6 pages)

End of Section

Hess Street Elementary School

First Floor Corridor Ceiling and Lighting and Gym RTU Replacement

Designated Substance Audit Report

Project Location:
107 Hess Street North, Hamilton, ON

Prepared for:
Hamilton-Wentworth District School Board
20 Education Court
Hamilton, ON L8N 3L1

Prepared by:
MTE Consultants Inc.
1016 Sutton Drive, Unit A
Burlington, ON L7L 6B8

November 29, 2024

MTE File No.: 56047-100

Engineers, Scientists, Surveyors.

Contents

Appendices

1.0 INTRODUCTION

1.1 Authorization

MTE Consultants Inc. (MTE) was retained by Hamilton-Wentworth District School Board (the Client) to conduct a Designated Substance Audit for the building located at 107 Hess Street North in Hamilton, Ontario.

The purpose of the audit was to identify the presence of Designated Substances within the building in accordance with Section 30 of the Occupational Health & Safety Act (OHSA), in advance of a corridor lighting and roof top RTU replacement. This report meets the requirements of Section 30 of the OHSA and the requirements of Ontario Regulation (O. Reg.) 278/05.

2.0 SCOPE OF WORK

As requested by the Client, this assessment was limited to the following areas:

- Lobby 102
- Corridor 106
- Office 107
- Office 108
- Corridor 109
- Classroom 112
- Roof above the Gymnasium

These areas, as depicted in Appendix C, are referred to in the following sections as the “Subject Areas”.

The Scope of Work for this assessment was completed by MTE and included the following activities:

- Review of existing or historical reports and documentation pertaining to Designated Substances within the building;
- Visual inspection of accessible locations within the Subject Area to identify the following suspect Designated Substances and Hazardous Building Materials:
    - Asbestos;
    - Lead;
    - Mercury;
    - Silica;
    - Mould growth;
    - Ozone Depleting Substances; and,
    - Polychlorinated Biphenyls limited to fluorescent light ballasts;
- The following Designated Substances are not expected to be present due to the building use or in a form that is hazardous: Acrylonitrile, Arsenic, Benzene, Coke Oven Emissions, Ethylene Oxide, Isocyanates, and Vinyl Chloride;
- Collection of bulk building material samples suspected to contain asbestos;
- Collection of paint scrape samples suspected to contain lead;
- Submission of samples to an accredited and/or qualified laboratory;

- Interpretation of laboratory results; and,
- Preparation of this report of findings and recommendations.

3.0 METHODOLOGY AND ASSESSMENT CRITERIA

This audit was conducted using visual and laboratory identification methods for the assessment of materials outlined in Section 2.0 and their corresponding location and use. Materials that are determined to be asbestos-containing materials (ACM) are further classified by their friability and condition. The areas outlined in Section 2.0 were inspected and limited to building components, materials and service connections. Notwithstanding that reasonable attempts were made to identify all Designated Substances, the possibility of concealed substances and material exists and may not become visible until substantial demolition has occurred and therefore are currently undocumented. All work was conducted in accordance with industry accepted methods and MTE Standard Operating Procedures and did not include the following:

- Materials indicated in this report as “Potentially Concealed”;
- Locations that may be hazardous to the surveyor (located at heights, electrical equipment, confined spaces);
- Where invasive inspection could cause consequential damage to the property or impair the integrity of the equipment, such as exterior finishes, underground services or components of mechanical equipment;
- Locations concealed by building finishes that require substantial demolition or removal for access or determination of quantities (plumbing or electrical lines);
- Non-permanent items or personal contents, furnishings; and,
- Settled dust or airborne agents unless otherwise stated.

4.0 ASSESSMENT AND RESULTS

An inspection of the building was conducted by MTE on October 17, 2024.

A description of the building and assessed finishes is provided below. Refer to Section 4.1 for a summary of findings.

Building Element	Description
Exterior Finishes	Sealants Flat roof system
Building Structure	Structural steel Concrete block
Mechanical Systems/Insulations	Boiler heating Roof mounted central air conditioning
	Fibreglass insulation on pipe straights
Electrical/Plumbing Systems	Fluorescent Light tubes
Floor Finishes	Vinyl floor tiles Terrazzo
Wall Finishes	Concrete Block
Ceiling Finishes	2’ x 4’ Small Dimple Random Pinhole ceiling tiles 2’ x 4’ Large Fissure Random Pinhole ceiling tiles 2’ x 4’ Small Fissure Random Pinhole ceiling tiles (04/11/22 Date Stamp)

4.1 Findings and Analytical Results

A summary of sampling locations and analytical results are included in **Appendix A**.

Laboratory certificates of analysis are included in **Appendix B**.

Figures of inspected areas are included in **Appendix C**.

A Photographic Log is included in **Appendix D.**

A detailed summary of findings and recommended actions is provided in **Table 4.3 of Appendix A.**

4.1.1 Asbestos

Asbestos was used in building materials throughout the years with a peak usage in the 1950s and 1960s. While the manufacture of most ACM was banned in the 1970s, buildings constructed in the 1980s have the potential for ACM as well. In 1986, legislation limiting the use of asbestos in consumer products was introduced.

As part of this inspection, a total of 26 bulk samples of suspect ACM were submitted for asbestos analysis with a total of 30 analyses being performed. The difference between the number of samples submitted and the number of samples analysed can be a function of either the stop-positive method or the requirement of analyzing multiple layers, performed by the laboratory, from a single sample reported as additional samples or subsets of a sample.

Bulk samples were submitted for asbestos analysis to Paracel Laboratories Ltd. (Paracel), in Mississauga, Ontario. Paracel is certified under the Canadian Association of Laboratory Accreditation to perform asbestos analysis of bulk samples (accreditation number A3762). Laboratory analysis was conducted in accordance with the United States Environmental Protection Agency (USEPA), Test Method EPA/600-R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, June, 1993 by Polarized Light Microscopy (PLM) as prescribed by O. Reg. 278/05.

Based on the laboratory results and visual identification, ACM was confirmed present at the time of the inspection. In addition, suspect ACM was either observed or may potentially be concealed by building finishes.

4.1.2 Lead

Lead was historically used in mortar pigments, ceramic glazing; plumbing solder, electrical equipment and electronics solder, in pipe gaskets as packing in cast iron bell and spigot joints of sanitary drains, flexible plumbing connections, flashing panels, acoustical dampeners, phone cable casing and some architectural applications. In buildings constructed after 1990, these applications are no longer applicable outside of specialized uses (shielding for medical imaging etc.).

As part of this inspection, a total of 2 paint scrape samples were collected from surfaces and represent the paint colours observed throughout the Subject Areas.

Samples were submitted for laboratory analysis by ASTM D3335-85A “Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry” following MOE Method E3470 Inductively Coupled Plasma Optical Emission Spectrometry to Paracel Laboratories Ltd., in Ottawa, Ontario. Paracel is accredited by the Canadian Association of Laboratory Accreditation to perform bulk lead analysis of paint.

Based on the laboratory results and visual identification, no lead-containing materials were confirmed present at the time of the inspection; however, lead-containing solder on copper pipe connections or lead pipe gaskets may potentially be concealed in buried lines or wall cavities.

4.1.3 Mercury

Mercury is typically used in building service applications such as fluorescent light tubes, compact fluorescent bulbs, metal halide (sodium halide) lamp bulbs, and neon lights as a vapour. Mercury may exist in thermostats and pipe or mechanical equipment thermometers as a liquid. Mercury is presumed to be present in the above materials.

Mercury-containing materials were visually identified at the time of the inspection.

4.1.4 Silica

Silica is present in rock, stone, soil, and sand. Masonry products such as concrete block, brick, and mortar, as well as concrete and associated products contain silica. Due to its ubiquitous nature, silica was historically used in a wide variety of building materials and is still used today in new construction.

Building materials that are presumed to contain silica were visually identified at the time of the inspection.

4.1.5 Mould

No water damaged or mould growth impacted building materials were observed during the inspection.

4.1.6 Polychlorinated Biphenyls (PCB)

Suspect PCB-containing light ballasts were visually identified during the inspection. All live electrical equipment that could not be properly and safely de-energized was not assessed, therefore light ballasts were not inspected. Light ballasts which were not accessed, will require additional investigation to determine their PCB content when removed from service.

4.1.7 Ozone-Depleting Substances (ODS)

ODS are chemical compounds that include chlorofluorocarbons (cfcs), hydrochlorofluorocarbons (hcfcs), halons, methyl bromide, carbon tetrachloride, hydrobromofluorocarbons, chlorobromomethane, and methyl chloroform which are widely used in cooling and refrigeration. The use of ODS is regulated under Ontario Regulation 463/10 *Ozone Depleting Substances and Other Halocarbons* Made under the Environmental Protection Act.

Building components presumed to contain ODS were identified at the time of the inspection.

4.2 Conclusions and Recommendations

A detailed summary of recommended actions is provided in **Table 4.3 of Appendix A**.

In accordance with Section 30 of OHSA and Section 8 of O. Reg. 278/05, the Owner must provide a copy of this report to all contractors doing work at the building. The Owner must also provide a copy of this report to all prospective contractors.

Should any additional suspect Designated Substances be discovered during building renovation demolition, work in the vicinity should cease and the materials should not be disturbed until

proper notification, testing and abatement instructions are provided. All waste generated as a result of any and all work at the Site must be handled, transported and disposed of in accordance with Ontario Regulation 347 made under the Environmental Protection Act and local by-laws. Based on the assessment findings and analytical results, the following abatement measures are presented. It should be noted that the recommended actions are the minimum required actions, as prescribed by the appropriate Acts, regulations, guidelines, standards, codes and general best practice measures.

4.2.1 Asbestos

ACMs were identified during the assessment. If these materials, including those deemed or suspected, will be disturbed, or will likely be disturbed, during building maintenance, renovations, construction, or demolition activities, they must be handled and disposed of in accordance with the procedures prescribed by O. Reg. 278/05.

All asbestos work must be conducted by contractors who are trained in the type of asbestos operations required, and should be overseen by a qualified third party Health, Safety and Environmental professional. In order to conduct Type 3 asbestos operations, contractors must be certified as Asbestos Abatement Workers AAW (Trade code 253W) and Asbestos Abatement Supervisors AAS (Trade code 253S) by The Ministry of Training, Colleges and Universities (Ministry of Advanced Education and Skills Development) as prescribed by Section 20 of O. Reg. 278/05. Suspect or visually confirmed ACM must be deemed to be asbestos-containing and treated as if they contain a type of asbestos other than Chrysotile.

ACM may be present in concealed locations and if construction, renovation, alteration, or maintenance activities are planned, invasive inspections of concealed locations for potential ACM must be performed prior to such activities.

Should any suspect ACM be discovered during the course of construction, renovation, alteration, or maintenance activities, work which disturbs the material must cease immediately. Suspect ACM must be treated as asbestos-containing or sampled prior to disturbance to assess the presence of asbestos.

4.2.2 Lead

No lead-containing materials were confirmed present during the assessment, however, low level lead-containing paint is present and the following general procedures are recommended as a precautionary measure as per the Environmental Abatement Council of Canada's (EACC) *Lead Guideline for Construction, Renovation, Maintenance or Repair (October 2014)*:

- General dust control;
- The washing of hands and face at on-site facilities;
- No smoking, eating, chewing gum or drinking in the work area; and,
- No removal of painted surfaces by means of abrasive blasting.

4.2.3 Mercury

Mercury-containing materials were identified. All mercury containing materials or sources should be removed, intact, prior to any work which may disturb or damage them and cause worker exposure to mercury liquid and/or vapour.

On-site crushing of mercury-containing materials should not occur. Care should be taken to ensure safe storage of the above until recycling or disposal can be coordinated. Under current

legislation, mercury waste requires handling and disposal in accordance with Ontario Regulation 490/09 of the OHSA and Ontario Regulation 347 of the Environmental Protection Act.

4.2.4 Silica

Silica is presumed to be present; therefore, special requirements for management and handing are required. The contractor should also consult MOL Occupational Health and Safety Branch's Guideline: *Silica on Construction Projects* (April 2011) for the procedures and methods required to remove and dispose of silica-containing materials.

4.2.5 Mould

No water damage or suspect mould growth was observed during the assessment therefore no special management and handling requirements are warranted.

4.2.6 Polychlorinated Biphenyls (PCB)

Suspect PCB-containing fluorescent light ballasts were identified but could not be conclusively classified as PCB-containing or non-PCB-containing.

It is the responsibility of the owner to inspect, or ensure the inspection of all light ballasts as they are removed from service to make certain they are properly classified as PCB-containing or non-PCB containing. Fixtures will require dismantling to access date stamps (located on the back of the ballast) in order to be correctly classified in accordance with Environment Canada's document "*Identification of Lamp Ballasts Containing PCBs, Report EPS 2/CC/2 (revised), August 1991"*.

Statutory Orders and Regulations (SOR)/2008-273, the *PCB Regulations*, made under the *Canadian Environmental Protection Act,* permits continued use of in-service PCB-containing light ballasts until the end of service life or until December 31, 2025.

4.2.7 Ozone Depleting Substances (ODS)

Building components presumed to contain ODS were identified and special requirements for management, handing and disposal by the owner, constructor, contractor, sub-contractors and workers apply.

Under current legislation, there are no requirements to remove ODSs from service simply because they are present. However, prior to commencing any work where this equipment will be dismantled, destroyed or disposed of, the refrigerant must be drained by a licensed technician and tagged with a notice indicating that the equipment no longer contains refrigerant. The appropriate notices or records shall be maintained in accordance with O. Reg. 463/10 for a minimum of two (2) years and shall include, but not be limited to, service records, transfers/releases of refrigerants, refrigerant types and refrigerant systems.

5.0 LIMITATIONS

Services performed by **MTE Consultants Inc.** (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering & Consulting profession. No other representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of MTE and the Client. It was completed in accordance with the approved Scope of Work referred to in Section 2.0. As such, this report may not deal with all issues potentially applicable to the site and may omit issues that are or may be of interest to the reader. MTE makes no representation that the present report has dealt with all-important environmental features, except as provided in the Scope of Work. All findings and conclusions presented in this report are based on site conditions, as they existed during the time period of the investigation. This report is not intended to be exhaustive in scope or to imply a risk-free facility.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based upon this report. Others with interest in the site should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time might affect the views, conclusions and recommendations (if any) provided in this report because environmental conditions of a property can change. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may re-assess the contents of this report.

All of which is respectfully submitted,

MTE Consultants Inc.

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Appendix A

Tables

TABLE 4.1: BULK ASBESTOS SAMPLE SUMMARY TABLE				
Sample #	**Location**	**Material Description**	**Asbestos Results (% Type)**	**Is Material ACM**
S01A	ROOF	RTU MECHANICAL SEALANT	ND	NO
S01B	ROOF	RTU MECHANICAL SEALANT	ND	NO
S01C	ROOF	RTU MECHANICAL SEALANT	ND	NO
S02A	**SAMPLED IN CORRIDOR 109 (ALSO OBSERVED WITHIN CORRIDOR 106, OFFICES 107/108 AND CLASSROOM 112)**	**2'X4' CEILING TILE - SMALL DIMPLE RANDOM PINHOLE**	**4% AMOSITE** **1% CHRYSOTILE**	**YES**
S02B	**SAMPLED IN CORRIDOR 109 (ALSO OBSERVED WITHIN CORRIDOR 106, OFFICES 107/108 AND CLASSROOM 112)**	**2'X4' CEILING TILE - SMALL DIMPLE RANDOM PINHOLE**	**NA**	**YES**
S02C	**SAMPLED IN CORRIDOR 109 (ALSO OBSERVED WITHIN CORRIDOR 106, OFFICES 107/108 AND CLASSROOM 112)**	**2'X4' CEILING TILE - SMALL DIMPLE RANDOM PINHOLE**	**NA**	**YES**
S03A	ROOM 112	12"X12" VINYL FLOOR TILE - GREY WITH BROWN FLECK	ND	NO
S03B	ROOM 112	12"X12" VINYL FLOOR TILE - GREY WITH BROWN FLECK	ND	NO
S03C	ROOM 112	12"X12" VINYL FLOOR TILE - GREY WITH BROWN FLECK	ND	NO
S04A	SAMPLED IN CORRIDOR 109 (ALSO OBSERVED THROUGHOUT INTERIOR)	CONCRETE BLOCK MORTAR	ND	NO
S04B	SAMPLED IN CORRIDOR 109 (ALSO OBSERVED THROUGHOUT INTERIOR)	CONCRETE BLOCK MORTAR	ND	NO
S04C	SAMPLED IN CORRIDOR 109 (ALSO OBSERVED THROUGHOUT INTERIOR)	CONCRETE BLOCK MORTAR	ND	NO
S04D	SAMPLED IN CORRIDOR 109 (ALSO OBSERVED THROUGHOUT INTERIOR)	CONCRETE BLOCK MORTAR	ND	NO
S04E	SAMPLED IN CORRIDOR 109 (ALSO OBSERVED THROUGHOUT INTERIOR)	CONCRETE BLOCK MORTAR	ND	NO
S05A	ROOM 112	2'X4' CEILING TILE - LARGE FISSURE RANDOM PINHOLE (ROOM 112 IS A MIXUTRE OF THESE TILES AND THE ASBESTOS TILES SAMPLED IN S02)	ND	NO
S05B	ROOM 112	2'X4' CEILING TILE - LARGE FISSURE RANDOM PINHOLE (ROOM 112 IS A MIXUTRE OF THESE TILES AND THE ASBESTOS TILES SAMPLED IN S02)	ND	NO
S05C	ROOM 112	2'X4' CEILING TILE - LARGE FISSURE RANDOM PINHOLE (ROOM 112 IS A MIXUTRE OF THESE TILES AND THE ASBESTOS TILES SAMPLED IN S02)	ND	NO
S06A	SAMPLED IN CLASSROOM 112 (ALSO OBSERVED THROUGHOUT INTERIOR)	BLACK VINYL BASEBOARD	ND	NO
		MASTIC	ND	NO
S06B	SAMPLED IN CLASSROOM 112 (ALSO OBSERVED THROUGHOUT INTERIOR)	BLACK VINYL BASEBOARD	ND	NO
		MASTIC	ND	NO

TABLE 4.1: BULK ASBESTOS SAMPLE SUMMARY TABLE				
Sample #	**Location**	**Material Description**	**Asbestos Results (% Type)**	**Is Material ACM**
S06C	SAMPLED IN CLASSROOM 112 (ALSO OBSERVED THROUGHOUT INTERIOR)	BLACK VINYL BASEBOARD	ND	NO
		MASTIC	ND	NO
S07A	ROOF	MEMBRANE	ND	NO
S07B	ROOF	MEMBRANE	ND	NO
S07C	ROOF	MEMBRANE	ND	NO
S08A	**SAMPLED IN OFFICE 107 (ALSO OBSERVED THROUGHOUT LOBBY 102, CORRIDOR 106, OFFICE 108 AND CORRIDOR 109)**	**12"X12" VINYL FLOOR TILE - GREY WITH DARK GREY STREAKS**	**2% CHRYSOTILE**	**YES**
		MASTIC	ND	NO
S08B	**SAMPLED IN OFFICE 107 (ALSO OBSERVED THROUGHOUT LOBBY 102, CORRIDOR 106, OFFICE 108 AND CORRIDOR 109)**	**12"X12" VINYL FLOOR TILE - GREY WITH DARK GREY STREAKS**	**NA**	**YES**
		MASTIC	ND	NO
S08C	**SAMPLED IN OFFICE 107 (ALSO OBSERVED THROUGHOUT LOBBY 102, CORRIDOR 106, OFFICE 108 AND CORRIDOR 109)**	**12"X12" VINYL FLOOR TILE - GREY WITH DARK GREY STREAKS**	**NA**	**YES**
		MASTIC	ND	NO

NA: Not Analyzed due to stop positive method **ND**: No asbestos fibres detected above the laboratory minimum detection limit

A bulk material sample containing 0.5% or more asbestos therefore establishes that material as asbestos-containing. In accordance with Table 1 of O. Reg. 278/05, a minimum number of samples for the material to be classified as non asbestos. A homogeneous material is defined by O. Reg. 278/05 “as material that is uniform in colour and texture”. Homogeneous samples are identified by an alphabetical suffix to sample names to represent multiple samples of a homogeneous material. When a homogeneous material is analysed it is determined to be asbestos-containing upon the first positive detection of asbestos equal to or greater than 0.5%. Subsequent samples of the same material are therefore not analysed. Some bulk samples are comprised of multiple layers and as such will require multiple analysis. In such cases each layer is isolated at the laboratory and analysed individually to determine asbestos content. As a result the laboratory may report additional samples beyond the submitted number of samples or include multiple analyses as subsets within a sample.

TABLE 4.2: LEAD IN PAINT SAMPLE SUMMARY TABLE					
Sample #	**Location**	**Colour**	**Material**	**Lead Content (ug/g)**	**Classification**
LP1	ROOM 112	YELLOW	WALL	9	LOW LEVEL LEAD-CONTAINING
LP2	SAMPLED IN CORRIDOR 109 (ALSO OBSERVED THROUGHOUT INTERIOR)	WHITE	WALL	10	LOW LEVEL LEAD-CONTAINING

"<": The samples analysed reported concentrations of lead to be less than 1000 ug/g and are therefore classified as low level lead-containing. However, no lead concentrations were reported above the sample specific laboratory detection limit.

As outlined in EACO's Lead Guideline for Construction, Renovation, Maintenance or Repair (October 2014), for the purpose of classifying surface coatings and mortars by laboratory analysis, any material containing lead at a concentration:

- Greater than 0.5% by weight (5,000 µg/g, mg/kg, ppm) is considered lead-based;
- Between 0.1 % and 0.5% by weight (1,000 to 5,000 µg/g, mg/kg, ppm) is considered lead-containing; or
- Less than 0.1% (1,000 µg/g, mg/kg, ppm) is considered low level lead-containing.

Table 4.3 - Summary of Designated Substances and Recommended Actions				
107 Hess street North, Hamilton, Ontario				
Material	**Location(s)**	**Material Description**	**Management Requirements If No Impacts to Material**	**Recommended Actions If Material Will Be Or Likely Be Impacted By Maintenance, Renovation, Construction or Demolition Activities**
Asbestos Non-Friable	Throughout Lobby 102, Corridor 106, Office 107, Office 108 and Corridor 109	12"x12" Grey with Dark Grey Floor Tile	In place management in accordance with O. Reg. 278/05	Removal in accordance with O. Reg. 278/05 as a Type 1 Operation
Asbestos Non-Friable	Throughout Corridor 106, Office 107, Office 108, Corridor 109 and Classroom 112	2'x4' Small Dimple Random Pinhole Ceiling Tiles	In place management in accordance with O. Reg. 278/05	Removal in accordance with O. Reg. 278/05 <7.5 m^2 as a Type1 Operation and for >7.5 m^2 as a Type 2 Operation
Low Level Lead-Containing Paint	Room 122	Yellow Paint on Walls	None	General hygiene procedures during renovation activities: • General dust control, • Washing of hands and face at on-site facilities, • No smoking, eating, chewing gum or drinking in the work area, • No abrasive blasting.
	Throughout Interior Corridor	White Paint on Walls		
Potentialyl Concealed Lead	Throughout Interior of Building on Plumbing Connections	Lead Solder on Copper Pipe	In place management in accordance with EACC's Lead Guideline	Removal prior to renovation/demolition activities in accordance with EACC's Lead Guideline as a: Class 1 Operation

Table 4.3 - Summary of Designated Substances and Recommended Actions				
107 Hess street North, Hamilton, Ontario				
Material	**Location(s)**	**Material Description**	**Management Requirements If No Impacts to Material**	**Recommended Actions If Material Will Be Or Likely Be Impacted By Maintenance, Renovation, Construction or Demolition Activities**
Potentially Concealed Lead	Concealed on Sanitary/Waste Lines	Lead Packed Pipe Gaskets	None	Invasive inspection prior to renovation or demolition activities. If confirmed present, removal in accordance with EACC's Lead Guideline as a: Class 1 Operation
Mercury	Throughout Interior of Building in Light Fixtures	Fluorescent Light Tubes in Light Fixtures	None	Intact removal and storage with no on-site crushing and disposal of materials to a licensed facility
Silica	Throughout Interior and Exterior of Building	Concret, Concrete Block, Terrazzo and Other Masonry Materials	None	Conduct any work during renovation, demolition activities in accordance with the Ministry of Labour Guideline Silica on Construction Projects
Potentially Concealed PCBs	Light Fixtures Throughout	Fluorescent Light Ballasts in Light Fixtures	SOR/2008-273, the PCB Regulations, permits continued use of in-service PCB-containing light ballasts until the end of service life or until December 31, 2025	Assess Each Ballast Upon Removal From Service Appropriate storage and disposal of any PCB-containing ballasts in accordance with SOR/2008-273
ODS	Roof	Rooftop Air Conditioning Unit(s)	None	Prior to the removal and disposal of equipment suspected of containing ODS, a licensed technician should be retained to drain and tag the equipment in a manner authorized under O. Reg. 463/10

Notes:
1) A copy of this report should be provided to all prospective contractors prior to quotation, in accordance with Section 30 of the Occupational Health and Safety Act.
2) Recommended actions are the minimum required actions, as prescribed by the appropriate Acts, regulations, guidelines, standards, codes and general best practice measures. Prior to demolition, the Contractor may choose to alter the approach and combine or break out sections of work. This is acceptable provided that the appropriate Acts, regulations, guidelines, standards and codes are followed and afford protection for the health and safety of workers, occupants and the public that is at least equal to the protection that would be provided by complying with the minimum requirements.
3) All waste generated is subject to characterization and disposal in accordance with Ontario Regulation 347.

Appendix B

Laboratory Certificates of Analysis

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

15 - 6800 Kitimat Rd
Mississauga, ON, L5N 5M1
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

MTE Consultants Inc. (Burlington)

1016 Sutton Drive, Unit A
Burlington, ON L7L 6B8
Attn: Gavin Oakes

Client PO:
Project: 56047-100 - Hess ES Corridor Lighting and RTU DSA
Custody:

Report Date: 28-Oct-2024
Order Date: 22-Oct-2024

Order #: 2443116

This Certificate of Analysis contains analytical data applicable to the following samples as submitted :

Paracel ID	Client ID
2443116-01	S01A - RTU Mech Sealant
2443116-02	S01B - RTU Mech Sealant
2443116-03	S01C - RTU Mech Sealant
2443116-04	S02A - 2x4 CT - Small Dimple Random Pinhole
2443116-05	S02B - 2x4 CT - Small Dimple Random Pinhole
2443116-06	S02C - 2x4 CT - Small Dimple Random Pinhole
2443116-07	S03A - 12x12 VFT - Grey w/ Brown Fleck - Room 112
2443116-08	S03B - 12x12 VFT - Grey w/ Brown Fleck - Room 112
2443116-09	S03C - 12x12 VFT - Grey w/ Brown Fleck - Room 112
2443116-10	S04A - Interior Concrete Block Mortar
2443116-11	S04B - Interior Concrete Block Mortar
2443116-12	S04C - Interior Concrete Block Mortar
2443116-13	S04D - Interior Concrete Block Mortar
2443116-14	S04E - Interior Concrete Block Mortar
2443116-15	S05A - 2x4 CT - Large Fissure Random Pinhole
2443116-16	S05B - 2x4 CT - Large Fissure Random Pinhole
2443116-17	S05C - 2x4 CT - Large Fissure Random Pinhole
2443116-18.1	S06A - Black Vinyl Wall Trim
2443116-18.2	S06A - Black Vinyl Wall Trim
2443116-19.1	S06B - Black Vinyl Wall Trim
2443116-19.2	S06B - Black Vinyl Wall Trim
2443116-20.1	S06C - Black Vinyl Wall Trim
2443116-20.2	S06C - Black Vinyl Wall Trim
2443116-21	S07A - Roof Membrane
2443116-22	S07B - Roof Membrane
2443116-23	S07C - Roof Membrane

Approved By:

Heather S.H. McGregor, BSc

Laboratory Director - Microbiology

Certificate of Analysis

Report Date: 28-Oct-2024

Client: MTE Consultants Inc. (Burlington)

Order Date: 22-Oct-2024

Client PO:

Project Description: 56047-100 - Hess ES Corridor Lighting and RTU DSA

2443116-24.1	S08A - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office
2443116-24.2	S08A - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office
2443116-25.1	S08B - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office
2443116-25.2	S08B - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office
2443116-26.1	S08C - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office
2443116-26.2	S08C - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office

Certificate of Analysis

Report Date: 28-Oct-2024

Client: MTE Consultants Inc. (Burlington)

Order Date: 22-Oct-2024

Client PO:

Project Description: 56047-100 - Hess ES Corridor Lighting and RTU DSA

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
2443116-01	16-Oct-24	Grey	Sealant	No	**Client ID: S01A - RTU Mech Sealant**	
					Non-Fibers	100
2443116-02	16-Oct-24	Grey	Sealant	No	**Client ID: S01B - RTU Mech Sealant**	
					Non-Fibers	100
2443116-03	16-Oct-24	Grey	Sealant	No	**Client ID: S01C - RTU Mech Sealant**	
					Non-Fibers	100
2443116-04	16-Oct-24	Grey	Ceiling Tile	**Yes**	**Client ID: S02A - 2x4 CT - Small Dimple Random Pinhole**	
					Amosite	4
					Chrysotile	1
					Cellulose	40
					MMVF	30
					Non-Fibers	25
2443116-05	16-Oct-24	Grey	Ceiling Tile		**Client ID: S02B - 2x4 CT - Small Dimple Random Pinhole**	
					not analyzed, positive stop	
2443116-06	16-Oct-24	Grey	Ceiling Tile		**Client ID: S02C - 2x4 CT - Small Dimple Random Pinhole**	
					not analyzed, positive stop	
2443116-07	16-Oct-24	Grey	Vinyl Floor Tile	No	**Client ID: S03A - 12x12 VFT - Grey w/ Brown Fleck - Room 112**	
					Non-Fibers	100
2443116-08	16-Oct-24	Grey	Vinyl Floor Tile	No	**Client ID: S03B - 12x12 VFT - Grey w/ Brown Fleck - Room 112**	
					Non-Fibers	100
2443116-09	16-Oct-24	Grey	Vinyl Floor Tile	No	**Client ID: S03C - 12x12 VFT - Grey w/ Brown Fleck - Room 112**	
					Non-Fibers	100
2443116-10	16-Oct-24	Grey	Mortar	No	**Client ID: S04A - Interior Concrete Block Mortar**	
					Non-Fibers	100
2443116-11	16-Oct-24	Grey	Mortar	No	**Client ID: S04B - Interior Concrete Block Mortar**	
					Non-Fibers	100

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
2443116-12	16-Oct-24	Grey	Mortar	No	**Client ID: S04C - Interior Concrete Block Mortar**	
					Non-Fibers	100
2443116-13	16-Oct-24	Grey	Mortar	No	**Client ID: S04D - Interior Concrete Block Mortar**	
					Non-Fibers	100
2443116-14	16-Oct-24	Grey	Mortar	No	**Client ID: S04E - Interior Concrete Block Mortar** [AS-NS-NA, Z-01]	
					Non-Fibers	100
2443116-15	16-Oct-24	Grey	Ceiling Tile	No	**Client ID: S05A - 2x4 CT - Large Fissure Random Pinhole**	
					Cellulose	40
					MMVF	30
					Non-Fibers	30
2443116-16	16-Oct-24	Grey	Ceiling Tile	No	**Client ID: S05B - 2x4 CT - Large Fissure Random Pinhole**	
					Cellulose	40
					MMVF	30
					Non-Fibers	30
2443116-17	16-Oct-24	Grey	Ceiling Tile	No	**Client ID: S05C - 2x4 CT - Large Fissure Random Pinhole**	
					Cellulose	40
					MMVF	30
					Non-Fibers	30
2443116-18.1	16-Oct-24	Black	Vinyl	No	**Client ID: S06A - Black Vinyl Wall Trim**	
					Non-Fibers	100
2443116-18.2	16-Oct-24	Brown	Mastic	No	**Client ID: S06A - Black Vinyl Wall Trim**	
					Non-Fibers	100
2443116-19.1	16-Oct-24	Black	Vinyl	No	**Client ID: S06B - Black Vinyl Wall Trim**	
					Non-Fibers	100
2443116-19.2	16-Oct-24	Brown	Mastic	No	**Client ID: S06B - Black Vinyl Wall Trim**	
					Non-Fibers	100
2443116-20.1	16-Oct-24	Black	Vinyl	No	**Client ID: S06C - Black Vinyl Wall Trim**	
					Non-Fibers	100

Certificate of Analysis

Report Date: 28-Oct-2024

Client: MTE Consultants Inc. (Burlington)

Order Date: 22-Oct-2024

Client PO:

Project Description: 56047-100 - Hess ES Corridor Lighting and RTU DSA

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
2443116-20.2	16-Oct-24	Brown	Mastic	No	**Client ID: S06C - Black Vinyl Wall Trim**	
					Non-Fibers	100
2443116-21	16-Oct-24	Black/Yellow	Roof Membrane	No	**Client ID: S07A - Roof Membrane**	[AS-PRE]
					Cellulose	10
					MMVF	10
					Non-Fibers	80
2443116-22	16-Oct-24	Black	Roof Membrane	No	**Client ID: S07B - Roof Membrane**	[AS-PRE]
					Cellulose	10
					Non-Fibers	90
2443116-23	16-Oct-24	Black	Roof Membrane	No	**Client ID: S07C - Roof Membrane**	[AS-PRE]
					Cellulose	10
					Non-Fibers	90
2443116-24.1	16-Oct-24	Grey	Vinyl Floor Tile	**Yes**	**Client ID: S08A - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office**	
					Chrysotile	2
					Non-Fibers	98
2443116-24.2	16-Oct-24	Black	Mastic	No	**Client ID: S08A - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office**	
					Non-Fibers	100
2443116-25.1	16-Oct-24	Grey	Vinyl Floor Tile		**Client ID: S08B - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office**	
					not analyzed, positive stop	
2443116-25.2	16-Oct-24	Black	Mastic	No	**Client ID: S08B - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office**	
					Non-Fibers	100
2443116-26.1	16-Oct-24	Grey	Vinyl Floor Tile		**Client ID: S08C - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office**	
					not analyzed, positive stop	
2443116-26.2	16-Oct-24	Black	Mastic	No	**Client ID: S08C - 12x12 VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office**	
					Non-Fibers	100

* MMVF: Man Made Vitreous Fibers: Fiberglass, Mineral Wool, Rockwool, Glasswool

**** Analytes in bold indicate asbestos mineral content.**

Certificate of Analysis

Report Date: 28-Oct-2024

Client: MTE Consultants Inc. (Burlington)

Order Date: 22-Oct-2024

Client PO:

Project Description: 56047-100 - Hess ES Corridor Lighting and RTU DSA

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	Lab Accreditation	Analysis Date
Asbestos, PLM Visual Estimation	AppE to SubE of 40CFR Part763 and EPA/600/R-93/116	1 - Mississauga	CALA 3762	22-Oct-24

Mississauga Lab: 15 - 6800 Kitimat Rd Mississauga, Ontario, L5N 5M1

Qualifier Notes

Sample Qualifiers :

AS-NS-NA: No sample submitted, no container or container empty

AS-PRE: Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis

Z-01: Subsample from S04D

Work Order Revisions | Comments

None

PARACEL LABORATORIES LTD.

Paracel ID: 2443116

d Office
2319 St. Laurent Blvd.
wa, Ontario K1G 4J8
800-749-1947
aracel@paracellabs.com

Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: MTE Consultants	Project Reference: 56047-100 - Hess ES Corridor Lighting and RTU DSA
Contact Name: Gavin Oakes; Aaron Rows	Quote #: MTE Standing Offer
Address: 1016 Sutton Drive, Unit A Burlington, ON L7L 6B8	PO #:
Telephone: 905-639-2552	Email Address: goakes@mte85.com arows@mte85.com

Turnaround Time:
☐ Immediate ☐ 1 Day
☐ 4 Hour ☐ 2 Day
☐ 8 Hour ☐ 3 Day
☒ Regular

Date Required: _____

ASBESTOS & MOLD ANALYSIS

Matrix: ☐ Air ☒ Bulk ☐ Tape Lift ☐ Swab ☐ Other **Regulatory Guideline:** ☒ ON ☐ QC ☐ AB ☐ SK ☐ Other:

Analyses: ☐ Microscopic Mold ☐ Culturable Mold ☐ Bacteria GRAM ☐ PCM Asbestos ☒ PLM Asbestos ☐ Chatfield Asbestos ☐ TEM Asbestos

Paracel Order Number: 2443116

	Sample ID	Sampling Date	Air Volume (L)	Analysis Required	Asbestos - Bulk: Identify Distinct Building Materials to Be Analyzed (if not specified, all materials identified will be analyzed) *	Positive Stop?
1	S01 A-C - RTU Mech Sealant	16 Oct 24	-	PLM		☒
2	S02 A-C - 2'x4' CT - Small Dimple Random Pinhole	16 Oct 24	-	PLM		☒
3	S03 A-C - 12"x12" VFT - Grey w/ Brown Fleck - Room 112	16 Oct 24	-	PLM		☒
4	S04 A-E - Interior Concrete Block Mortar	16 Oct 24	-	PLM		☒
5	S05 A-C - 2'x4' CT - Large Fissure Random Pinhole	16 Oct 24	-	PLM		☒
6	S06 A-C - Black Vinyl Wall Trim	16 Oct 24	-	PLM		☒
7	S07 A-C - Roof Membrane	16 Oct 24	-	PLM		☒
8	S08 A-C - 12"x12" VFT - Grey w/ Dark Grey Streaks - Corridor/Main Office	16 Oct 24	-	PLM		☒
9						☒
10						☐
11						☐
12						☐

*** If left blank, all distinct materials identified in the samples will be analyzed and reported separately as per EPA 600/R-93/116. Additional charges will apply.**

Comments:

Method of Delivery: Purolator

Relinquished By (Sign): Aaron Rows	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Aaron Rows			
Date/Time: 21 Oct 24 - 10:30am	Date/Time:	Date/Time: Oct 22/24 9:45	Date/Time: Oct 22 24 9:26

PARACEL LABORATORIES LTD.

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351 Nash Road North, unit 9B
Hamilton, ON L8H 7P4
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

MTE Consultants Inc. (Burlington)

1016 Sutton Drive, Unit A
Burlington, ON L7L 6B8
Attn: Gavin Oakes

Client PO:
Project: 56047-100 - Hess ES Lighting & RTU DSA
Custody:

Report Date: 28-Oct-2024
Order Date: 22-Oct-2024

Order #: 2443124

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2443124-01	LP01 - Yellow - Room 112
2443124-02	LP02 - White - Walls Throughout

Approved By:

Milan Ralitsch, PhD
Senior Technical Manager

Certificate of Analysis

Report Date: 28-Oct-2024

Client: MTE Consultants Inc. (Burlington)

Order Date: 22-Oct-2024

Client PO:

Project Description: 56047-100 - Hess ES Lighting & RTU DSA

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 6020 - Digestion - ICP-MS	25-Oct-24	25-Oct-24

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Certificate of Analysis

Report Date: 28-Oct-2024

Client: MTE Consultants Inc. (Burlington)

Order Date: 22-Oct-2024

Client PO:

Project Description: 56047-100 - Hess ES Lighting & RTU DSA

Sample Results

Lead

Matrix: Paint

Paracel ID	Client ID	Sample Date	Units	MDL	Result
2443124-01	LP01 - Yellow - Room 112	16-Oct-24	ug/g	5	9
2443124-02	LP02 - White - Walls Throughout	16-Oct-24	ug/g	5	10

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	**ND**	**5**	**ug/g**						
Matrix Duplicate									
Lead	**64.6**	**5**	**ug/g**	**73.1**			**12.40**	**50**	
Matrix Spike									
Lead	50.7	5.00	ug/g	ND	95.5	70-130			

PARACEL LABORATORIES LTD.

Paracel ID: 2443124

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2443124	

Client Name: MTE Consultants	Project Ref: 56047-100 - Hess ES Lighting & RTU DSA	Page 1 of 1
Contact Name: Gavin Oakes; Aaron Rows	Quote #: MTE Standing Offer	Turnaround Time
Address: 1016 Sutton Drive, Unit A Burlington, ON L7L 6B8	PO #:	☐ 1 day ☐ 3 day ☐ 2 day ☑ Regular
Telephone: 905-639-2552	E-mail: goakes@mte85.com arows@mte85.com	Date Required:

☐ REG 153/04 ☐ REG 406/19	Other Regulation	Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)	Required Analysis
☐ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO		
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA		
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm		
☐ Table	Mun:		
For RSC: ☐ Yes ☐ No	☐ Other:		

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Lead											
1	LP01 - Yellow - Room 112	P	-	1	16 Oct 24	3:45 pm	X											
2	LP02 - white - walls throughout	P	-	1	16 Oct 24	3:45 pm	X											
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

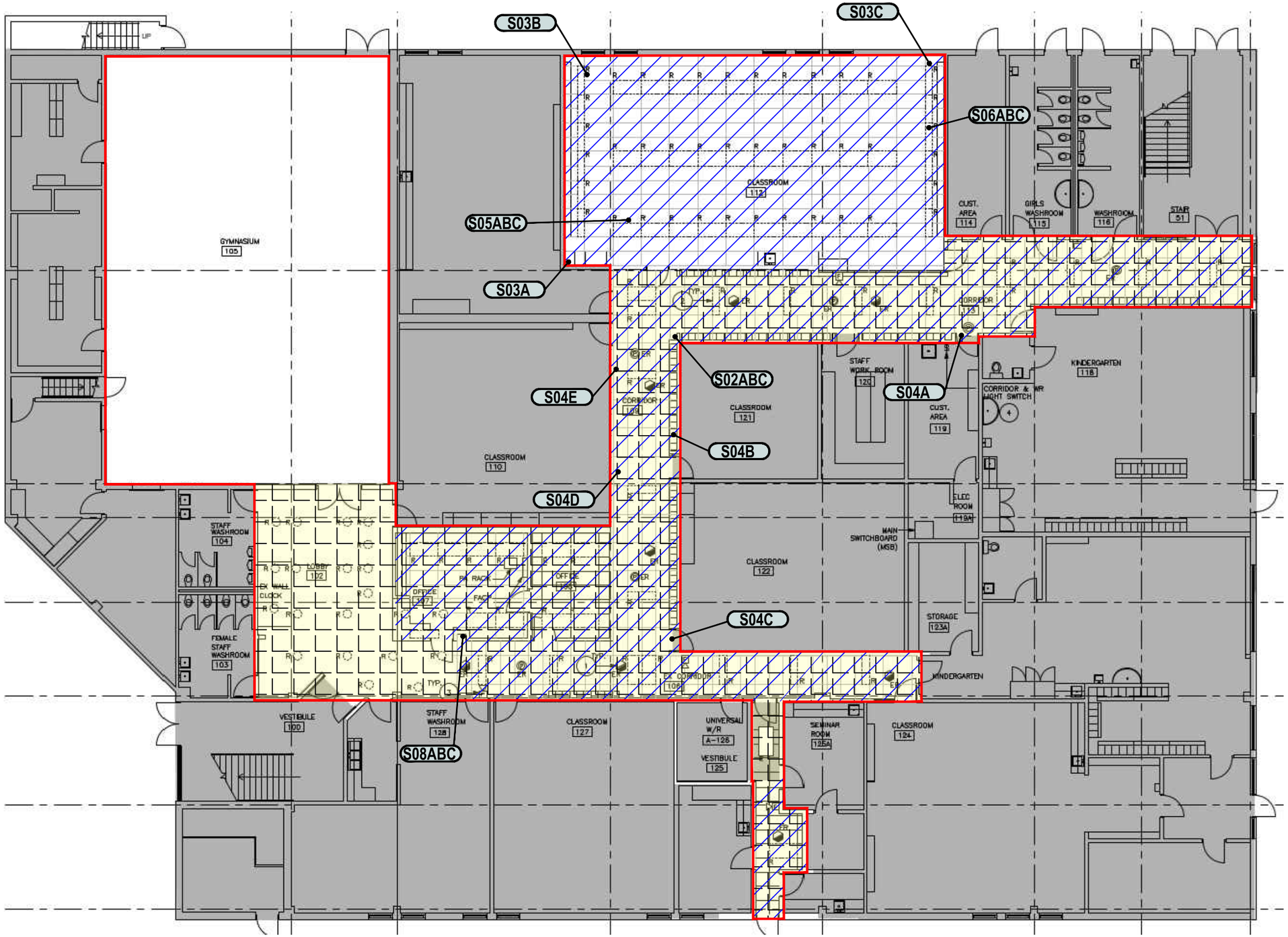
Comments:

Method of Delivery: Purolator

Relinquished By (Sign): Aaron Rows	Received By Driver/Depot:	Received at Lab: dm	Verified By: dm
Relinquished By (Print): Aaron Rows	Date/Time:	Date/Time: 10/22/24 950	Date/Time: 10/22/24 1041
Date/Time: 21 Oct 24 - 10:20am	Temperature: °C	Temperature: -	pH Verified: ☐ By: NR

Appendix C

Figures



Notes:

ALL DRAWINGS TO BE REFERENCED WITH THE DSA REPORT. LOCATIONS AND QUANTITIES ARE APPROXIMATE.

ALL KNOWN OR SUSPECT DESIGNATED SUBSTANCES ARE NOT DEPICTED ON THIS FIGURE. REFER TO THE DSA REPORT FOR A COMPLETE LIST OF IDENTIFIED KNOWN AND SUSPECT DESIGNATED SUBSTANCES.

THIS FIGURE IS COLOUR DEPENDENT, PHOTOCOPIES MAY ALTER INTERPRETATION OF FIGURE. ALWAYS REFER TO ORIGINAL DRAWINGS AND DSA REPORT.

Designated Substances and Hazardous Materials Legend

- S02CD — Sample Identification
- Scope of Work
- ACM Ceiling Tiles
- ACM Vinyl Floor Tiles

MTE
Engineers, Scientists, Surveyors

Ph. (905) 639-2552 www.mte85.com

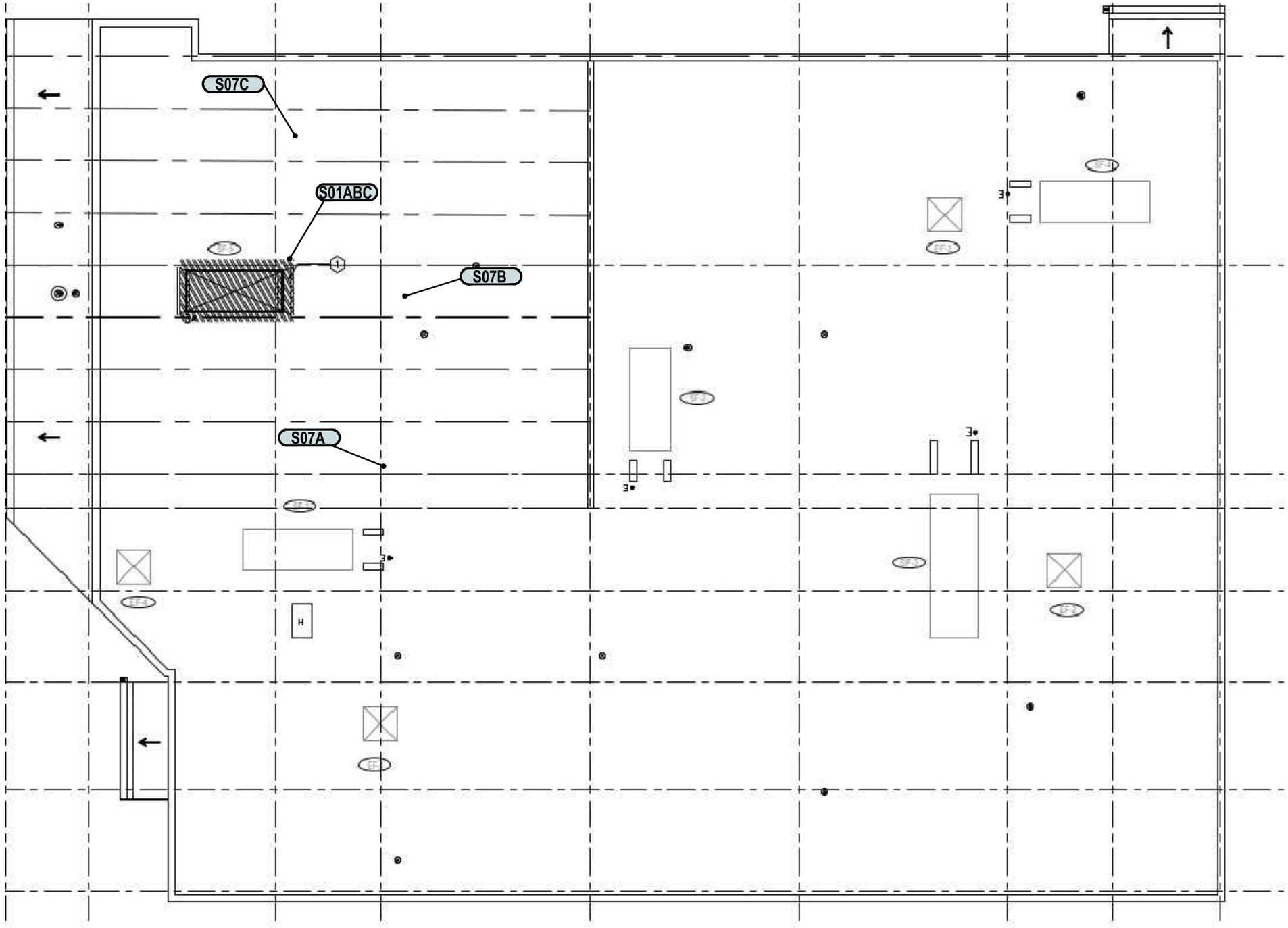
CLIENT
Wentworth District School Board

PROJECT
DESIGNATED SUBSTANCE AUDIT

DRAWING
MAIN FLOOR- HESS STREET ELEMENTARY SCHOOL BOARD
107 HESS STREET NORTH, HAMILTON, ON

Project Manager	G. OAKES	Date	NOVEMBER 2024
Baseplan By	MTE	Project No.	56047-100
Figure By	SXS	Drawing No.	1.0
Scale	N.T.S.		

November 06, 2024 — 12:00 pm — Plotted By: SXS
Project: 56047-100 CAD: P:\P\56047\100\56047-100- DSS.DWG



Notes:

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THIS FIGURE IS COLOUR DEPENDENT, PHOTOCOPIES MAY ALTER INTERPRETATION OF FIGURE. ALWAYS REFER TO ORIGINAL DRAWINGS AND DSA REPORT.

Designated Substances and Hazardous Materials Legend

S02CD — Sample Identification

MTE
Engineers, Scientists, Surveyors

Ph. (905) 639-2552 www.mte85.com

CLIENT
Wentworth District School Board

PROJECT
DESIGNATED SUBSTANCE AUDIT

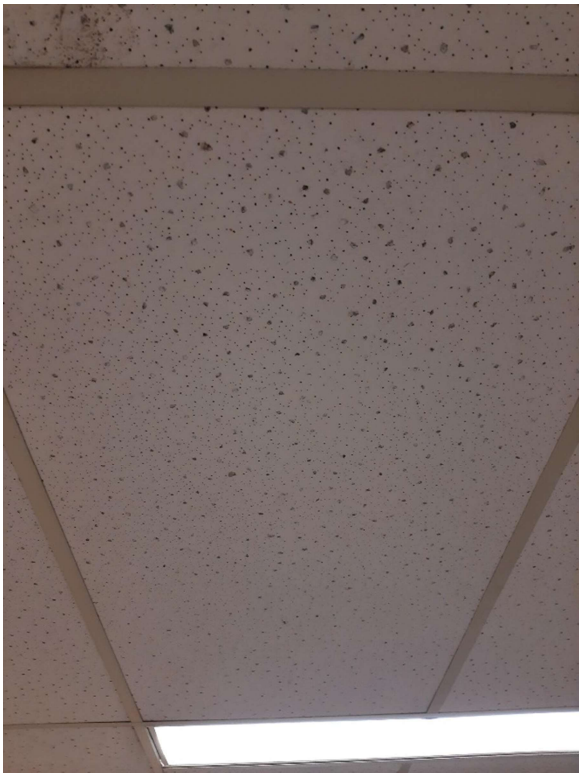
DRAWING
ROOF - HESS STREET ELEMENTARY SCHOOL BOARD 107 HESS STREET NORTH, HAMILTON, ON

Project Manager	G. OAKES	Date	NOVEMBER 2024
Baseplan By	MTE	Project No.	56047-100
Figure By	SXS	Drawing No.	2.0
Scale	N.T.S.		

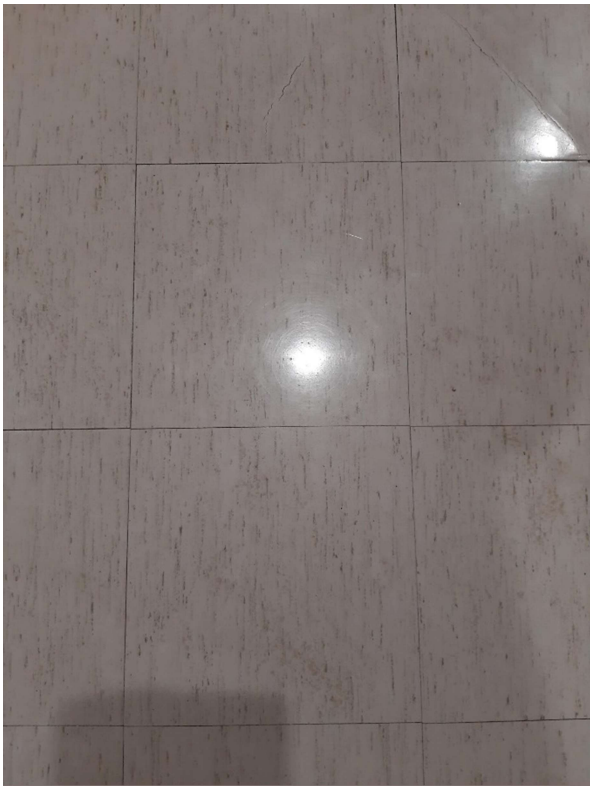
November 06, 2024 — 12:00 pm — Plotted By: SXS
Project: 56047-100 CAD: P:\P\56047\100\56047-100- DSS.DWG

Appendix D

Photographic Log



Photograph No. 1 – 2'x4' Small dimple random pinhole ceiling tiles were observed throughout the interior and sampled (S02A,B,C). The ceiling tiles are asbestos-containing.

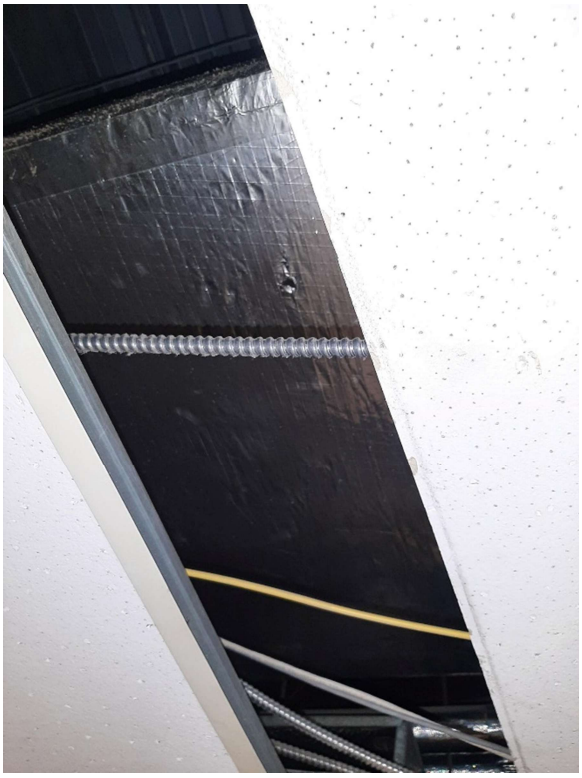


Photograph No. 2 – 12"x12" Grey with dark grey streak vinyl floor tile were observed throughout the main corridor, main office, and principles office. The vinyl floor tiles were sampled (S08A,B,C) and are asbestos-containing; however, the associated mastic is non- asbestos.

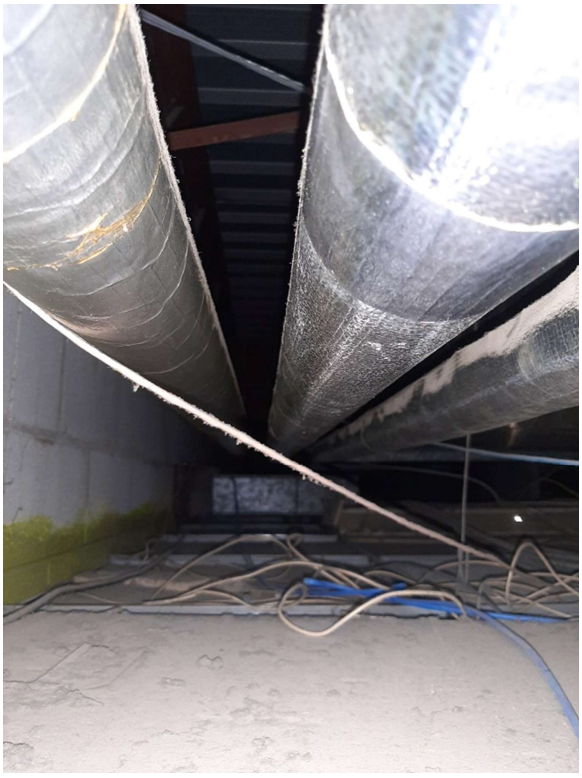
Photograph No. 3 – The roof composition was inspected and consists of a tar membrane, fiberglass insulation and the steel deck. The tar membrane was sampled (SS07A,B,C) and is non-asbestos.

Photograph No. 4 – The mechanical sealant observed on the RTU was sampled (S01A,B,C) and is non-asbestos.

Photograph No. 5 – Roof top air handling unit was observed and may containing ozone depleting refrigerants.



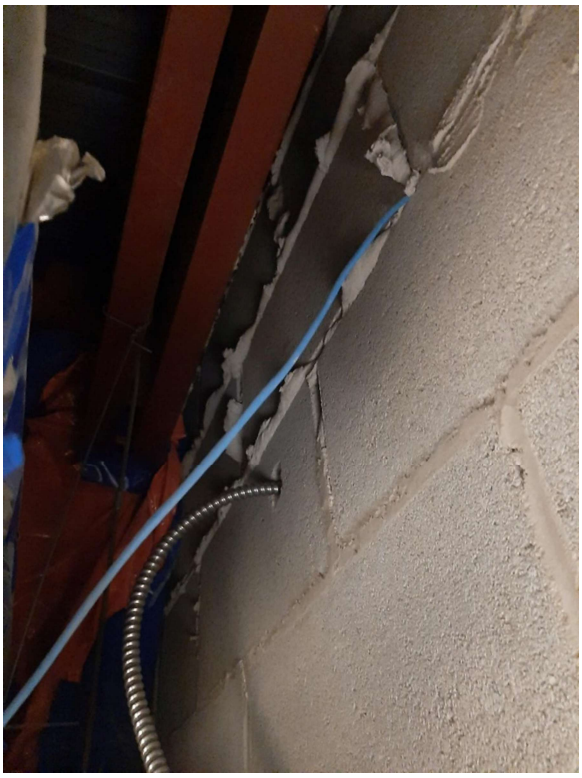
Photograph No. 6 – Fiberglass insulation was observed on duct work above drop ceilings.



Photograph No. 7 – Foil wrapped fiberglass pipe straights were observed above drop ceilings.

Photograph No. 8 – 2'x4' Large fissure random pinhole ceiling tiles were observed in Room 112 and were sampled (S05A,B,C). The ceiling tiles are non-asbestos; however, a mixture of asbestos and non-asbestos tiles are present throughout the room.

Photograph No. 9 – 2'x4' Small fissure random pinhole ceiling tiles were observed in Room 112. These tiles have a 04/02/11 date stamp and are not considered asbestos-containing; however, a mixture of asbestos and non-asbestos tiles are present throughout the room.



Photograph No. 10 – Concrete block mortar was sampled throughout the interior (S04A,B,C,D,E) and is not asbestos-containing.

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

.1 Read this section in conjunction with all other sections so as to conform to Division 1, and the General Requirements of the project.

.2 Inform all sub-trades of the presence of Asbestos Containing Materials identified in the documents.

.3 The Contractor involved directly or indirectly with the removal, handling, management, transportation and disposal of Asbestos Containing Materials and Asbestos Waste in any and all aspects shall take all reasonable precautions, due care and diligence to prevent asbestos from becoming airborne and shall take all reasonable precautions to control and prevent the spread of airborne asbestos in the event of an incident, accidental release or loss of containment. Cost of additional work by the Contractor and/or Consultant to rectify unsatisfactory conditions, shall be charged to the Contractor.

.4 No allowance will be made for any difficulties encountered or any expenses incurred on account of any conditions of the site or any item existing thereon that is visible or known or can be reasonably anticipated.

.5 The Contractor shall be prepared to respond throughout the duration of the project in order to repair, encapsulate remove or otherwise manage additional asbestos as required. The abatement contractor shall provide an emergency contact phone number and be on call to provide emergency services.

.6 The abatement contractor shall control all water migration (including leakage and spillage) from the abatement work area to areas below/adjacent. It is the responsibility of the contractor to protect all items from damage caused by water used in the abatement work area(s). The abatement contractor must immediately mitigate any and all damage to the satisfaction of the owner and Consultant resulting from water used in the abatement work area(s) at their own expense. No allowances shall be made as a result of lost time, resources, materials or equipment.

.7 It is the Contractor’s responsibility to ensure all construction aspects of the project are conducted in accordance with applicable construction safety legislation, regulations and general approved practice. This includes, but is not limited to; all means, methods, techniques, sequences, procedures, safety programs and precautions used.

1.2 DEFINITIONS

.1 Asbestos Containing Material: Materials that contain 0.5 percent or more asbestos by dry weight.

.2 Asbestos Waste: is material that contains asbestos in more than a trivial amount or proportion as defined by Ontario Regulation 347 as amended by Ontario Regulation 558/00 and includes the following:

.1 Solid or liquid waste that results from the removal of asbestos-containing construction or insulation materials and contains asbestos;

.2 Commercial waste and/or domestic waste that contains asbestos;

.3 Non-hazardous solid industrial waste that contains asbestos; and

.4 Materials determined or deemed contaminated with asbestos.

.3 Authorized Visitors: The Consultant or their representative, Architect, Owner's representatives, and persons representing regulatory agencies.

.4 Contractor: Contractors or Sub-Contractor performing work included in this specification.

.5 Consultant: Owner's Representative providing inspection and air monitoring.

MTE Consultants Inc.
1016 Sutton Drive, Unit A, Burlington, Ontario, L7L 6B8
Phone: 905-639-2552 Fax: 905-639-7727
Contact: Gavin Oakes Cell: 905-719-5217

PART 2 – SCOPE OF WORK

2.1 SUMMARY OF MATERIALS

.1 Refer to the following documents regarding Designated Substances within the work areas. The survey and documentation of Designated Substances is required by Section 30 of the Occupational Health and Safety Act and shall be read in conjunction with these specifications.

.1 "*Hess Street Elementary School, First Floor Corridor Ceiling and Lighting and Gym RTU Replacement, Designated Substance Audit Report – 107 Hess Street North, Hamilton, ON*" dated November 29, 2024 prepared by MTE Consultants Inc.

.2 Removal and/or disturbance of asbestos-containing materials shall be performed in accordance with Ontario Regulation 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations.

.3 Removal and/or disturbance of lead-containing materials shall be performed in accordance with the Environmental Abatement Council of Canada's Lead Guideline for Construction, Renovation, Maintenance and Repair (2014)

.4 Removal and/or disturbance of mercury-containing materials shall be performed in a manner which maintains the mercury intact, with no on-site crushing. Following removal, mercury-containing materials shall be safely stored on-Site until the Contractor can safely dispose of the materials at a licensed landfill.

.5 Removal and/or disturbance of silica-containing materials shall be performed in accordance with the Ministry of Labour's Guideline Silica on Construction Projects.

.6 Suspect PCB-containing equipment, including light ballasts, shall be assessed upon removal from service to determine PCB content. If identified as PCB-containing, equipment shall be appropriately stored and disposed of by the Contractor in accordance with SOR 2008-273 - PCB Regulations.

.2 ACM may be present in concealed locations and become apparent during construction, renovation, alteration, or maintenance activities. Should any suspect ACM be discovered during the course of regular construction, renovation, alteration, or maintenance activities,

work should cease and the materials should not be disturbed. Suspect ACM must be treated as asbestos-containing or sampled and proven to not contain asbestos. Any activities that require disturbance of ACM must be performed in accordance with Ontario Regulation 278/05. It is the responsibility of the constructor to provide supervision and training and undertake due care and diligence in situations where such discoveries can and would occur.

.3 Upon discovery of suspect or known ACM not identified or referred to in Section 2.0 or the reports referenced, the constructor shall immediately notify, orally and in writing; an inspector at the office of the Ministry of Labour nearest the workplace, the owner/representative, the Contractor and the joint health and safety committee or the health and safety representative, if any, for the workplace. The written notice shall include the following:

.1 The name and address of the person giving the notice;

.2 The name and address of the owner of the place where the work will be carried out;

.3 The municipal address or other description of the place where the work will be carried out sufficient to permit the inspector to locate the place, including the location with respect to the nearest public highway;

.4 A description of the work that will be carried out;

.5 The starting date of the work that will be carried out; and

.6 The name and address of the supervisor in charge of the work.

.4 No work that is likely to involve handling, dealing with or disturbing or removing the discovered materials shall be done unless it has been determined whether the material is asbestos-containing; or, the work is performed in accordance to Ontario Regulation 278/05 as though the materials were asbestos-containing materials and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than Chrysotile.

2.2 SUMMARY OF MATERIALS

.1 Where required to complete the scope of the proposed renovations, disturbance of Asbestos-Containing Materials shall be performed as follows, in accordance with Ontario Regulation 278/05:

Location	ACM	Asbestos Operation	Notes
Throughout Corridor 106, Office 107, Office 108, Corridor 109 and Classroom 112	2' x 4' Ceiling Tiles Small Dimple Random Pinhole	Type 1	Removal of less than 7.5m^2
		Type 2	Removal of greater than 7.5 m^2
Throughout Lobby 102, Corridor 106, Office 107, Office 108 and Corridor 109	12" x 12" Vinyl Floor Tiles Grey with Dark Grey Streak (Associated Mastic is Non-Asbestos)	Type 1	Removal using non-powered hand tools in conjunction with dust suppression

2.3 SCHEDULING

.1 The Contractor shall schedule and perform work in accordance with the Contract Time established in the agreement.

2.4 INSPECTION

.1 From project set-up to completion of clean-up, the Asbestos Abatement Consultant will be present on both the inside and outside of the work area.

.2 Inspections will be conducted to confirm the Contractor's compliance. Failure to comply with the specified requirements may result in a stoppage of work at no additional cost to the Owner.

.3 Promptly notify the Consultant of any ACM or potential ACM discovered during the work and not apparent in the audit, specifications or site meeting(s). DO NOT disturb such material until given direction by the Consultant. Assume such material to contain asbestos of a type other than Chrysotile until proven otherwise. Failure to notify the Consultant of ACM prior to removal will result in the dispute of payment of fees for any extra work performed.

.4 The following inspections will be conducted at the Owner's cost. Provide Consultant with minimum of 24 Hours verbal notice:

.1 Pre Start Inspection: conducted after completion of work area set-up and prior to start of contaminated work.

.2 Contaminated Work Inspections: inspections and routine monitoring of the abatement will be conducted for the duration of the work.

.3 Final Inspection: conducted after removal of all ACM, and application of lockdown agent to confirm cleanliness. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level

specified shall be at no additional cost.

2.5 SUBMITTALS

.1 Submit to the Consultant upon request:

.1 AAW and AAS certification and relevant training for all workers/supervisors on-site and involved in the project.

.2 Names, credentials and contact information of Site superintendent and shift supervisors.

.3 All necessary permits, certificates, and documents for all aspects of the work to be completed.

.4 Ministry of Labour Notice of Project if applicable.

.5 Certificate of Approval for transportation of asbestos waste.

.6 Negative air unit performance leak tests.

.7 HEPA/P100 filtered vacuum performance leak tests.

.8 Any and all proposed changes, alterations, deviations intended to be made in scope, procedures and/or measures from these specifications or associated regulations, guidelines and standards.

.2 The contractor shall have all asbestos waste transported under a current and valid Certificate of Approval or Provisional Certificate of Approval that specifically authorizes the transportation of asbestos waste in bulk. A copy of the Certificate of Approval will be maintained on-site and within the transport vehicle(s) and will be provided to the Consultant upon request.

2.6 PERMITS AND REGULATIONS

.1 Comply with all federal, provincial and local requirements, Regulations and Acts as well as client/owner corporate policies and procedures pertaining to asbestos and health and safety, provided that in any case of conflict among these requirements or with these specifications the more stringent requirements shall apply.

.2 Comply will all aspects of the Occupational Health and Safety Act Revised Statues of Ontario, 2005.

.3 Comply with Ontario Regulation 278/05 “Asbestos on Construction Projects and in Buildings and Repair Operations”, made under the Occupational Health and Safety Act.

.4 Comply with “Handling, Transportation and Disposal of Asbestos Waste’ in accordance with Ontario Regulation 347 as amended by Ontario Regulation 558/00, under the Environmental Protection Act (General-Waste Management), June 1992.

.5 Before varying a measure or procedure described in Ontario Regulation 278/05, or these specifications, the contractor/constructor must ensure that the varied measure(s) and/or procedure(s), affords protection for the health and safety of workers and building occupants that is at least equal to the protection that would be provided by complying with Ontario

Regulation 278/05. Written notice of the varied measure(s) and/or procedure(s) shall be given in advance to the joint health and safety committee and safety representative, if any, for the workplace. Such notice shall also be provided to the Consultant.

2.7 INSTRUCTION AND TRAINING

.1 It shall be the responsibility of the Constructor to inform all workers involved in this project of the hazards in regard to the work to be performed and ensure appropriate training has been provided to all workers.

.2 Every worker shall be properly trained in accordance with Section 19 of Ontario Regulation 278/05 in the removal/management of asbestos as a Type 1, Type 2 and Type 3 Operation and have had instruction and training in:

.1 Asbestos awareness;

.2 The hazards of asbestos exposure;

.3 Personal hygiene and work practices;

.4 The use, cleaning, maintenance, selection and disposal of respirators and protective clothing; and

.5 The measures and procedures prescribed by Ontario Regulation 278/05.

.3 Instruction and training related to personal protective equipment and hygiene shall include but shall not necessarily be limited to:

.1 Limitations of the equipment;

.2 Inspection and maintenance of the equipment;

.3 Fitting of the equipment; and

.4 Disinfecting and decontamination of the equipment.

.4 The abatement contractor shall ensure that every worker/supervisor involved in a Type 3 operation meets the training and certification requirements of Section 20 of Ontario Regulation 278/05.

2.8 WORKER PROTECTION

.1 All personal protective equipment shall be used and maintained in accordance to the manufactures specifications and/or federal, provincial, local regulations and Acts and any corporate policies and procedures.

.2 All Personal protective equipment shall be of a nature that can be readily and effectively decontaminated or shall be of a disposable type.

.3 Damaged, deteriorated or defective personal protective equipment shall be repaired or replaced immediately and the worker shall not continue with their duties until such damages, deterioration or defects have been corrected.

.4 All personal protective equipment shall be durable enough and otherwise suitable to

withstand the nature of the work being performed and the environmental conditions present within the work area(s).

.5 The contractor shall provide all workers with personally issued respirators suitable for protection against asbestos and acceptable to the Ministry of Labour.

.6 It shall be the responsibility of the contractor/constructor to ensure that all procedures for the use of respiratory equipment in accordance with Ontario Regulation 278/05 and manufacturers requirements are complied with. This shall include but shall not necessarily be limited to:

.1 The worker being physically able to perform the required duties while wearing the respirator;

.2 Respirators must be fit checked by qualitative or quantitative fit testing. Instruction must be provided as defined by the Occupational Health and safety Act;

.3 Air purifying respirators will be equipped with Ministry of Labour and NIOSH approved N 100, P 100, R 100 or HEPA hard exterior cassette style filters and shall be fitted so that an effective seal exists between the respirator and the workers face;

.4 Supplied air respirators will have supply air meet the Canadian Standards Association (CSA) standard Z180.1-00, Compressed Breathing Air and Systems (March 2000);

.5 Cleaning and disinfecting of respirator(s) after each use or more often if needed;

.6 Inspection of respirator(s) and/or respiratory equipment before each use;

.7 The proper storage in a clean, dry and sanitary location when respirator(s) are not in use; and

.8 The development of written procedures regarding selection, use and care of respirators.

.7 Protective Clothing: The contractor shall provide every worker who enters the work area with disposable coveralls and gloves which:

.1 Shall be made of a material that does not readily retain nor permit the penetration of asbestos fibres;

.2 Shall consist of head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garment and skin under the protective clothing;

.3 Shall include suitable footwear; and

.4 Shall be repaired or replaced if torn or damaged.

.8 The contractor shall provide worker(s) with Canadian Standards Association approved head, hearing and foot protection for the work being performed and as required by applicable construction safety regulations.

2.9 AUTHORIZED VISITOR PROTECTION

.1 The contractor shall provide all prescribed personal protective equipment to authorized visitors to the work area(s).

.2 Ensure authorized visitors have received required training prior to entry to the work areas.

.3 Instruct authorized visitors in all relevant procedures to be followed while in and around the work area(s).

PART 3 - APPROVED PRODUCTS

3.1 MATERIALS AND EQUIPMENT

.1 Amended Water: Water with a surfactant agent added to reduce water tension for thorough wetting of fibres.

.2 Decontamination Shower: For the purpose of worker decontamination, a portable self-contained shower equipped with the following shall be utilized:

.1 Hot and cold water connections;

.2 Interior hot and cold fixtures that can be controlled by the person using the shower; or provide a constant water temperature of not less the 40 Celsius but not greater 50 Celsius;

.3 A containment basin of sufficient capacity to collect and contain the quantity of water required for at least one worker to properly decontaminate; and

.4 Shall be supplied with soap and clean towels.

.3 Drop Sheets: Fire retardant Polyethylene: 0.15mm (6mil) minimum thickness or Fire retardant Fibre Reinforced (FR) polyethylene: 0.15mm (6mil) minimum thickness. New Materials Only.

.4 Exhausted Ducting: For use with Negative Air Unit(s) shall be flexible reinforced heavy duty type duct and be free of tears, punctures and damage and be otherwise suitable for the conditions of the work area(s). The cross sectional area of the ducting shall be maintained during the operation of the Negative Air Unit(s). And reasonable care shall be taken to ensure the ducting does not become damaged.

.5 Micronic Water Filter: Shall be used to filter contaminated water that is to be discharged to local sanitary sewers. Contaminated water includes but is not necessarily limited to wash down water and decontamination shower water. The filter shall be equipped with a secondary 5 micrometer filter. As an alternative to filtration, contaminated water may be collected in appropriate waste containers for off-site disposal.

.6 Negative Air Units: Shall be equipped with HEPA/P100 filters and shall have performance leak testing to verify efficiency of filters. Copies of filter tests shall be provided to the consultant upon request.

.7 Power Tools: Used in the cutting, grinding, drilling, abrading, sanding, vibrating or removal

of Asbestos Containing Material, as a Type 2 Operation, shall be equipped with an effective dust collection device with a HEPA/P100 filtration system capable of capturing all debris and dust generated by the tool. All tools and assemblies of dust collection and filtration equipment will be subject to approval and testing by the Consultant as seen fit prior to use.

.8 Pressure Differential Measuring Device: Shall be capable of measuring pressure differential of 0.02 inches of water column and shall otherwise measure pressure differential in an appropriate range and interval. The device shall be dedicated to the site/work area, properly calibrated, installed and maintained throughout the duration of work to measure pressure differential between the enclosed removal area and the occupied area and shall be acceptable to the consultant. Daily records shall be kept by the contractor, on site, and made available to the consultant.

.9 Sealant: A suitable water based post-removal sealer appropriate for the lock-down and sealing of asbestos fibres to polyethylene sheeting and cleaned substrate.

.10 Sprayer(s): Shall be capable of delivering low velocity mist pattern spray of Amended water or sealant. Sprayers may be hand held reservoir type or powered airless units.

.11 Surfactant: A commercial or industrial agent that when added to potable water reduces surface tension.

.12 Tape: Shall be able to create and maintain a suitable seal on polyethylene and other materials within the work area under both wet and dry conditions and ambient temperatures for the duration of the work being performed and shall otherwise be suitable for the work being performed.

.13 Waste Containers: Waste shall be contained in two overlying dust tight containers impervious to asbestos fibres. The outer container shall be a minimum of 0.15mm (6mil.) thick sealable polyethylene waste bag.

.1 Should the waste material include sharp objects/materials, the inner container shall be a sealable metal, cardboard, fibre or plastic type suitable to resist puncturing of the containers;

.2 Containers shall be cleaned with a damp cloth or vacuum equipped with a HEPA filter immediately before being removed from the work area;

.3 Outer waste containers shall have a pre-printed cautionary asbestos warning identifying it as asbestos waste in both official languages clearly visible and legible in a colour which contrasts with the background on which it is printed; and,

.4 Be otherwise suited for the waste being contained.

.14 Vacuums: Shall be equipped with HEPA/P100 filters and shall have performance leak testing to verify efficiency of filters. Copies of filter tests shall be provided to the consultant upon request.

3.2 SIGNAGE AND PLACARDS

.1 Before beginning work, post a sufficient number of signs at each entrance/exit to the work area(s) warning of asbestos hazards and restricting access to authorized persons wearing personal protective equipment.

.2 On both sides of all containers and vehicles used in the transport of asbestos waste in large easily legible letters of a minimum of ten centimetres (10cm) in height which contrast in colour with the background of the container or vehicle the following words shall be clearly displayed:

.1 CAUTION: CONTAINED ASBESTOS FIBRES; Avoid Creating Dust and Spillage; and,

.2 Asbestos May be Harmful to Your Health; Wear Approved Protective Equipment.

PART 4 - EXECUTION

4.1 GENERAL REQUIREMENTS – ALL PROCEDURES

.1 Before beginning work, post at each entrance/exit to the work area(s) a sufficient number of signs warning of asbestos hazards and restricting access to authorized persons wearing personal protective equipment.

.2 Eating, drinking, chewing or smoking shall not be permitted in the work area.

.3 Where wet removals are to take place de-energize and disable with proper lock-out tag-out procedures electrical systems.

.4 Temporary electrical distribution systems equipped with Ground Fault Circuit Interrupters (GFCI) shall be supplied and used by the Contractor during wet removals.

.5 Remove all items from the work area(s). If items are affixed or otherwise cannot be removed from the work area(s), ensure that they are pre-cleaned using a HEPA/P100 filtered vacuum or damp wiping and completely covered and sealed with polyethylene sheeting and otherwise adequately protected.

.6 Before commencing with work, disable and seal all ventilation to and from the work area and ensure ventilation remains disabled throughout the duration of activities. Seal any and all openings within the work area(s).

.7 Removal of Asbestos Containing Materials shall commence only after set-up is complete.

.8 Frequently and at regular intervals during the Work and immediately upon completion of the work clean up and place all asbestos dust, debris and waste in approved waste containers.

.9 Prevent the spread of dust from the Work Area.

.10 At completion of Work or at the end of the work day, remove from work area(s) all asbestos waste and in accordance with requirements of Ontario Regulations and these specifications dispose of asbestos waste off-site.

4.2 EXECUTION OF TYPE 1 OPERATION

.1 Set-Up

.1 Ensure adequate signage is posted restricting access to the work area to

authorized personnel.

.2 Prevent the spread of dust from the work area using measures appropriate to the work to be done. Use single layer rip proof polyethylene drop sheets. In areas with carpeted or textured floors which cannot be readily cleaned use double layer rip proof polyethylene over flooring in work area(s).

.3 Provide facilities for washing hands and face.

.4 Allow for inspection by the Consultant to confirm that set-up is sufficient prior to the start of work.

.2 Asbestos Removal

.1 If a worker requests, the contractor shall supply a respirator in accordance with Ontario Regulation 278/05 Table 2 requirements, suitable for protection against asbestos and protective coveralls and the worker shall wear the respirator and coveralls.

.2 Perform removal of ACM in a manner to reduce dust creation to lowest level practicable by:

- Dust and waste shall not be permitted to fall freely from one work level to another
- Use of hand tools only for the removal of ACM
- Careful removal of ACM
- Continual wetting of Asbestos Containing Materials throughout the work
- Placing removed asbestos waste directly into approved waste containers

.3 All workers shall proceed to washing facilities and wash hands and face before leaving the work area.

.3 Clean-Up

.1 After completion of the removal; perform final thorough cleanup of polyethylene, barriers, drop sheets, tools, equipment, items, work area(s) and adjacent areas using HEPA/P100 filtered vacuum or damp wiping methods. Ensuring work area(s) and all items within the work area(s) are clean of visible asbestos dust, debris and waste. Place and seal asbestos dust debris and waste in approved waste containers.

.2 Allow for inspection by Consultant to determine abatement is complete and an acceptable level of cleanliness prior to application of sealant.

.3 Wet and fold polyethylene drop sheets and barriers in a manner which contains asbestos dust, debris and waste, place and seal in approved waste containers.

.4 If Personal Protective Equipment was requested and used by the worker prior to leaving the work area(s) clean all asbestos dust, debris and waste from clothing and personal protective equipment (PPE). Remove and place disposable PPE in approved waste container.

.5 Immediately before their removal from the work area, clean each filled waste container using HEPA/P100 filtered vacuum and place and seal in a secondary

clean waste container.

4.3 EXECUTION OF TYPE 2 OPERATION

.1 Set-Up

.1 Construct an enclosure using polyethylene sheeting that extends from floor to ceiling and encompasses the entire work area were asbestos containing materials will be removed or encapsulated. The enclosure shall include the following:

- Double flap weighted air lock doors at all entrances, exits and doorways of the enclosure and rooms within the enclosure;
- Transparent windows for inspection purposes from outside the enclosure area;
- Sealed edges of the entire enclosure using tape or other suitable methods; and
- Ensure all edges of enclosure are securely fixed.

.2 Construct a decontamination facility as close as practicable to the work area which shall include the following:

- A room suitable for changing into protective clothing and for storing contaminated protective clothing and equipment; and,
- A room suitable for changing into street clothes and for storing clean clothing and equipment.

.3 Arrange configuration of the above-mentioned rooms so that (a) person(s) entering/exiting the work area must pass through each room in the correct order.

.4 Allow for inspection by the Consultant to confirm that set-up is sufficient prior to the start of work.

.2 Asbestos Removal

.1 Workers entering the work area shall don all appropriate personal protective equipment including coveralls and respiratory protection prior to entering the work area.

.2 Before commencing with work and at the beginning and end of each work shift and at a minimum of at least once per day the enclosure shall be inspected for any defects of deficiencies.

.3 Any defects or deficiencies observed shall be repaired forthwith and no work other than such repairs shall be conducted until repair activities are completed

.4 Other than loose material which is pulverized, crumbled and or powdered and shall be removed by HEPA/P100 filtered vacuum, Asbestos Containing Materials to be removed or disturbed shall be thoroughly wetted with Amended Water before and during work unless wetting creates a hazard or causes damage.

.5 Perform removal of ACM in a manner to reduce dust creation to lowest level practicable by:

- Dust and waste shall not be permitted to fall freely from one work level to

another;
- Use of hand tools only for the removal of ACM;
- Careful removal of ACM;
- Continual wetting of Asbestos Containing Materials throughout the work; and
- Placing removed asbestos waste directly into approved waste containers.

.6 All workers shall proceed to the washing facilities while wearing respirator and shall wash hands and face before leaving the work area.

.3 Clean-Up

.1 After completion of the removal; perform final thorough cleanup of polyethylene, barriers, tools, equipment, items, work area(s) and adjacent areas using HEPA/P100 filtered vacuum or damp wiping methods. Ensuring work area(s) and all items within the work area(s) are clean of visible asbestos dust, debris and waste. Place and seal all asbestos dust debris and waste in approved waste containers.

.2 Allow for inspection by Consultant to determine abatement is complete and an acceptable level of cleanliness prior to application of sealant.

.3 Apply sealant to all vertical and horizontal surfaces, enclosures, drop sheets and items within the enclosure. Allow sufficient time for sealant to dry.

.4 Wet and fold polyethylene and barriers in a manner which contains asbestos dust, debris and waste, place and seal in approved waste containers.

.5 Prior to leaving the work area(s) workers shall clean all asbestos dust, debris and waste from Personal Protective Clothing Using HEPA/P100 filtered vacuum or damp wipe methods prior to removing the clothing. Remove and place disposable Personal Protective Clothing in approved waste containers.

.6 Immediately before their removal from the work area, clean each filled waste container using HEPA/P100 filtered vacuum and place and seal in a secondary clean waste container.

END

1. Definitions

1. The following Section of this Specification are of the abbreviated type and include incomplete sentences. Definite and indefinite articles have often been omitted and sentences are written in the form of direct instructions to the Contractor without using the phrase `the Contractor shall.' Standard specifications and other quality references inserted govern materials and workmanship without using phrases `conform with,' `conformity therewith,' etc. Omitted words and phrases to be supplied in the same manner as they are when a note appears on the Drawings.

2. The Specifications are separated into Sections for reference convenience only. Such separation must in no instance make Owner or his Consultants arbiter to establish subcontract limits between Contractor and Subcontractor.

3. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on Drawings and/or in Specifications, including all labour, materials, equipment, tools, services, and incidentals necessary and required to complete the work. Responsibility for breakdown into and extension of subcontracts, including co-ordination of same, rests entirely with the Contractor.

4. Standard Specifications referred to are editions in force at Tender Closing Date.

2. Terminology

1. Consultants are the team of Architects, Engineers and other experts commissioned by the Owner, directly or indirectly, to execute design, contract documents and supervision for the project, including any of their agents or employees.

2. Prime Consultant is the Architect.

3. Contractor is the Firm or Corporation who, having signed the Agreement, has the sole legal responsibility to carry out the work shown or described in the Contract Documents for the Owner, whether contractually assigned to a Subcontractor or supplier, or not.

3. Minimum Standards

1. Unless otherwise specified, work and material to conform or exceed the minimum standards set out in the editions of the Canadian Government Specification Board, Canadian Standards Associations, the Ontario Building Code, Underwriters' Laboratories of Canada, the Canadian Electrical Code, the Local Building Code in force, whichever is applicable.

2. Copies of Standard Specifications referred to in this Specification to be kept on the site.

3. The use of the name (or its abbreviation) of any of the following bodies, accompanied by the reference number of a specification of that body to mean that the entire specification of the body to apply as noted:

AISC: American Institute of Steel Construction;
ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers;
ASTM: American Society for Testing Materials;
CEC: Canadian Electric Code;
CGSB: Canadian Government Specification Board;
CISC: Canadian Institute of Steel Construction;
CRCA: Canadian Roofing Contractors' Association;
CSA: Canadian Standards Association;
OBC: Ontario Building Code;
ULC: Underwriters' Laboratories of Canada;

CLA: Canadian Lumbermen's Association.

4. Cooperation

1. Each trade to co-operate with the trades of adjacent or affected work. Supply in good time requirements affecting adjacent and underlying work in writing and items to be set or built in. Similarly, heed requirements and build-in items provided by other trades.

2. Take necessary precautions to protect work of other trades from contamination, marring or other damage due to application or installation processes, methods and activities.

3. General Contractor and each trade to co-operate with Contractors which may be assigned or selected by the Owner to perform work under Cash Allowances. Owner reserves the right to assign non-unionized labour to perform work under Cash Allowances, at Owners discretion.

4. Cooperate with and assist in coordinating work by Owner’s own forces or other contractors engaged by the Owner, in the interest of the school.

5. Coordination

1. Co-ordinate the work of all trades in such a manner that each trade co-operates with the trade of adjacent work.

2. Organize weekly job site meetings and send out notices stating time and place to Consultants, subcontractors, Suppliers and all others whose presence is required at the meetings.

3. Take note of all persons attending these meetings and submit to Consultants and Owner, Minutes of these Meetings showing any major decisions made and instructions or information required.

4. Co-ordinate the Work in this Contract with the work of others awarded work under Cash Allowances.

6. Building Dimensions and Co-ordination

1. Ensure that all necessary job dimensions are taken, and all trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.

2. Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.

3. Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.

4. Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.

5. All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.

6. Advise Consultant of discrepancies and if there are omissions on drawings, particularly reflected ceiling plans and jointing patterns for paving, ceramic tile, or carpet tile layouts, which affect aesthetics, or which interfere with services, equipment or surfaces. DO NOT PROCEED without direction from the Consultant.

7. Ensure that each Subcontractor communicates requirements for site conditions and surfaces necessary for the execution of the Subcontractor's work, and that he provides setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, insets, anchors, accessories, fastenings, connections and access panels. Inform other Subcontractors whose work is affected by these requirements and preparatory work.

8. Prepare interference drawings to properly co-ordinate the work where necessitated. Refer to Section 01340.

7. Use of Premises Before Substantial Performance

1. The Owner shall have the right to enter and occupy the building, in whole or in part, for the purpose of placing fittings and equipment, or for other use, before completion of the Contract if, in the opinion of the Consultant, such entry and occupancy does not prevent or interfere with the Contractor in the performance of the Contract. Such entry shall in no way be considered as an acceptance of the Work in whole, or in part, nor shall it imply acknowledgment that terms of the Agreement are fulfilled.

8. Layout of Work

1. Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.

2. Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.

9. By-Laws and Regulations

1. Nothing contained in the Drawings and Specifications are to be so construed as to be knowingly in conflict with any law, by-law or regulation of municipal, provincial or other authorities having jurisdiction.

2. Perform work in conformity with such laws, by-laws and regulations and make any necessary changes or deviations from the Drawings and Specifications subsequently required as directed and at no cost to the Owner unless notification is given in writing before Tender Closing Date.

3. Furnish inspection certificates and/or permits as may be applicable as evidence, that installed work conforms with laws, by-laws, and regulations of authorities having jurisdiction.

10. Protection

1. Take necessary precautions and provide and install required coverings to protect material, work and finishes from contamination, damage, the elements, water and frost.

2. Make good any damage or replace damaged materials, as directed. Repairs to be made by the trade having originally installed or fabricated the damaged material, finish or item. Protect electrical equipment from water and the elements.

3. Protect adjacent private and public property from damage and contamination.

4. Protect curbs and sidewalks from damage from trucking by means of boards and the like. Repair, or pay or repair of damage to existing roads and sidewalks.

5. Mark glass after glazing in an acceptable manner and leave in place until final clean-up.

6. Protect floor finishes from construction traffic and transport of construction materials and equipment by means of 6 mm plywood panels.

11. Delivery, Handling and Storage of Materials

1. No storage available within the school for materials. Contractor to make necessary arrangements for storage containers as needed. Storage container location to be approved by the Owner prior to commencing project. Coordinate location of storage container/staging area with school prior to placement and protect all existing surfaces including turf, asphalt. The Contractor is fully responsible for security, or any storage containers, fencing, equipment or material stored on school premises. HWDSB will not be held liable for missing or damaged items.

2. All deliveries to the school premises must be scheduled to arrive when no students are outside. This includes avoiding times when students are arriving, departing, or during outdoor activities.

3. Any maneuvering of vehicles or equipment within or around the school premises must be conducted while students are in class. This excludes maneuvering during breaks, lunch periods, or any other times when students might be outside.

4. All site maneuvering activities must be accompanied by a flag person to ensure the safety of students and staff.

5. Store materials which will be damaged by weather in suitable dry accommodation. Provide heat, as required, to maintain temperatures recommended by material manufacturer.

6. Store highly combustible or volatile materials separately from other materials, and under no circumstances, within the building. Protect against open flame and other fire hazards. Limit volume of supply on the site to minimum required for one day's operations.

7. Handle and store material so as to prevent damage to material, structure and finishes. Avoid undue loading stresses in materials or overloading of floors.

8. Avoid undue loading stresses in materials or overloading of floors. Do not store materials in building or utilize it for construction purposes in any manner which would exceed design loading on any building element. Temporarily support or strengthen parts of the structure subjected to excessive loads during construction.

9. Do not store material and equipment detrimental to finished surfaces within areas of the building where finishing has commenced or has been completed. No storage will be available within the school. Contractor to make necessary arrangements exterior to the school in storage containers as needed. Coordinate locations with school prior to placement and protect all existing surfaces.

10. Deliver package material in original, and Storage of unopened and undamaged containers with manufacturer’s labels and seals intact.

12. Debris

1. Assign clean-up duties to a crew with own Foremen which will be of sufficient size to prevent accumulation of debris and dirt in any part of the structure or on the site.

2. Remove Construction Debris daily and dispose of this debris in a legal manner so as to avoid causing hazards to occupants and visitors on site.

3. Under no circumstances should debris, rubbish or trash be burned or buried on the site.
   - Do not dispose of any waste in the Owner's facilities unless Owner authorized. Under no circumstances shall the Contractor use the school's garbage disposal containers including those in the classrooms and interior spaces of the school.
   - Perform a scan of the ground areas adjacent to the work area by use of metal detector/magnetic sweeper daily. Any construction debris is to be removed from the grounds on a daily basis.
   - Pathways used to access exterior waste bins for demolition should take precautions to ensure routes are protected and cleared of any debris.

13. Cutting, Fitting and Patching

1. Required cutting to be done by General Contractor. Patching and painting of work to be executed by the General Contractor.

2. All sub-trades are to notify the General Contractors bidding as to the extent of the cutting, patching, and painting of their respective trades.

3. Drilling, cutting, fitting and patching necessary due to failure to deliver items to be built-in time, or installation in wrong location to be executed, as directed, at no cost to the Owner.

4. Give written notification prior to commencement of drilling and cutting of load bearing structural members and finished surfaces.

5. Cut holes with smooth, true, clean edges, after they are approved by applicable trade. Size holes and openings for hot water and steam pipes, so as to allow for expansion and contraction of such pipes.

14. Fastenings

1. Supply all fastenings, anchors and accessories required for fabrication and erection or work.

2. Metal fastenings to be of the same material as the metal component they are anchoring, or of a metal which will not set up an electrolysis action which would cause damage to the fastening or metal component under moist conditions.

3. Exposed metal fastenings and accessories to be of the same texture, color, and finish as base metal on which they occur. Keep to a minimum; evenly space and lay out.

4. Fastenings to be permanent, of such a type and size and installed in such a manner to provide positive anchorage of the unit to be secured. Wood plugs are not acceptable. Install anchors at required spacing to provide required load bearing or shear capacity.

5. Power actuated fastenings are not to be used without prior written approval for specific use.

15. Surplus Materials

1. Surplus materials specifically so specified, to remain property of the Owner and be neatly stockpiled or stored, as directed.

2. All other surplus materials to become property of the Contractor; to be removed from the site and legally disposed of.

16. Documents Required and General Duties

1. **At Commencement of Contract**
   .1 The Owner has paid for the cost of the Building Permit. Mechanical Subcontractor will pay the cost of other Fees related to the Work Specified under Mechanical Scope. Electrical Subcontractor will pay the cost of all permits and fees related to the Work specified under Electrical Scope.
   .2 The General Contractor is to pay all other fees and refundable deposits if Applicable

2. **During Construction**
   .1 Organize Job Meetings in accordance with Section 01200.
   .2 Supply Monthly Progress Reports and Construction Schedule in accordance with Section 01200.
   .3 Confirm that payments are being made to subcontractors and suppliers by submission of receipts with the second and subsequent Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.

3. **Upon Completion**

   1.Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:
   .1 All deficiencies to have been completed in a satisfactory manner.
   .2 All final clean-up to have been executed, as specified in Section 01710.
   .3 Finishing Hardware, Inspection and Verification.
   .4 Organize a Final Inspection tour at which to be present:
   - the Owner's authorized representative;
   - the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any;
   - the Contractor and his superintendent.

   .5 Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.
   .6 A complete release of all liens arising out of this Contract, other than his own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.

.7 Clearance Certificates from the Workplace Safety and Insurance Board, for the General Contractor and all Subcontractors.
.8 All reference records, as specified, under Section 01720.
.9 Certificate of Inspection from Mechanical and Electrical Engineers.
.10 Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.
.11 Statement of Completion from General Contractor.
.12 Final adjustment of all Allowances.
.13 H.E.P.C. Inspection Certificate and all other Inspection Certificates required by Provincial, Municipal and other authorities having jurisdiction.
.14 Balancing Reports.
.15 As-Built Drawings. –Digital pdf files and AutoCAD v2018 or higher.
.16 A softcopy of Operation and Maintenance Manuals. A digital copy (pdf file) of all closeout documents.

17. Progress Reports

1. Submit to the Architect, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims.

2. Keep permanent written daily records on the site on the progress of work. Record to be open to inspection at reasonable times and copies to be furnished upon request. Records to show notes of commencement and completion of different trades and parts of work; daily high and low temperatures and other weather particulars; number of men engaged on the site (including sub-trades) broken down in groups for each type of construction work, and particulars about excavation and shoring; erection and removal of form work; pouring and curing of concrete; floor finishing; placing and compaction of backfill, masonry work; roofing.

3. Daily progress to give particulars on commencement and completion of each trade or part of work; form work erections and removal; concrete pouring and curing; floor finishing; masonry work; roofing; waterproofing; finishing trades, tests and inspection and the like.

18. Inspection and Testing

1. The contractor is responsible to provide his own quality control in order to meet or exceed the requirements of specified standards, codes, design criteria and referenced documents.

End of Section

1. Project Meetings for Coordination

1. Following the pre-construction meeting/construction phase kick-off meeting, arrange for site meetings every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled. Prior to substantial performance, meetings shall be scheduled for every week in an effort to effectively complete all obligations under the contract in a timely manner.

2. General contractor's site supervisor and project manager as well as other responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.

3. Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.

4. Provide physical space for meetings within the construction office, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: _____".

5. Within three days after each meeting, distribute digital copies of the minutes to each invited person, regardless of attendance.

2. Pre-construction Meeting

1. Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

3. Project Meetings for Progress of Work

1. Conduct progress meetings in accordance with the schedule and/or decisions made at Pre-construction meeting.

2. Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.

3. Include in the agenda the following:

    .1 Review, approval of minutes of previous meeting.
    .2 Review of Work progress since previous meeting.
    .3 Field observations, problems, conflicts.
    .4 Problems which impede construction schedule.
    .5 Review of off-site fabrication delivery schedules.
    .6 Corrective measures and procedures to regain projected schedule.
    .7 Revisions to construction schedule.
    .8 Progress during the preceding work period.
    .9 Look ahead for the succeeding two-week work period.

.10 Review submittal schedules: expedite as required.
.11 Maintenance of quality standards.
.12 Pending changes and substitutions.
.13 Review proposed changes for effect on construction schedule and on completion date.
.14 Other business

4. Progress Records

1. Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:

    .1 Daily weather conditions, including maximum and minimum temperatures.
    .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
    .3 Conditions encountered during excavation.
    .4 Dates of erection and removal of formwork, in each area of the project.
    .5 Dates of pouring the concrete in each area of the project, with quantity and particulars of the concrete.
    .6 Work force on project daily per trade.
    .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

End of Section

1. General

1. Submit to Architect, for review, shop drawings, product data and samples specified.

2. Until the submission is reviewed, work involving relevant products must not proceed.

2. Shop Drawings

1. Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate the appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.

2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

3. Maximum sheet size 24” x 36” as a PDF.

4. General Contractor shall provide and maintain an up-to-date shop drawing tracking log, which shall be reviewed at each construction meeting.

3. Project Data

1. Certain specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

2. Above will only be accepted if they conform to following:
   .1 Delete information which is not applicable to project.
   .2 Supplement standard information to provide additional information applicable to project.
   .3 Show dimensions and clearances required.
   .4 Show performance characteristics and capacities.
   .5 Show wiring diagrams (when requested) and controls.

4. Coordination of Submissions

1. Review shop drawings, product data and samples prior to submission.

2. Verify:
   .1 Field measurements.
   .2 Field construction criteria.
   .3 Catalogue numbers and similar data.

3. Coordinate each submission with requirement of work and Contract documents. Individual shop drawings will not be reviewed until all related drawings are available.

4. Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.

5. Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect's review of submission, unless Architect gives written acceptance of specified deviations.

6. Notify Architect, in writing at time of submission, of deviations from requirements of Contract documents.

7. After Architect's review, distribute copies.

5. Submission Requirements

1. Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.

2. Submit a digital copy (PDF) of shop drawings, product data to Architect for review.

3. Accompany submissions with transmittal letter, in duplicate, containing:
   .1 Date.
   .2 Project title and number.
   .3 Contractor's name and address.
   .4 Number of each shop drawing, product data and sample submitted.
   .5 Other pertinent data.

4. Submissions must include:
   .1 Date and revision dates.
   .2 Project title and number.
   .3 Name of:
      .1 Contractor.
      .2 Subcontractor.
      .3 Supplier.
      .4 Manufacturer.
      .5 Separate detailer when pertinent.

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

6. Interference Drawings
   .1 Prepare interference drawings for all work in confined space ie: ceiling space.

End of Section

1. Access

1. Provide and maintain adequate service roads to project site to provide safe and convenient access for deliveries.

2. Storage Sheds

1. Provide adequate weather-tight sheds with raised floors, for storage of materials, tools and equipment. Coordinate location with Owner and obtain approval.

2. The contractors and/or subcontractors are not permitted to use school spaces/areas for storage at any time.

3. Storage shed to be within fast fence compound staging area to prevent vandalism. Staging area to be confirmed with Owner and Consultant prior to erecting area.

3. Sanitary Facilities

1. Provide portable toilets and other washroom facilities as required. Coordinate location with Owner and obtain approval. Keep area and premises in sanitary condition.

2. The contractors and/or subcontractors are not permitted to use school sanitary facilities at any time.

3. Portable toilet to be within fast fence compound staging area to prevent vandalism. Staging area to be confirmed with Owner and Consultant prior to erecting area.

4. Parking

1. The contractors and/or subcontractors are responsible for coordinating parking with the local municipality.

2. The contractors and/or subcontractor are not permitted to use the school parking lots during the months of September to June. The school parking lots can be used for construction during the months of July and August. Coordinate use of spaces with Owner and obtain approval.

5. Site Enclosures

1. Erect temporary site enclosures, hoarding, using prefabricated lock fence system. Fencing shall be mechanically fastened to the ground using secure spikes on the construction side of the fence. Alternatively, construction fencing shall be mechanically fastened to the vertical t-bar piled into the ground. The ground shall be repaired to its original condition matching adjacent surfaces once the fence is no longer required and removed off site. Exterior fencing shall include visual barrier using geotextile fastened to the fence. Access into this fenced area shall be controlled by the general contractor. Maintain fence at all times for the duration of the project.

2. Interior hoarding walls shall be erected at all locations where existing occupied spaces are in the vicinity and adjacent to the construction area. All interior hoarding walls shall be constructed using stud framing and drywall. Alternatively, good-one-side plywood can be used. All hoarding walls shall include a properly latching and lockable man door complete with locking handset/lever or orbit hardware. Access through this door shall be controlled by the general contractor. Maintain hoarding walls at all times for the duration of the project.

3. Size and location of enclosure to suit area of construction.

6. Enclosure of Structure

1. Provide temporary weather-tight enclosures protection for exterior openings until permanently enclosed.
2. Erect enclosures to allow access for installation of materials and working inside enclosures.

3. Design enclosures to withstand wind pressure.

4. Erect dust barriers to prevent dust migration to non-renovated areas. Provide boot dust mats at each interior connection to occupied areas from the construction entrances/exits. If contractor is not able to prevent dust migration to non-renovated areas, the contractor shall provide negative air units and maintain for the duration of the project until such time where dust migration can be prevented.

7. Power supply

1. Electrical power is available in existing building and will be provided at no charge for construction purpose.

8. Water Supply

1. Water is available in existing building and will be provided at no charge for construction purpose.

9. Scaffolding

1. Construct and maintain scaffolding in rigid, secure and safe manner.

2. Erect scaffolding independent of walls. Remove promptly when no longer required.

3. Scaffolding to be designed by a professional Engineer when required under the Occupational Health and Safety act.

10. Heat and Ventilating

1. Not applicable.

End of Section

1. Construction Safety Measures

1. Observe and enforce construction safety measures required by the National Building Code; the O.B.C.; The Provincial Government; Workplace Safety & Insurance Board; and Municipal authorities.

2. In particular, the Occupational Health and Safety Act (O. Reg. 213/91), the regulations of the Ontario Ministry of Labour and Ontario Electrical Safety Code shall be strictly enforced.

3. Contractor shall ensure that copies of all applicable construction safety regulations, codes and standards are available on the job-site throughout the period of construction. All workers are to be informed that these documents are available for reference at any time.

4. The Contractor shall be considered as the "Constructor" in consideration of the rights and responsibilities for all construction safety requirements, procedures, facilities and inspection of all work performed by the Contractor, Subcontractors/Sub-trades and other Contractors engaged on this project.

5. In the event of a conflict between any of the provisions of the above authorities the most stringent provisions are to be applied.

2. Safety Data Sheet

1. Safety Data Sheets (SDS) must be available at the job-site for any product listed on the Hazardous Ingredients List prior to being used, installed or applied inside of the building.

2. A Safety Data Sheet is to be submitted to the Architect for any product which is known to create, or suspected of creating, a health hazard or discomfort during construction or upon commissioning of the project including, but not limited to, the following:
   .1 adhesives
   .2 solvents
   .3 sealants, (caulking, vapour seals, etc.)
   .4 sprayed-on fireproofing
   .5 resilient flooring
   .6 carpet, paint, varnish or other coatings
   .7 exposed membrane waterproofing
   .8 special coatings, (terrazo sealants, chafing coatings, etc.)
   .9 solder, brazing and welding and other filler metal
   .10 other products whose particles or vapours may become air borne after installation.
   .11 any other product as directed by the Consultant.

3. Comply with WHMIS regulation, Workplace Hazardous Material Information System.

3. Fire Safety Requirements

1. Comply with requirements for Building Construction, the Ontario Building Code, the Ontario Fire Code, the requirements of Local Fire Authorities and of the requirements of the Office of the Fire Marshal.

4. Overloading

1. Ensure no part of Work is subjected to a load which will endanger its safety or will cause permanent deformation.

5. Falsework

1. Design and construct falsework in accordance with the CSA S269.1

6. Scaffolding

1. Design and construct scaffolding in accordance with CSA Z797.

2. Scaffolding to be designed by a Professional Engineer when required under the Occupational Health and Safety Act.

7. Materials Specifically Excluded

1. Asbestos and/or asbestos-containing products are not permitted. Submit Safety Data Sheets for any product suspected of containing asbestos if so requested by Consultant. Examples of some materials requiring close scrutiny and/or confirmation include:
   .1 Transite drainage pipe - whether buried or above grade - not permitted.
   .2 Composite floor tile containing asbestos - not permitted.
   .3 Lay-in ceiling tiles containing asbestos - not permitted.
   .4 Insulation and/or jacketing for pies, ducts, motors, pumps, etc. - not permitted if any asbestos is present.
2. Solder for all piping is to be lead-free.
   .1 "Lead Free" shall mean solder which contains less than 0.030% of lead when dissolved in fluoroboric and nitric acids and tested by inductively coupled argon plasma atomic emission spectroscopy. "Steelbond 281" and "Silverbrite" are acceptable solder products.
   .2 The mechanical contractor shall provide an affidavit signed by the Principal of the company, on company letterhead, that all of the solder used on the project was either one of the two acceptable products or that the solder used (identified by brand name) meets or exceeds the testing criteria.
   .3 The Owner shall undertake random testing of the soldered joints. Should testing prove that the solder used was not as specified, the Owner shall take action against the contractor to the full extent of the law.
3. All paint and finish coatings are to be lead and mercury-free. Submit Material Safety Data Sheets confirming that these products are free of all lead and/or mercury compounds.

End of Section

PART 1 - GENERAL

1.1 Related Work

1. These specifications apply to all 16 divisions of the project specification. It is the responsibility of the contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.

2. It is recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the owner, notify the Architect of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Architect.

3. Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Architect. Suitability of all products used is the responsibility of the contractor.

1.2 Compliance Specifications

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

1.3 Beyond Compliance Specifications

1. These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner’s intention to develop a specification which maximizes environmentally “friendly” materials and methods wherever possible within current technical and budget limitations.

2. Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.

3. The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.

4. These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.

5. These provisions apply to both indoor and outdoor applications equally.

1.4 Exceptions

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

PART 2 - MATERIALS

2.1 Products or Substances to be Avoided or Limited in Use

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

2.2 Volatile Organic Compounds

1. No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.

   Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.

2. Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents, therefore the fact that a product is waterborne does not automatically make it acceptable.

2.3 Chlorinated Substances

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

2.4 Plasticizers

1. Plasticisers which offgass (low molecular weight) should be avoided.

2.5 Man Made Mineral Fibres

1. Products containing mineral fibres which can be emitted or abraded should be avoided.

   Examples: duct liner, mineral fibre ceiling tiles, etc.

2.6 Radiation

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

2.7 Biocides

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

2.8 Heavy Metals

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

2.9 Aluminum

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

2.10 Ozone Depleting Substances

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

2.11 Greenhouse Gasses

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

2.12 Bituminous (tar) Products

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

2.13 Chemical Compounds

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

2.14 Adhesives

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

2.15 Composite Products

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

2.16 Cleaners and Solvents

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

End of Section

1. General

1. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

2. Store volatile waste in covered metal containers and remove from premises daily.

3. Prevent accumulation of waste, which create hazardous conditions.

4. Provide adequate ventilation during use of volatile or noxious substances.

5. At no time shall waste be stored inside the school building. All waste and waste containers must be separated from general public and school occupants using properly secured and locking construction hoarding.

2. Materials

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

2. Provide on-site construction specific dump containers for collection of waste materials, and rubbish. The school waste bins, and garbage collection shall not be used to dispose of construction related waste materials, debris and/or rubbish.

3. Cleaning During Construction

1. Maintain project grounds, and public properties free from accumulations of waste materials and rubbish.

2. Remove waste materials, and rubbish from site.

3. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

4. Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

4. Final Cleaning

1. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces and leave project clean and ready for occupancy.

2. Employ experienced professional cleaners, for final cleaning.

3. In preparation for Substantial Performance or Fitness for Occupancy status, whichever occurs first, conduct final inspection of interior and exterior surfaces and of concealed spaces.

4. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.

5. Clean and polish glass and mirrors.

6. Repair, patch and touch-up marred surfaces to specified finish and to match new adjacent surfaces.

7. Broom-clean, magnet roll, and pressure wash all concrete and asphalt paved surfaces; rake clean other surfaces of grounds.

8. Clean exposed ductwork and structure.

9. Replace filters.

10. Clean bulbs and lamps and replace those burned out.

11. Clean diffusers and grilles.

12. Clean sinks, faucets, and water closets and controls.

13. Maintain cleaning until project, or portion thereof, is occupied by Owner.

End of Section

1. Requirements Included

1. Record documents, samples, and specifications.
2. Equipment and systems.
3. Product data, materials and finishes, and related information.

2. Quality Assurance

1. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

3. Format

1. Organize data in the form of an instructional manual.
2. Correlate data into related consistent groupings.
3. Cover: Identify each section with type or printed title “Project Record Documents”, list title of Project, identify subject matter of contents.
4. Arrange content in folders under Section numbers and sequence of Table of Contents.
5. Provide separate folder for each separate product and system, with typed description of product and major component parts of equipment.

4. Contents, Each Volume

1. Table of Contents: Provide title of project; names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
2. For each Product or System: list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
3. Product Data: mark sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
4. Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
5. Typed Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer’s instructions.

5. Submission

1. Submit for review a digital pdf file of completed closeout documents in final form 15 days prior to substantial performance. For equipment put into use with Owner’s permission during construction, submit Operating and Maintenance Manuals within 10 days after start-

up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

2. Consultant comments will be returned, and the contractor is to revise the content of documents as required prior to final submittal.

3. Submit one (1) digital copy of revised volumes of data in final form within ten days after final inspection.

4. For contract drawings (architectural, landscaping, structural, mechanical, electrical), transfer neatly as-built notations onto a digital set and submit to consultant.

5. Prepare digital pdf file for submission on USB of completed closeout documents.

6. Record Documents and Samples

1. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
   .1 Contract Drawings.
   .2 Specifications.
   .3 Addenda
   .4 Change Orders and other modifications to the Contract.
   .5 Reviewed shop drawings, product data and samples.
   .6 Field test records.
   .7 Inspection certificates.
   .8 Manufacturer's certificates.

2. Store Record Documents and Samples in Field Office apart from documents used for construction. Provide files, racks, and secure storage.

3. Label and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "Project Record" in neat, large, printed letters.

4. Maintain Record Documents in a clean, dry, and legible condition. Do not use Record Documents for construction purposes.

5. Keep Record Documents and samples available for inspection by Consultant.

7. Recording As-Built Conditions

1. The consultant will provide electronic copies of project drawings in PDF format. Make one (1) hardcopy of the project drawings for the purpose of recording as-built conditions. Mark and record changes on an on-going basis as construction proceeds. **Near the end of the construction period transfer all marks to the supplied electronic documents and submit for consultant review as project record as-built documents**.

2. Refer to drawings/specifications for additional mechanical and electrical requirements.

3. Record information concurrently with construction progress. Do not conceal work until required information is recorded.

4. Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
   .1 Measure depths of elements of foundation in relation to finish first floor datum.
   .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
   .4 Field changes of dimension and detail.
   .5 Changes made by change orders.
   .6 Details not on original Contract Drawings.
   .7 References to related shop drawings and modifications.

5. Specifications: legibly mark each item to record actual construction, including:
   .1 Manufacturer, trade name, and catalog number of each project actually installed particularly optional items and substitute items.
   .2 Changes made by Addenda and Change Orders.

6. Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

8. Digital As-Built Drawings

1. Retain the services of a CAD drafting company acceptable to the consultant to prepare digital CAD As-Built documents for all Architectural and Engineering drawings.

2. After the consultant has found the Redlined As-Built drawings to be acceptable, transfer to digital file all information recorded on As-Built drawings. Layering of information as per consultant's instructions.

9. Equipment and Systems

1. Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
2. Panelboard Circuit Directories: provide electrical service characteristics, controls, and communications.

3. Include installed colour coded wiring diagrams.

4. Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instruction. Include summer, winter, and any special operating instructions.

5. Maintain Requirements: include routine procedures and guide for troubleshooting; disassembly, repair and reassemble instructions; and alignment, adjusting, balancing, and checking instructions.

6. Provide servicing and lubrication schedule, and list of lubricants required.

7. Include manufacturer's printed operation and maintenance instructions.

8. Include sequence of operation by controls manufacturer.

9. Provide original manufacturer's parts lists, illustrations, assembly drawings, and diagrams required for maintenance.

10. Provide installed control diagrams by controls manufacturer.

11. Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

13. Provide a list of the original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

14. Include test balancing reports as specified in mechanical specifications.

15. Additional Requirements: As specified in individual specification sections.

10. Materials and Finishes

1. Building Products, Applied Materials, and Finishes: include product data, with catalog number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

2. Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

3. Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommend schedule for cleaning and maintenance.

4. Additional Requirements: as specified in individual specifications sections.

11. Guarantees, Warranties and Bonds

1. Separate each warranty or bond keyed to the List of Contents listing.

2. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 01721 whenever standard preprinted trade or manufacturer's Guarantee/Warranty forms are not available.

3. Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

4. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

5. Verify that documents are in proper form, contain full information, and are notarized.

6. Co-execute submittals when required.

7. Retain warranties and bonds until time specified for submittal.

End of Section

1. Notes

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.

2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.

3. Comply with Requirements for Guarantee/Warranty as specified in Section 01720, Article 10.

To: Hamilton-Wentworth District School Board
20 Education Court
Hamilton, ON L9A 0B9

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER	Hamilton-Wentworth District School Board
PROJECT	*Hess Street ES* *Ground Floor Corridor Renovation and RTU Replacement* *Project No. P02081*
ARCHITECT	*AMRA J Architects Inc.*
REFERENCE	(to specifications or drawings)
TIME	Period of Guarantee/Warranty:_____ years
GUARANTEE/ WARRANTY	Starting Date: Substantial Performance as certified by Architect Date: _____

(Description of Guarantee/Warranty)

_____
_____
_____

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

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

SUBCONTRACTOR

_____ _____
Signature Date

Authorized Signing Officer: _____
(Name Printed)

_____
Title

Name of Firm: _____

Address: _____

Telephone Number _____

CONTRACTOR

_____ _____
Signature Date

Authorized Signing Officer: _____ _____
(Name Printed)

_____
Title

Name of Firm: _____ SEAL

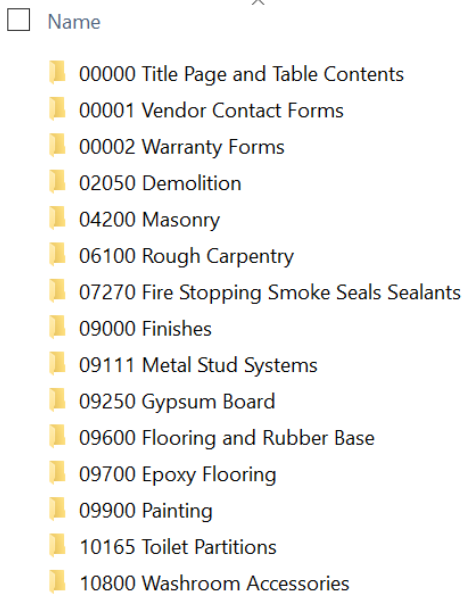
Address: _____

Telephone Number _____

End of Section

1. Maintenance Manual

1. On completion of project, submit to the Owner one (1) digital copy of Operations Data and Maintenance Manual in English, made up as follows:
   1.1. Enclose title sheet, labeled "Operation Data and Maintenance Manual", project name, date and list of contents.
   1.2. Organize content folders into applicable sections of work to parallel project specification break-down. Mark each section by labeled folder similar to the following example:



   1.3. The digital copy of all documents in the operations and manuals must be provided on a USB, format to be PDF.

2. Include the following information, plus data specified.

   .1 Maintenance instructions for finished surface and materials.
   .2 Copy of hardware and paint schedules.
   .3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
   .4 Names, addresses and phone numbers of sub-contractors and suppliers.
   .5 Guarantees, Warranties and bonds showing:
      .1 Name and address of project.
      .2 Guarantee commencement date (date of Final Certificate of Completion).
      .3 Duration of guarantee.
      .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
      .5 Signature and seal of Contractor.
      .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.

3. Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.

4. Include in the Manuals a complete set of final shop drawings indicating corrections and changes made during fabrication and installation.

5. Include in the manuals a complete set of final as-built red line drawings. Include each drawing sheet and indicate on the title block “As-Build Drawing”

End of Section

1. General

1. **Bonds:** Refer to RFT Document for bonding requirements at time of tender submission and throughout the duration of the construction period.

2. Standard Warranty

1. Refer to Supplementary General Conditions and to Standard Contract Document CCDC No. 2, 2020 for warranty requirements and conditions for the standard warranty which is required for the work of this contract.

3. Extended Warranties

1. Refer to individual specification sections for requirements of extended warranties required for particular sections or items of work.

2. Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested.

3. Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.

4. All Extended Warranties shall be listed separately and included as a separate section in the operations and maintenance manuals provided to the HWDSB at project close out. Each Extended Warranty document shall include the vendor's contact information, date of warranty commencement and expiry as well as listing the specific product with extended warranty. This document shall clearly indicate if the warranty includes or excludes labour.

5. Listed below is a summary of extended warranties required for individual Sections. This list, if inconsistent with the specified requirements of individual extended warranties, shall be deemed correct with respect to the length of extended warranties. Extended warranties required shall include, but not be limited to, the following:

   Extended warranties (total warranty period listed, including entire building warranty)

Sealants (Section 07 92 00)	5 years
Painting (Section 09 91 00)	2 years

End of Section

Appendix A – Construction School Specific Information Sheet Sample

In addition to the terms and conditions of the Contract Documents, the Contractor shall follow the protocols of the Construction Site Specific Information Sheet, sample provided below.
A completed version of this document, with site specific content, will be provided to the Contractor at the pre-construction meeting.

HWDSB

Capital Projects
Facility Services

Construction School Specific Information Sheet

1. School Information:

School Name:	Insert School Name
Bell Times	
Morning (School Entry)**:**	0:00 AM
Afternoon (School Dismissal):	0:00 PM
Aftercare Program Dismissal:	6:00 PM
Caretaking Phone Number:	000-000-0000
***After-Hours Emergency Number:**	905-667-3079
****Caretaking Hours**	
September to June	6:00 AM – 10:00 PM
December Holiday Break	6:00 AM – 2:00 PM
March Break	6:00 AM – 2:00 PM
July to August	6:00 AM – 2:00 PM
Saturday / Sunday	CLOSED
Account Code:	HP0000
Security Panel Code:	0000

*Please call the After-Hours Emergency Number noted above if issues arise outside of Caretaking Hours. These would include unanticipated interruption of services, issues with building or room access, fire alarm or security concerns, etc.

**Caretaker hours are not guaranteed. Please confirm with the HWDSB project supervisor prior to any work taking place, and then on a weekly basis throughout the duration of the project.

2. School Entry for afterhours, school holidays or closures:

Please follow these steps upon entry to the building outside of caretaker hours and on school holidays or closures:

1. Call API Alarm Inc. at 1-877-787-5237 and notify them in advance of the day(s) and time(s) that access to the building will be required. They will require the HP code noted above.
2. Disarm the security panel when arriving.
3. Arm the security panel when leaving.
4. Call API to verify that the building is armed and secure.

Failure to follow this procedure outside of caretaker hours and on school holidays or closures will result in an automatic dispatch of a security guard to the building to verify who has entered/exited the building. Security costs associated with the dispatch of a security guard for failing to follow the procedure will be expensed to the contractor responsible for the incident.

3. Protocol for Work Impacting Fire Alarm System or Devices

The contractor is to follow this procedure when the fire alarm system is impacted.

A. References and Definitions:

Fire Alarm Control and Testing Service Provider: Hamilton Fire Control

Fire Alarm and Security System Monitoring Service Provider: API Alarm Inc.

Fire Watch: An hourly patrol of areas that are not protected/monitored by the fire alarm system. These include but are not limited to, a disconnected device, a covered device, a bypassed device, or device in trouble. The general contractor is responsible for fire watch in all construction areas. Caretaking staff are responsible for fire watch in all other areas of the school. Fire watch is to be recorded in a Fire Watch Log.

Fire Watch Log: The general contractor is to document and maintain a written log confirming fire watch has been conducted hourly. This log is to remain on site for the duration of the project. This written log is maintained separate from the caretaking fire watch log. The caretaking log is digitally recorded within the Boards asset management system (eBase).

B. Mandatory Pre-Construction Site Meeting with Hamilton Fire Control

1. Contractor to request a meeting prior to mobilization with Michael Fleet from Hamilton Fire Control (HFC), the project supervisor from HWDSB, the facility operation supervisor from HWDSB and the head caretaker to review any work that will affect the fire alarm system. This can be coordinated by the project supervisor upon request.

   Contact: Michael Fleet - Hamilton Fire Control
   Phone: (905) 527-7042
   Email: michael@hamiltonfirecontrol.ca

2. Contractor to minute the meeting and submit to the project supervisor and Michael Fleet from HFC for review within 48 hours of the site-walk-through.

C. Mandatory Construction Protocol if the Fire Alarm System is Impacted

1. Contractor to follow procedures discussed and documented from the pre-construction site meeting with Hamilton Fire Control.

2. If devices are impacted during occupied hours:
   - Per the Fire Safety Plan, contractor to notify API that they'll be on Fire Watch (in the area of the impacted devices only). API will not take any action; the notification is for information purposes only.
   - Contractor to either take the device offline or protect/cover it. Fire watch (in the area of the impacted device only) is required in either of these scenarios. If the alarm goes off during work, all occupants, including contractors, are to evacuate the building and the fire department will be dispatched.

   If hot work is taking place, prior to the above-noted steps:
   - Contractors are required to advise HWDSB at least 24 hours before any hot work is scheduled to take place.
   - The contractor is required to provide a hot work permit to HWDSB at the same time.

3. If devices are impacted outside of occupied hours, and the contractor is the only party in the building:
   - The same protocol above is to be followed.

4. If the system or specific devices will not be operational while the school is completely vacant (i.e. overnight or on a weekend when no Work is taking place):
   - No action required.

The system is to be bypassed (device(s) or full system). The system is NOT to be put on test. The only time the system will be put on test and the school will be on Fire Watch is if the system is being tested.

In the event a fire alarm device is activated, all occupants of the school, including contractors, must evacuate the school. The fire department will be dispatched. The contractor will be responsible for all fire department costs resulting from construction.

4. Please follow these steps for planning any service (electrical, gas, water) shutdowns:

A. Internal Localized System/Service Shutdowns:

1. Localized shutdowns **require minimum 3 days' notice** to HWDSB project supervisor for coordination with the school facility and staff.

2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. If a shutdown will impact the security system, the contractor shall contact API Alarm Inc. at 1-877-787-5237 and notify them in advance of the day(s) and time(s) of the shutdown.
4. If a shutdown impacts the fire alarm system, the contractor shall follow the Fire Alarm Bypass Protocol, section 4 above.
5. If required, the contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

6. Process will vary based on services shutdown and ability to localize shutdown.

B. Complete School System/Service Shutdowns:

1. Complete building shutdowns **require minimum 5 days' notice** to HWDSB project supervisor.
2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. Contractor to contact API Alarm Inc. at 1-877-787-5237 and notify them in advance of the day(s) and time(s) of shutdown.
4. During the shutdown, the contractor is responsible for following Fire Alarm Bypass Protocol, section 4 above.
5. The contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

6. HWDSB project supervisor will coordinate with other HWDSB departments to ensure all systems (IIT, security, communications) are up and running after service disruption has concluded.
7. If required, HWDSB project supervisor will coordinate with City of Hamilton staff if site has shared facilities such as recreation centre, community centre, pool or library, etc.
8. Process will vary based on service shutdown.

C. Heating and Cooling System Shutdowns:

1. Heating and cooling system shutdowns **require minimum 5 days' notice** to HWDSB project supervisor

2. Shutdowns must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.
3. The contractor is to coordinate with Board vendor/s to be on site to ensure boilers, roof top units, heat pumps, etc. are functioning properly after service disruption has concluded.

    - Chamberlain Building Services Inc - info@chbs.ca, 905-664-1914 or
    - Union Boiler Company Limited - info@unionboiler.com, 905-528-7977

4. If the boiler system is drained, the contractor upon refilling the system, is responsible for coordinating Board approved chemical treatment vendor to treat water.

    - Aquarian Chemicals Inc - info@aquarianchemicals.com, 905-825-3711

5. Process will vary based on services shutdown and ability to localize shutdown.

D. Asbestos Abatement and Designated Substance Related Work:

1. Designated substance related work **requires minimum 5 days' notice** to HWDSB project supervisor.
2. Designated substance related work in occupied areas must be completed outside of school bell times/operational hours which vary by facility and must be scheduled for evenings after 6:00 PM, weekends or board holidays.

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to:

1.1.1.1. CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents.

1.1.1.2. Division 01 requirements and documents referred to therein.

1.2. SUMMARY

1.2.1. Section Includes: Provide demolition and salvage including but not limited to following:

1.2.1.1. Selective demolition of interior walls and ceilings as shown in drawings including doors and frames.

1.2.1.2. Removal of existing base, wall finishes.

1.2.1.3. New and or enlarged openings in floor structure.

1.2.1.1. Items to be salvaged for reinstallation as part of the scope of work in this project:

1.2.1.1.1. Acoustic ceiling panels in existing ceilings to be reused as required for the infills at removed lighting and repairs of existing ACT.

1.2.1.2. Items to be salvaged to be turned over to the Owner:

1.2.1.2.1. As noted on drawings.

1.2.2. This section does not include the following:

1.2.2.1. Removal of hazardous materials or asbestos abatement.

1.2.2.2. Demolition of exterior building components or structural elements.

1.2.2.3. Mechanical or electrical equipment, except as required to make minor modifications to allow the work to be completed.

1.2.3. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.2.3.1. Construction phasing, and work restrictions: Section Request for Tender Documents

1.2.3.2. Alteration and repair requirements, making good: Section Request for Tender Documents

1.3. REFERENCES

1.3.1. Definitions:

1.3.1.1. Hand Demolition: Systematic demolition of structures by workers using hand-held tools.

1.3.1.2. Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos, PCB's, CFC's, HCFC's, poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

1.3.1.3. Construction Waste Management Plan: Written plan addressing opportunities for reduction, reuse, or recycling of materials.

1.3.1.4. Construction Waste Management Report: Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials.

1.3.2. Reference Standards:

1.3.2.1. CSA S350 - Code of Practice for Safety in Demolition of Structures

1.3.2.2. NFPA 241 - 2022, Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. 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, inspection of construction to be demolished, methods to be used, sequence and quality control, Project staffing, restrictions due to environmental protection requirements and other matters affecting demolition, to permit compliance with intent of this Section.

1.4.2. Review structural load limitations of existing structures. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays. Review and finalize protection requirements.

1.4.3. Coordination: Coordinate with Owner for the material ownership including but not limited to:

1.4.3.1. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor’s property and shall be removed from Project site.

1.4.4. Pre-Demolition Meetings:

1.4.4.1. Convene pre-idemolition meeting 1 week prior to beginning work of this Section and on-site installation, with Contractor, HWDSB Project Manager, and Consultant for each work area.

1.4.4.1.1. Confirm extent of salvaged and demolished materials

1.4.4.1.2. Review Contractor's demolition plan

1.4.4.1.3. Verify existing site conditions adjacent to demolition work

1.4.4.1.4. Coordination with other construction sub trades

1.4.4.2. Make a site inspection with HWDSB Project Manager and Consultant to examine existing conditions and areas adjacent to demolition work.

1.4.5. Scheduling:

1.4.5.1. Where practicable, remove or neutralize hazardous or toxic materials before demolition begins.

1.4.5.2. Phase selective demolition to be coordinated with Owner to accommodate new construction.

1.5. ACTION AND INFORMATIONAL SUBMITTALS

1.5.1. Submittals in accordance with Section 01 33 00 Submittal Procedures.

1.5.2. Action Submittals: Provide the following submittals before starting any work of this Section

1.5.2.1. Schedule of Demolition Activities: Coordinate with Section 01 32 16 - Construction Scheduling. Submit demolition, schedule showing timing and sequencing of the work in each work area. Deviation from schedule will not be permitted without approval from HWDSB Project Manager.

1.5.2.2. Construction Waste Management Plan: to identify materials for reduction, reuse, or recycling:

1.5.2.2.1. Descriptions of and anticipated quantities of materials to be salvaged, reused, recycled and landfilled.

1.5.2.2.2. Number and location of dumpsters.

1.5.2.2.3. Schedule and anticipated frequency of tippage.

1.5.2.2.4. Name and address of haulers, waste facilities and waste receiving organizations

1.5.3. Informational Submittals: Provide the following submittals when requested by the Consultant:

1.5.3.1. Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Consultants for work of similar complexity and extent.

1.6. CLOSEOUT SUBMITTALS

1.6.1. Submit copies of certified bills of lading or receipts from authorized disposal sites and reuse and recycling facilities for material removed from site.

1.7. QUALITY ASSURANCE

1.7.1. Comply with National Building Code, Part 8, Construction Safety Measures at Construction and Demolition Sites.

1.7.2. Do work in accordance with CSA S350 and NFPA 241 and comply with pertinent codes, regulations and insurance carriers providing coverage for this work.

1.7.3. Execute the work in strict accordance with The Occupational Health and Safety Act and Regulations for Construction Projects, latest addition. Keep copy of the Act at the place of the Work at all times.

1.8. DELIVERY, STORAGE AND HANDLIING

1.8.1. Ensure ceiling material being reclaimed has not come into contact or in any way contain hazardous materials or special waste.

1.8.2. Ensure ceiling material being reclaimed is dry and free from debris.

1.8.3. Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.9. EXISTING CONDITIONS

1.9.1. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1.9.1.1. Hazardous materials will be as defined in the Hazardous Products Act.

1.9.1.2. Hazardous materials, if found or suspected, will be removed by Owner before start of the Work. Do not disturb Hazardous Substances or items suspected of containing Hazardous Substances.

1.10. SITE CONDITIONS

1.10.1. Review "Designated Substance Report" and take appropriate precautions.

1.10.2. If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify HWDSB Project Manager immediately.

1.10.3. Proceed only after receipt of written instructions have been received from the HWDSB Project Manager.

1.10.4. Every part of the demolition work must be carefully planned, scheduled, and coordinated with the HWDSB Project Manager, including:

1.10.4.1. Hours of operation

1.10.4.2. Dust control, infection prevention and control.

1.10.4.3. Disruption to existing mechanical or electrical services, fire alarm, sprinkler, communications systems.

1.10.4.4. Noise control.

1.10.4.5. Protection to existing building

1.10.4.6. Access to the work area including procedures for movement and removal of materials.

1.10.5. Conform to restrictions for maintaining on-going school functions including roads, streets, sidewalks, passageways. Do not place or store materials anywhere outside of the work area.

1.11. MAINTENANCE MATERIAL SUBMITTALS

1.11.1. Bundle 25 existing acoustic ceiling panels, as selected from the ceiling removals by the HWDSB Project Manager for Owner's future maintenance use.

1.11.2. Execute Section 00 65 37.

PART 2 - PRODUCTS

2.1. MATERIALS

2.1.1. Description:

2.1.1.1. Regulatory Requirements:

2.1.1.1.1. Conform to The Occupational Health and Safety Act and Regulation for Construction Projects

2.1.1.1.2. Conform to OBC, especially Division C, Part 1, Article 1.2.2.3 as applicable.

2.1.1.1.3. Conform to Fire Code, Regulation under Fire Marshal Act especially Part 8.

2.1.1.1.4. Conform to requirements of Section 01 50 00.

2.1.2. Provide materials necessary for temporary bracing and shoring. On completion, remove temporary materials from site.

2.1.3. Materials and Products Removed From Existing Building

2.1.3.1. Refer to drawings for existing items that are designated to be carefully removed and reinstalled or relocated.

2.1.3.2. Refer to drawings for existing items that are to be carefully removed and handed over to the Owner.

2.1.3.3. Materials resulting from demolition and not required to be retained shall be removed promptly from site in accordance with requirements of authorities having jurisdiction and in safe manner to minimize danger at site and during disposal.

2.1.3.4. Materials that are to be removed from the site and can be reused should be sent to the appropriate facility. Submit a waste management plan to Consultant including items for recycling.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Review Project Record Documents of existing construction provided by Owner.

3.1.2. Consultant does not guarantee that existing conditions are the same as those indicated in Construction Documents.

3.1.3. Preliminary Survey:

3.1.3.1. Before commencing demolition operations in each work area, examine the area determine type of construction, materials, condition of structure, finishes to remain, and site conditions.

3.1.3.2. Assess potential effect of removal of any part or parts on remainder of structure before such part(s) are removed.

3.1.3.3. Prepare a complete photographic record of all finishes and equipment to remain. Note any damages, missing items, breaches in fire rated construction, potential hazardous materials, conditions that are different from what is shown in the Construction Documents, and any other items of concern that could impact the construction. Submit report of existing conditions before start of demolition operations, for each work area.

3.1.4. Existing Services:

3.1.4.1. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.

3.1.4.2. Identify all services and systems exposed as part of the demolition.

3.1.4.3. Verify services are cut off and properly capped before commencing associated or effected demolition.

3.1.4.4. Provide and maintain temporary fire alarm and fire protection services required during demolition to satisfaction of authorities having jurisdiction, fire departments and HWDSB Project Manager.

3.1.4.5. Verify prior to commencement work of this Section that disconnection and capping of medical gas, electrical and mechanical services have been carried out.

3.1.4.6. Verify that dust control hoardings, and infection prevention measures have been completed, inspected and accepted before proceeding.

3.2. PREPARATION

3.2.1. Protection of In-Place Conditions:

3.2.1.1. Post suitable warning signs outside of work area for protection of patients and public. Supervise entrance to work area to prevent entrance by unauthorized persons. If requested, provide lockable doors to prevent public entering danger zone.

3.2.1.2. Post warning signs on electrical lines and equipment which must remain energized to serve other portions of the building during period of demolition.

3.2.1.3. Provide fire extinguishers acceptable to fire prevention authorities in locations and of type suitable to enable personnel to deal with fire occurring during progress of work.

3.2.1.4. Ensure that temporary fire separations are in place to maintain the integrity of existing fire separations, before commencement of demolition work.

3.2.2. Environmental Protection:

3.2.2.1. Do not interfere with infection control air pressure systems, ventilation and dust proof hoardings at any time.

3.2.2.2. Prevent extraneous materials from contaminating ductwork, or cavities in the structure beyond the work area by providing temporary enclosures during demolition work.

3.2.2.3. Removal of all demolition materials shall be in sealed containers.

3.2.3. Protection to Existing Services:

3.2.3.1. Provide protection required to enable existing building services, systems and equipment to remain in continuous and normal operations.

3.2.3.2. Demolition shall be carried out in a manner to ensure the minimum of disruption to Owner, and other contractors working in the building.

3.3. DEMOLITION — GENERAL

3.3.1. Execute work in conformance to Hamilton-Wentworth District School Board requirements. Notify HWDSB Project Manager before disrupting building access or services.

3.3.2. Carry out demolition in accordance with CSA S350-M. Demolish structure and remove materials from site. Use hand tools only. Use of pneumatic or hydraulic equipment must be reviewed and approved. Adhere to manufacturer's recommendations in use of hand held tools while conforming to the Occupational Health and Safety Act requirements. The use of chutes to lower demolition materials and debris must be coordinated with HWDSB Project Manager. Do not create falling materials hazard.

3.3.3. Do not demolish spray or trowel-applied friable materials, materials suspected of containing PCBs or other hazardous materials. Where such materials are encountered notify HWDSB Project Manager immediately. Do not proceed until instructions have been received from HWDSB Project Manager.

3.3.4. Remove mechanical and electrical items indicated to be removed. Remove all abandoned services, communication lines, electrical wiring, plumbing, and ductwork.

3.3.5. The use of pneumatic or electrical jack hammers is not permitted.

3.3.6. Report any existing conditions uncovered by the demolition work that require remediation. This includes:

3.3.6.1. Damaged or unsafe services.

3.3.6.2. Unsupported services, structural members or missing hangers.

3.3.6.3. Incomplete insulation, vapour retarder or air barrier.

3.3.6.4. Incomplete or unacceptable fire separation, missing seals, fire dampers, fireproofing or firestopping.

3.3.7. Minimize noise. Avoid use of noisy equipment. Proposed methods for demolition to be reviewed at the pre-construction meetings ahead of the work in each work area.

3.3.8. Firestopping and Smoke Seal: In event work of this Section impacts on integrity of fire separations, ensure trade performing firestopping is notified.

3.3.9. Demolition for new services:

3.3.9.1. Cut openings through existing walls, partitions, roofs and floors. Establish exact location of steel reinforcing and conduits in existing concrete slabs or walls before cutting. Locate using non destructive, non ionizing radio frequency locators, magnetic scanning or X-ray. Scanning procedures and proposed methods and equipment to be reviewed with HWDSB Project Manager before proceeding. Be responsible for damage to existing steel reinforcing and be liable for structural failure.

3.3.9.2. Neatly cut openings and holes plumb, square and true to dimensions required. Use cutting methods least likely to damage remaining or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3.3.9.3. Openings to allow passage of ducts shall be closed tight to perimeters of duct at all locations where fire dampers are required.

3.3.10. Where items are to be removed from existing structure or surfaces that are to remain in place, remove those items complete with hangers, brackets and other readily removable supports and fastenings:

3.3.11. Building Services:

3.3.11.1. Arrange with HWDSB Project Manager to disconnect or interrupt existing school services. Cut-off and cap existing building services under Owner's supervision.

3.3.11.2. Coordinate with Mechanical and Electrical respectively for removal, relocation and reinstallation of mechanical and electrical items.

3.3.11.3. Prevent demolition debris from entering building drains.

3.3.12. Relocation of Salvaged Items:

3.3.12.1. Carefully remove, store, protect and re-install where applicable existing materials and equipment noted on Drawings to be retained and relocated. Relocate items to be retained and store them in areas directed by Consultant. In addition to items indicated on Drawings, Owner still reserves the right to retain any items or materials.

3.3.13. In areas where work is required to be performed over acoustic ceilings composed of lay-in panels in a supporting grid, panels shall be carefully removed to avoid damage and replaced when the work is completed. If existing lay-in panels in a room are damaged and cannot be matched with new panels, then all the panels in that room shall be replaced with new units to the Consultant's approval at no additional cost to the Owner.

3.3.14. Restore disturbed fireproofing membranes or coverings to existing structural steel members and open web steel joists with materials and methods acceptable by the authorities having jurisdiction.

3.4. STOCKPILING

3.4.1. Label stockpiles, indicating material type and quantity.

3.4.2. Designate appropriate security resources/measures to prevent vandalism, damage and theft.

3.4.3. Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.4.4. Separate from general waste stream each of following materials. Stockpile materials in neat and orderly fashion for alternate disposal. Stockpile materials in accordance with applicable fire and safety regulations.

3.4.4.1. Glass fibre ceiling tiles.

3.4.4.2. Wood fibre ceiling tiles.

3.4.4.3. Wiring and conduit.

3.4.4.4. Outlets/switches.

3.4.4.5. Floor receptacles.

3.4.4.6. Metal duct work, baffles, HVAC equipment.

3.4.4.7. Demountable partitions.

3.4.4.8. Drapes.

3.4.4.9. Tracks and blinds.

3.4.4.10. Insulation batts.

3.4.4.11. Miscellaneous metals.

3.4.4.12. Carpet.

3.5. DEMOLITION - STRUCTURAL STEEL, EQUIPMENT SUPPORTS

3.5.1. Review Structural design for full scope of demolition

3.5.2. Dismantle steel members and maintain structure stable. Do not place excessive loads on components.

3.5.3. Install adequate temporary guys and supports to ensure stability and to prevent excessive loading.

3.5.4. Support each component being disconnected from structure, and lower, do not drop, component after it is disconnected.

3.6. REMOVAL OF CONCRETE

3.6.1. Saw cut and remove portions of existing roofing as required to allow for new installations as indicated. Cut or break-up concrete into small pieces. Do not allow pieces to fall on floor slab or ceilings below.

3.6.2. Cut in smooth, uniform, straight lines. Take care to remove only as much as required.

3.6.3. Do cutting and removal in accordance with structural requirements, do not endanger Work or property.

3.6.4. Where reinforcing steel is to be left in place, use saw cuts from surface of reinforcing steel around perimeter(s) of area(s) to be demolished. Retouch damaged coating of existing reinforcing steel.

3.6.5. Take precautions to adequately support structure, provide bracing required for safety and execution of the Work. Coordinate with structural requirements

3.7. REMOVAL OF EXISTING WINDOWS, DOORS AND FRAMES

3.7.1. Remove existing frames and glazing where indicated on drawings. Protect areas exposed by removal from the elements, rain, snow. Protection shall be installed immediately as removal Work proceeds and disturbed areas shall be made watertight at end of each work shift.

3.7.2. Remove infill panel and air conditioning unit including supporting steel framing, where indicated in drawings.

3.8. REMOVAL OF CEILINGS AND WALLS

3.8.1. Remove existing ceilings as shown in drawings and as required for installation of new partitions, equipment and/or new mechanical or electrical services.

3.8.2. Carefully remove acoustical ceiling panels keeping panels horizontal as much as possible. Vacuum clean top surface immediately upon removal using HEPA filter equiped vacuum cleaner.

3.8.3. Clean surfaces of all existing air ducts, conduits, piping and equipment above ceiling before any work is started using HEPA filter equiped vacuum cleaner.

3.8.4. Store and protect ceiling panels for re-installation after work above ceiling is complete, except where new ceilings are indicated. Replace damaged ceiling components with new materials to match existing.

3.8.5. Remove existing walls or portions thereof, where indicated and provide openings where required. Cut surfaces in smooth, uniform, straight, plumb lines.

3.8.6. When removing ceilings, remove entire ceiling systems including hangers and remove hangers used for support of light fixtures in such areas.

3.8.7. Take precautions to adequately support structure, provide bracing required for safety and execution of the work. Coordinate with structural requirements.

3.8.8. With reference to Ont. Reg 278, follow appropriate abatement procedures for all Type 1, Type 2, and Type 3 Operations as described in the regulation. This includes the removal of gypsum board and joint compound material. The cost for this hazardous materials abatement is included in the guaranteed price contract, not part of a cash allowance.

3.9. REMOVAL OF MASONRY

3.9.1. Remove masonry units not more than 1 block at a time, carefully lowered to the floor. Masonry shall neither be loosened in large masses nor permitted to fall in mass on floors.

3.9.2. Provide adequate temporary support where openings have been cut in masonry walls to prevent masonry displacement, cracking or other damage until permanent support is in place. Coordinate installation of new lintels in existing walls with structural work, metal fabrications work and masonry work.

3.10. REMOVAL OF RESILIENT FLOOR FINISHES

3.10.1. Strip all adhesive, underlayment or other cleavage membranes.

3.10.2. Coordinate surface preparation of concrete slab with flooring trades in Division 09. Leave substrate flush, smooth and level suitable for new floor finish.

3.11. EXISTING SLAB PREPARATION

3.11.1. Remove existing floor finishes and bases as noted above.

3.11.2. At existing locations where flooring and base has been removed, where concrete curbs, bases, steps and pads have been removed, grind and patch existing concrete slabs as required and clean slab and base surfaces, remove ridges, bumps, adhesives and other matter detrimental to bond of levelling coat, new finish application or underlayment. Surfaces shall be smooth, level and free of gouges; prepare for levelling coat and/or new finish application specified in respective Sections or underlayment.

3.11.3. At existing locations designated to receive new flooring, remove paint, old adhesives, and hard applied finishes by grinding or other approved means, as required to accommodate new flooring. Prepare for flooring application. Coordinate requirements with Work specified in flooring Sections.

3.11.4. At existing locations where slabs have been contaminated with oil, grease, resins or other such material not compatible with subsequent applied underlayment or flooring, remove contaminants by blast tracking or prepare existing surfaces by other approved means.

3.11.5. Rinse subfloor and vacuum clean.

3.12. MISCELLANEOUS DEMOLITION

3.12.1. Remove millwork items, washroom accessories, fitments, and other such components as indicated on the drawings.

3.12.2. Remove fixtures, tracks, shelves, doors, frames, and railings that are attached to partitions and ceilings identified to be removed in the drawings.

3.13. CUTTING AND PATCHING

3.13.1. Obtain Consultant's approval before cutting, boring or sleeving load-bearing members.

3.13.2. Cut and patch as required to make work fit.

3.13.3. Make cuts with clean, true, smooth edges.

3.13.4. Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

3.13.5. Patch openings created where mechanical and electrical services are removed in existing building.

3.13.6. Use specialists in affected materials to execute cutting, fitting and remedial work.

3.13.7. Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.

3.14. CLEANING

3.14.1. Waste Management:

3.14.1.1. Clear away dirt, rubbish and loose litter resulting from work of this Section, minimum daily. Keep dust to a minimum. Sweep clean work area daily. Remove demolished materials from the work area daily.

3.14.1.2. Removal of debris from the work are to be done at times scheduled with HWDSB Project Manager, using designated route to exterior location on site. Use covered wheeled bins only to transport materials from the work area.

3.14.1.3. Demolition materials to be placed in covered bins in location on site where shown on drawings.

3.14.1.4. Maintain site area around bins clean, safe and secure.

3.14.1.5. Selling or burning of materials on site is not permitted.

3.14.1.6. Conform to Waste Management Plan for delivery of materials to suitable recycling yards. Conform to requirements of authorities having jurisdiction regarding disposal of other waste materials.

3.14.1.7. Materials prohibited from municipality waste management facilities shall be removed from site and disposed of at companies specializing in handling contaminated materials.

3.14.1.8. Obtain weigh bills and receipts to document the disposal of all waste materials including recycled materials. Submit copies of these receipts as requested by consultant/owner.

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to:

1.1.1.1. Division 01 requirements and documents referred to therein.

1.2. SUMMARY

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

1.2.1.1. 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.).

1.2.1.2. Seals to form draft tight barriers to retard passage of flame and smoke and where specifically designated, passage of liquids while passing hose stream test.

1.2.2. Systems and specified Products are only a guide and may not address all firestopping conditions pertaining to situations which may be present in the Work. Provide firestopping and smoke seal required for the Work. These Products and systems are not presented to restrict other tested and approved listed assemblies of other manufacturers designing assemblies conforming to Code and resolving firestopping required for the Work.

1.3. REFERENCES

1.3.1. Definitions:

1.3.1.1. Firestop System Types:

1.3.1.1.1. Head of Wall Joint Firestop Systems (HW): Systems intended for installation in vertical separations between wall and floor or roof structures. Ensure these systems do not incorporate penetrating items such as pipes or cables.

1.3.1.1.2. Joint Firestop Systems (JF): Systems intended for installation in openings such as construction joints, gaps and spaces in floors or walls or at floor and wall intersections in accordance with approved systems. Ensure these systems do not incorporate penetrating items such as pipes or cables.

1.3.1.1.3. Perimeter Joint Firestop Systems (PJ): Perimeter joint firestop system rating are governed by lowest of fire resistance ratings of individual components (i.e. wall, floor or joint system). These systems consist of floor with fire endurance rating, exterior wall with or without fire endurance rating and perimeter joint system. Ensure these perimeter joint firestop systems do not incorporate penetrating items such as pipes or cables.

1.3.1.1.4. Service Penetration Firestop Systems (SP): Systems intended for installation in openings of limited dimensions and shape in floor or wall assemblies in accordance with approved systems. Ensure penetrating pipes, cable trays and similar items are in exact accordance with approved systems.

1.3.1.1.5. Service Penetration for Combustible Systems (SPC): Systems intended for installation in openings of limited dimensions and shape in floor or wall assemblies in accordance with approved systems. Ensure penetrating pipes are in exact accordance with approved systems. These systems are

tested with a minimum differential pressure of 50 Pa between exposed and unexposed surfaces of assembly to meet Code requirements for Combustible Pipes for Use in Drain, Waste and Vent Piping.

1.3.1.2. Ratings: Rating of firestop system applies to its use in specific assembly of materials, penetration and floor or walls in which it is tested as follows:

1.3.1.2.1. F Rating: When system remains in opening during fire test for rating period without permitting passage of flame through openings or occurrence of flaming on any element of unexposed side of assembly.

1.3.1.2.2. FT Rating: When system remains in opening during fire test in accordance with F Rating requirement and additionally, transmission of heat through firestop system during rating period shall not have been such as to raise temperature of any thermocouple on unexposed surface of system more than 163 deg C (325 deg F) above initial temperature.

1.3.1.2.3. FH Rating requirement and additionally, during hose stream test firestop system shall not develop any opening that would permit a projection of water from stream beyond unexposed side.

1.3.1.2.4. FTH Rating: When system remains in opening during fire test and hose stream test within limitations described for F, FT and FH ratings.

1.3.1.2.5. L Rating: Based on volume of air flowing, per unit of time through opening around test sample under specified pressure difference applied across surface of system. L Ratings are intended to determine acceptability of firestop systems with reference to control of air movement through assembly. Rating is expressed in litres per second (ℓ/s) per linear metre of opening for joint systems.

1.3.2. Reference Standards:

1.3.2.1. ASTM G21 - Standard practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

1.3.2.2. CAN/ULC-S101- Standard Methods of Fire Endurance Tests of Building Construction and Materials

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

1.3.2.4. CAN/ULC-S115 - Standard Method of Fire Tests of Firestop Systems

1.3.2.5. ULC Guide No. 40 U19 - Firestop Systems

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

1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Coordination:

1.4.1.1. Coordinate construction of openings and penetrating items to ensure that through-penetration fire-stop systems are installed according to specified requirements.

1.4.1.2. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire-stop systems.

1.4.1.3. Notify manufacturer's representative at least seven days in advance of through-penetration fire-stop system installations; confirm dates and times on days preceding each series of installations.

1.4.1.4. Do not cover up through-penetration fire-stop system installations that will become concealed behind other construction until manufacturer's representative and building inspector, if required by Authorities Having Jurisdiction, have examined each installation.

1.4.2. Preinstallation Meetings:

1.4.2.1. Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Consultant. Presided over by Contractor include Consultant who may attend, Subcontractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline.

1.4.2.2. Review Contract Documents for work included under this trade 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 work of this Section.

1.5. SUBMITTALS

1.5.1. Submittals in accordance with Submittal Procedures as specified in Section 01 10 00.

1.5.2. Product Data:

1.5.2.1. Submit manufacturers' specifications and technical data for each material including compositions, limitations, documentation conforming ULC and/or cUL firestop system proposed for this Project and manufacturers' installation instructions.

1.5.3. Shop Drawings:

1.5.3.1. Submit complete and detailed Shop Drawings for each condition encountered on site. Indicate following:

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

1.5.3.1.2. Required temperature rise and flame rating.

1.5.3.1.3. Hose stream rating (where applicable).

1.5.3.1.4. Thickness.

1.5.3.1.5. Proposed installation methods.

1.5.3.1.6. Material of firestopping and smoke seals, primers, reinforcements, support and securement methods, damming materials, reinforcements and anchorages /fastenings.

1.5.3.1.7. Size of opening.

1.5.3.1.8. Adjacent materials.

1.5.3.1.9. Number of penetrations.

1.5.3.2. Designate on Shop Drawings fixed penetrants, relative positions, number of penetrations, expansion and control joints in rated slabs and walls, firestopping details at receptacles and similar poke-through devices and surrounding permanent materials. Identify re-entry locations.

1.5.3.3. Submit fireproofing manufacturer's written verification that manufacturers have identified where firestopping is required, have selected correct firestop system and applicators have been trained by system manufacturers. Products, systems and assemblies have been installed in accordance with manufacturer's requirements.

1.5.4. Certificates:

1.5.4.1. Submit manufacturer's verification that installed firestopping and smoke seal materials comply with specified requirements.

1.5.4.2. Submit copies of ULC, Warnock Hersey and/or cUL Listing cards for review.

1.6. QUALITY ASSURANCE

1.6.1. Qualifications:

1.6.1.1. Installers: 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.

1.6.2. Ensure work of this Section is by 1 Subcontractor responsible for firestopping materials and systems for all work except as specified herein.

1.6.3. Ensure firestopping systems conform to requirements of CAN/ULC-S115 tested assemblies that provide fire rating as shown.

1.7. SITE CONDITIONS

1.7.1. Ambient Conditions:

1.7.1.1. 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.

1.7.1.2. 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.

1.7.1.3. Ventilate areas in which firestopping is being applied. Protect water-soluble material from wetting until fully cured.

1.8. WARRANTY

1.8.1. Manufacturer Warranty: 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. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

2.1.1.1. 3M Canada; www.3m.ca

2.1.1.2. A/D Fire Protection Systems Inc.; www.adfire.com

2.1.1.3. Hilti (Canada) Corporation; www.hilti.ca

2.1.1.4. Tremco Canada; www.tremcosealants.com

2.1.2. Substitution Limitations: This Specification is based on Hilti (Canada) Corporation’s Products. Comparable Products from manufacturers listed herein will be reviewed provided they meet requirements of this Specification. No further substitutions will be permitted.

2.2. MATERIALS

2.2.1. Performance/Design Criteria:

2.2.1.1. Ensure firestop systems intended for installation in fire separations have assigned fire ratings as defined herein when tested in accordance with CAN/ULC-S115. Ensure firestop systems intended for use in fire resistive wall and/or floor assemblies are evaluated in accordance with CAN/ULC-S101 (Refer to ULC Guide No. 40 U19).

2.2.1.2. For “L Rating” systems, ensure results do not exceed 5.0 cfm/sq ft of penetration opening at both ambient and elevated temperatures.

2.2.1.3. Mould Resistance: Provide penetration firestopping with mould and mildew resistance rating of 0 or 1 in accordance with ASTM G21.

2.2.1.4. Supply materials and systems capable of effectively impeding passage of fire, smoke, gasses and where specifically indicated passage of liquids. Use only firestop systems that have been ULC and/or cUL tested for specific fire rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire rating involved for each separate instance.

2.2.1.5. Ensure firestopping system provides fire-resistance rating, flame and temperature not less than fire resistance rating of surrounding floor, wall or assembly, in accordance with requirements of OBC.

2.2.1.6. Firestop System Rating: Where applicable, comply with F Rating based on number of hours system can resist flames and gases; T Rating based on maximum temperature rise of 163 deg C (325 deg F) above ambient for any thermocouple in addition to flame, gas and stream performance and H Rating based on capacity to withstand hose stream after burn. Design combined and/or built-up site systems in accordance with approved restrictions and technical evaluations acceptable to Consultant and authorities having jurisdiction.

2.2.1.7. Ensure systems provide fire and temperature rating in accordance with those outlined in OBC and effectively impeding passage of flame, smoke and gasses.

2.2.1.8. Firestopping seals except for wall joints in visible areas must be of easily identifiable colour, such as red or yellow to be clearly distinguished from other building materials.

2.2.1.9. Ensure service penetration components and assemblies, including back-up materials and supports are certified in accordance with CAN/ULC-S115 or CAN/ULC-S101 and be ULC listed by a certified authority recognized by building Code officials in locality in which Building is situated.

2.2.1.10. Ensure suitability of Products for application and compatibility of materials with surfaces to which it will be applied.

2.2.1.11. Ensure site system assembly is in accordance with CAN/ULC-S115 labeled and listed system design limitations, unless proposed assembly is approved by authorities having jurisdiction and meets Consultant's review. Design combined and/or built-up site systems in accordance with approved restrictions and technical evaluations acceptable to authorities having jurisdiction as reviewed by Consultant. Engineering Judgements from firestopping manufacturers reviewed by Consultant and authorities having jurisdiction may be used for conditions where a ULC and/or cUL firestopping system is not available. Ensure Engineering Judgements are performed in accordance with IFC’s “Recommended IFC Guidelines for Evaluating Firestop Systems in Engineering Judgments (EJs)”

2.2.1.12. Ensure sealants and putty for overhead and vertical joints are non-sagging; seals for floors, self-levelling. Ensure flexible fire stop sealant provides movement capability in fire rated joint applications. Ensure sealants are compatible with base materials such as without limitations masonry, concrete, metal, gypsum board and other similar items.

2.2.1.13. Ensure Products have a compressive strength capable of providing self support at a penetrating item and shall maintain their integrity as tested in a ULC vertical application.

2.2.1.14. Ensure Products are compatible with abutting dissimilar architectural coatings and finishes at floors, walls, ceilings, waterproofing membranes and the like. Check with Room Finish Schedule and manufacturer of selected materials being installed.

2.2.1.15. Integral Pipe Sleeves/Firestopping Components: Other Sections within Divisions 21, 22 and 23 may specify fire-rated pipe sleeves, cast-in pipe/sleeve assemblies and integral firestopped penetration devices and accessories listed by authorized testing and certification authorities. These systems may eliminate need for separate firestopping applications at certain designated locations and it is responsibility of this Section to determine any and all locations where such devices will be utilized on Project.

2.2.1.16. Do not provide Products containing asbestos.

2.2.1.17. Firestopping System 1 (JF and/or PJ Systems):

2.2.1.17.1. This Firestopping System is primarily an expansion, control and perimeter seal without smoke resistance and be non-combustible, semi-rigid, felt fire protection. Certified assembly of 1 of listed manufacturers and acceptable to Consultant.

2.2.1.17.2. Ensure blanket type firestopping is listed and labelled in accordance with ULC Guide No. 40 U19 or 40 U19.13, with reference to “JF System Listings”.

2.2.1.17.3. Where required by listing, ensure impaling clips are heavy gauge galvanized wire or 25 mm (1") wide x 0.607 mm (24 ga) galvanized steel, Z formed with horizontal bottom and dimensions conforming to location of firestopping and width of void to be filled. Ensure compression of joint do not damage clips.

2.2.1.18. Firestopping System 2: Same materials as in System 1, but without use of impaling clips and with smoke and fluid seal with hose stream resistance. Certified assembly of 1 of listed manufacturers and acceptable to Consultant.

2.2.1.19. Firestopping System 3: Fire, gas, fluid and hose stream resistant elastomeric sealant with movement capabilities, ULC labeled assembly of 1 of listed manufacturers and acceptable to Consultant. Ensure materials have elastic characteristics where used at openings subject to movement. Intumescent pads may form part of this system, at Contractor’s option.

2.2.1.20. Firestopping System 4: Ensure firestopping, gas, fluid and hose stream resistant seals at openings intended for ease of re-entry such as cables be an elastomeric seal or proprietary assembly of following types; a cementitious or rigid seal at such locations is not permitted. Certified assembly of 1 of listed manufacturers and acceptable to Consultant.

2.2.1.21. Firestopping System 4-A: Where openings are considered large such as at cable trays and bus ducts. Certified assembly of 1 of listed manufacturers and acceptable to Consultant.

2.2.1.22. Firestopping System 5 (Cavity Wall Compartment Closer and Firestopping): Strips of "RXL Safe" semi-rigid mineral fibre insulation by Roxul Inc.; www.roxul.com 75 mm (3") wide by depth of cavity plus 13 mm (1/2") with galvanized skewers for securement at 300 mm (12") oc., or compressed 25% to fill depth of cavity.

2.2.2. Primers: To manufacturer's recommendations for specific material, substrate and end use.

2.2.3. Damming and Backup Materials, Supports and Anchoring Devices: Non-combustible, to manufacturer's recommendations in accordance with tested assembly being installed and as acceptable to authorities having jurisdiction. Ensure sheet steel covers over temporarily unused

sleeves in tenant and similar spaces are minimum 0.912 mm (20 ga) thick galvanized sheet steel formed to a tight fit over opening with specified firestopping materials installed beneath. Combustible materials are acceptable only if they are approved under ULC or cUL systems, otherwise they should be removed after permanent firestop materials have cured.

2.2.4. Pre-Installed Firestop Devices: For use with non-combustible and combustible pipes (closed and open systems), conduit and/or cable bundles penetrating concrete floors, provide 1 of following Products:

2.2.4.1. “Cast-In Firestop Device (CP 680-P)” by Hilti (Canada) Corporation.

2.2.4.2. “Cast-In Firestop Device (CP 680-PX)” by Hilti (Canada) Corporation for use with XFR pipe.

2.2.4.3. “Cast-In Firestop Device (CP 680-M)” by Hilti (Canada) Corporation for use with non-combustible penetrants.

2.2.4.4. “Firestop Drop-In Device (CFS-DID)” by Hilti (Canada) Corporation for use with non-combustible and combustible penetrants.

2.2.5. Pre-Formed Materials: For use with standard head-joint top tracks and bottom-joint tracks and slip-type head joints in fire-rated construction at top or bottom of partition, provide following Product:

2.2.5.1. “Firestop Top Track Seal (CFS-TTS)” by Hilti (Canada) Corporation.

2.2.6. Re-Penetrable, Round Cable Management Devices:

2.2.6.1. For use with new cable bundles penetrating gypsum board or masonry walls, provide following Product:

2.2.6.1.1. “Speed Sleeve (CP 653)” by Hilti (Canada) Corporation with integrated smoke seal fabric membrane.

2.2.6.2. For use with existing cable bundles penetrating gypsum board or masonry walls, provide 1 of following Products:

2.2.6.2.1. “Firestop Cable Collar (CFS-CC)” by Hilti (Canada) Corporation.

2.2.6.2.2. “Firestop Retrofit Sleeve Kit (CFS-SL RK)” by Hilti (Canada) Corporation.

2.2.7. Single or Cable Bundles up to 25 mm (1”) Diameter: Penetrating gypsum board, masonry, concrete walls or wood floor assemblies, provide following Product:

2.2.7.1. “Firestop Cable Disc (CFS-D 1”)” by Hilti (Canada) Corporation

2.2.8. Pipe and Duct Insulation and Wrappings Compatible with Firestopping Systems: "TREMstop WS" by Tremco Canada or “3M™ Fire Barrier Duct Wrap 615” by 3M Canada.

2.2.9. Intumescent Pads: “Firestop Block (CFS-BL)” by Hilti (Canada) Corporation or “3M™ Fire Barrier Putty Sleeve Kits” by 3M Canada.

2.2.10. Re-Entry Pillows: Permanently pliable, “Firestop Block (CFS-BL)” by Hilti (Canada) Corporation, "TREMstop PS" by Tremco Canada or “3M™ Fire Barrier Self Locking Pillows” by 3M Canada.

2.2.11. Mixes:

2.2.11.1. Mix materials at correct temperature and in accordance with manufacturer's directions.

2.2.11.2. Cleaning Materials: As recommended by firestop manufacturer.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. 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.

3.1.1.2. Verify openings, dimensions and surfaces conform to fire and smoke seal assembly.

3.1.1.3. Examine sizes of penetrating service, percentage fill and sleeve or opening sizes with exact annular space calculations, anticipated movement and conditions necessary to establish correct type, thickness and installation of back-up materials and seals.

3.1.1.4. Since firestop systems do not re-establish structural integrity of load bearing partitions/ assemblies, or support live loads and traffic, consult structural engineer prior to penetrating any load bearing assembly.

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

3.2. PREPARATION

3.2.1. Surface Preparation:

3.2.1.1. Provide primer or surface conditioner if required by Product manufacturer. Prime surfaces in accordance with manufacturer's directions.

3.2.1.2. Remove combustible material and loose material detrimental to bond from edges of penetration. Clean, prime or otherwise prepare substrate material to manufacturer's recommendation.

3.2.1.3. Remove insulation from insulated pipe and duct where such pipes or ducts penetrate a fire separation unless ULC certified assembly permits such insulation to remain within assembly, or where mechanical trades have installed special fire rated insulated sleeves. Ensure continuity of thermal and vapour barriers where such are removed, altered or replaced, to satisfaction of Mechanical and Electrical and Consultant.

3.2.1.4. Alternatively, ensure pipe and duct insulation and wrappings occurring within openings to receive firestopping and smoke seals under this Section are installed prior to work of this Section and insulation and wrappings within fire seals are ULC listed components of system to be installed under this Section, unless ULC certified assembly permits such other insulation and wrappings to remain within assembly. Coordinate work of this Section with Mechanical and Electrical.

3.2.1.5. Clean bonding surfaces to remove deleterious substances including dust, paint, rust, oil, grease, moisture, frost and other foreign matter which may otherwise impair effective bonding.

3.3. INSTALLATION

3.3.1. 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.

3.3.2. Provide temporary forming, packing and bracing materials necessary to contain firestopping. Upon completion, remove forming and damming materials not required to remain as part of system.

3.3.3. Install damming and firestopping materials as per manufacturer's instructions.

3.3.4. Mix and apply firestopping and smoke seals in accordance with manufacturer's instructions and tested designs to provide required fire (temperature and flame) rated seal, to prevent passage of smoke and where specifically designated, passage of fluids.

3.3.5. Provide temporary forming and packing as required. Apply materials with sufficient pressure to properly fill and consolidate mass to seal openings.

3.3.6. Tool or trowel exposed surfaces. Allow materials to cure by not covering up materials until full curing has taken place.

3.3.7. Where a designated system described hereinafter does not meet Code requirements for particular service condition, substitute with next higher system meeting required rating.

3.3.8. Notify Consultant when completed installations are ready for inspection and prior to concealing or enclosing firestopping and smoke seals.

3.3.9. System 1:

3.3.9.1. Install fire rated joint firestopping by compressing material minimum of 25% to ensure complete sealing and to follow irregularities of concrete slabs at perimeter of building where junction occurs with back of cladding system. Apply firestopping sealant of spray over compressed mineral wool.

3.3.9.2. Butt succeeding sections of firestopping material tightly up against preceding. Leave no voids.

3.3.9.3. Provide firestopping between exterior wall cladding and concrete floor slab. Secure and support to suit design requirements.

3.3.9.4. Use this System for joint seals through fire-resistance rated floor slabs, ceilings and roofs unless otherwise stipulated.

3.3.10. System 2:

3.3.10.1. At fire-rated masonry walls and gypsum board partitions which extend nominally to within 19 mm (3/4") of underside of deck above, insert fire rated joint assembly firestopping material in 25% compression in accordance with ULC test requirements and manufacturer's instructions. Provide adequate depth of material to fill gap flush with face of wall, except as otherwise specified. Apply firestopping sealant of spray over compressed mineral wool.

3.3.10.2. Insert at intersection of fire-resistance rated masonry and gypsum board partitions.

3.3.10.3. Insert at both sides of control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

3.3.10.4. Where wall/slab junction is exposed in finished work, keep fibre back 9 mm (3/8") from face of block and apply fire-resistant sealant to gap, tooling to a concave joint.

3.3.10.5. At perimeter slab locations where this system would otherwise be exposed in finished work and where smoke seal is required, provide cover spray material of thickness as recommended by manufacturer of System 3 material set flush with top of slab and tooled smooth. Minimum cover spray thickness 3 mm (1/8"). Where anticipated movement in joint width is inevitable, select sealant with elastic capabilities.

3.3.11. System 3:

3.3.11.1. This System establishes fire rated firestopping for service penetrations throughout the Project. Seal gaps and holes in fire-rated walls and slabs and composite construction through which conduit, wire, cables, ductwork, piping and other protrusions pass as a result of work using fire-resistant penetration sealant. Include opening which have been formed, sleeved and cored.

3.3.11.2. Apply at unpenetrated openings and sleeves installed for future use through fire-resistance rated assemblies.

3.3.11.3. Apply this System between spaces having different air pressures. (See Mechanical Drawings for pressurized areas and locations of moving penetrants.)

3.3.11.4. Apply at "wet" rooms supported by suspended slabs at locations over Electrical and Equipment Rooms or similar areas containing power devices in which future re-entry is not required.

3.3.11.5. Apply at Mechanical Rooms and similar rooms having systems containing liquids, including piping runs, unless such rooms are located over slab-on-grade.

3.3.11.6. Install System 3 materials at elevator shafts, duct shafts and other similar locations over occupied spaces.

3.3.11.7. Install 6 mm to 9 mm (1/4" to 3/8") bead of firestop caulking at interface of retaining angles around fire dampers, where angles meet fire-rated assembly and between retaining angles and fire damper, both sides of penetration. At floor locations, sealant bead at top of assembly is adequate.

3.3.11.8. Where necessary, remove insulation from insulated pipe and duct where such services penetrate a fire separation unless certified assembly permits such insulation to remain within assembly. Apply wrapping materials as listed herein.

3.3.11.9. Install System 3 materials at open wall joints, including expansion joints between fire rated enclosures and assemblies.

3.3.12. Systems 4 and 4A: Install at following locations:

3.3.12.1. At Electrical, Electrical Switchgear, Electrical Transformer Rooms and at Telephone Equipment Rooms requiring re-entry for additional services.

3.3.12.2. Install at communications and computer cable penetration points throughout.

3.3.13. System 5: Maintain maximum cavity wall compartments to lesser of following 2 criteria by bridging gap between cavity back-up material and back face of brick with full-depth strips of compartment closer and firestopping material, securing in position with mechanical fasteners and sealing against firm, primary cavity materials:

3.3.13.1. 10 m² (100 sq ft).

3.3.13.2. Division B, Part 3, Paragraph 3.1.11 of OBC.

3.3.14. Accessories: At hollow fire-rated walls, apply intumescent pads to back surfaces and cable entry points of electrical boxes, panels and other service penetration points, ensuring close coordination with electrical, mechanical and drywall trades. Where greater dimension of panel exceeds 500 mm (20"), gypsum board trades construct fire-rated enclosure around recessed panels.

3.3.15. Penetration Sizing: Ensure following regulates sizing of service penetrations to be firestopped, other than for fire dampered openings:

3.3.15.1. Ensure single, circular penetration is sleeved by work of Divisions 21, 22, 23, 26, 27 and 28.

3.3.15.2. Multiple penetrations of circular elements are defined as more than 1 circular penetration having a maximum space of 100 mm (4") between closest faces of such penetrating elements. Forming of such multiple penetrations is responsibility of respective trades whose service penetrates rated assembly and such formed opening shall be square or rectangular frame around group of penetrations in which maximum clearance between outer penetration element and face of opening shall be 25 mm (1").

3.3.15.3. Create single and multiple rectangular penetrations in same manner as specified above, but edge clearance may be increased to a maximum of 50 mm (2").

3.3.15.4. Exception; at fire dampers, clearances are governed by testing authorities' requirements.

3.3.15.5. For purposes of this Specification, a moving penetrant is defined as a penetrating device having an anticipated movement of greater than 9 mm (3/8") when measured at right angles to face of rated assembly.

3.3.16. Cable Tray Penetrations:

3.3.16.1. Seal (firestop) cable tray penetrations with re-enterable/re-penetrable matrices/devices with applicable ratings determined in accordance with CAN/ULC-S115 having a minimum L Rating not exceeding 5.0 cfm/sq ft of penetration opening at both ambient and elevated temperatures. For penetrations through a fire wall or horizontal fire separation provide a firestop system with a FT Rating as determined by ULC or cUL which is equal to fire resistance rating of construction being penetrated.

3.3.16.2. Ensure ULC or cUL tested listings for cable tray and cable penetrations conform to annular space requirements, (construction assembly type, penetrating item type and fire-rating) for each separate instance per manufacturer's listings.

3.4. SITE QUALITY CONTROL

3.4.1. Site Tests and Inspections:

3.4.1.1. Perform a series of 5 fog tests to random locations as designated by Consultant. Should any penetration, joint or void, under jurisdiction of this Section, emit visible fog, make repairs and replace deficiencies and re-perform fog test at no additional cost to Owner.

3.4.1.2. Ensure fog units (machines) have a formulation output range of (1.5 gal/hr). Formulation particle size 0.5 - 25 µm. Ensure fogging agent is non-toxic, non-staining and provides a heavy fog at 30 ppm with a permissible airborne level concentration of 50 ppm.

3.4.1.3. Fog at a rate of 4 s/100 cu ft. Maintain fog density until inspection is complete.

3.4.1.4. Independent inspection and testing company may be appointed by Owner to carry out additional inspection and testing as directed by Consultant. Tests include 3 fog tests per floor at random locations.

3.4.1.5. 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.

3.4.2. Ensure firestopping systems do not affect structural integrity of load bearing walls and assemblies. Coordinate with Consultant prior to penetrating any load bearing assembly. For unusual firestop application for which no tested system is available, ensure manufacturers submit their proposal to local authorities having jurisdiction for their review and approval prior to installation.

3.4.3. Conform to both temperature and flame ratings of standards listed hereinafter and other requirements of authorities having jurisdiction.

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

3.4.5. Manufacturer Services: Consult with Product manufacturer's technical representative about following items:

3.4.5.1. Fire stopping system for fire separation required.

3.4.5.2. Curing characteristics of materials specified.

3.4.5.3. Joint characteristics as built.

3.4.5.4. To be on-site during initial installation of firestop systems to train appropriate subcontractor personnel in proper selection and installation procedures. Ensure this is done per manufacturer's written recommendations published in their literature and drawing details.

3.5. CLEANING

3.5.1. 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.

3.5.2. 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

3.6.1. 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 INSTRUCTIONS

1.1.1. Read and conform to:

1.1.1.1. Division 01 requirements and documents referred to therein.

1.2. SUMMARY

1.2.1. Section Includes: Provide joints sealants including but not limited to following:

1.2.1.1. Liquid joint sealants.

1.2.1.2. Preformed joint sealants.

1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.2.2.1. Masonry control and expansion joint fillers and gaskets: Section 04 22 00 - Concrete Unit Masonry.

1.2.2.2. Firestopping and smoke seals: Section 07 84 00 - Firestopping.

1.2.2.3. Glazing sealants: Section 08 80 00 - Glass and Glazing.

1.2.2.4. Sealing of joints around sound attenuating gypsum board partitions: Section 09 21 16 - Non-Structural Metal Framing.

1.3. REFERENCES

1.3.1. Reference Standards:

1.3.1.1. ASTM C661-15(2022) - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer

1.3.1.2. ASTM C719-22 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

1.3.1.3. ASTM C794-18(2022) - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

1.3.1.4. ASTM C834-2023 - Standard Specification for Latex Sealants

1.3.1.5. ASTM C920-18 - Standard Specification for Elastomeric Joint Sealants

1.3.1.6. ASTM C1021-08(2023) - Standard Practice for Laboratories Engaged in Testing of Building Sealants

1.3.1.7. ASTM C1135-19 Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants

1.3.1.8. ASTM C1193-2016 R23 - Standard Guide for Use of Joint Sealants

1.3.1.9. ASTM 1247 -20 - Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids

1.3.1.10. ASTM C1248-22 - Standard Test Method for Staining of Porous Substrate by Joint Sealants

1.3.1.11. ASTM C1311-22 - Standard Specification for Solvent Release Sealants

1.3.1.12. ASTM C1330-2023 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants

1.3.1.13. ASTM D412-16(2021) - Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.

1.3.1.14. ASTM D624-00(2020) - Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

1.3.1.15. ASTM D2240-15(2021) - Test Method for Rubber Property - Durometer Hardness.

1.3.1.16. ASTM E283-19 - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

1.3.1.17. ASTM E331-00(2016) - Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

1.3.1.18. SCAQMD Rule 1168-2017 Adhesives and Sealants Applications

1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Coordination:

1.4.1.1. Coordinate installation of joint sealants with sequence of work by other Sections.

1.4.2. Preinstallation Meeting:

1.4.2.1. Prior to start of work, arrange for Project site meeting of parties associated with work of this Section. Presided over by Contractor, include Consultant who may attend, Subcontractor performing work of this trade, Contractor's consultants of applicable discipline and manufacturer’s representative.

1.4.2.2. 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. Discuss also following items:

1.4.2.2.1. Verify with sealant manufacturer that specified sealants are compatible with and will satisfactorily adhere to substrates.

1.4.2.2.2. Weather conditions under which work will be done.

1.4.2.2.3. Anticipated frequency and extent of joint movement.

1.4.2.2.4. Joint design.

1.4.2.2.5. Suitability of durometer hardness and other properties of material to be used.

1.4.2.2.6. Recommendations of manufacturer for mixing of multi-component sealants.

1.4.2.2.7. Number of beads to be used in sealing operation and priming operation if required.

1.5. ACTION SUBMITTALS

1.5.1. Product Data:

1.5.1.1. Submit Product information from sealant manufacturer prior to commencement of work of this Section including:

1.5.1.1.1. Preparation instructions and recommendations.

1.5.1.1.2. Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.

1.5.1.1.3. Composition and physical characteristics.

1.5.1.1.4. Surface preparation requirements.

1.5.1.1.5. Priming and application procedures.

1.5.1.1.6. Suitability of sealants for purposes intended and joint design.

1.5.1.2. Joint sealant schedule: indicating application, joint location, sealant type, manufacturer and product name, and colour, for each application. Utilize joint sealant designations included in this Section.

1.5.2. Samples:

1.5.2.1. Provide cured, colour samples of manufacturer's standard range of colours in each type of sealant and caulking compound for colour selection by Consultant.

1.5.2.2. Submit samples of primer, bond breaker tape and joint backing material, if requested.

1.6. INFORMATIONAL SUBMITTALS

1.6.1. Test and Evaluation Reports:

1.6.1.1. Confirm compatibility/adhesion with all materials that membranes come into contact with.

1.6.1.2. Compatibility Testing Report: Prior to supply or installation, test exterior sealant materials for compatibility with joint substrates. Test for staining and adhesion including substrates treated with sealers, curing compounds and water repellants, etc. Submit a written report of test results to Consultant.

1.6.1.3. Test report on adhesion, compatibility and staining effect on samples of adjacent materials used on Project.

1.6.1.4. 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.

1.7. QUALITY ASSURANCE

1.7.1. Qualifications:

1.7.1.1. Installers: Provide work of this Section executed by competent installers who have a membership in good standing with SWRI and have minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of sealant manufacturer.

1.7.2. Preconstruction Testing:

1.7.2.1. Test for compatibility of sealant and accessory Products with joint substrates. Provide test results and written recommendations for primers and substrate preparation required for proper adhesion.

1.7.2.2. Test sealants with substrate materials using ASTM C794 or manufacturer's standard test methods to determine requirements for joint preparation, including cleaning and priming. Test sealants with related materials to verify compatibility. For materials failing tests, obtain joint sealant manufacturer’s written instructions for corrective measures, including use of specialty formulated primers.

1.7.2.3. Test elastomeric joint sealants for compliance with requirements of ASTM C920 and where applicable, to other standard test methods.

1.7.2.4. Test elastomeric joint sealants for compliance with requirements of ASTM C719 for adhesion and cohesion under cyclic movement, adhesion-in peel and indentation hardness.

1.7.2.5. Test other joint sealants for compliance with requirements indicated by referencing standard Specifications and test methods.

1.7.3. Do no sealant work until samples have been accepted. Ensure accepted samples become standard of comparison for sealant and caulking work on site.

1.8. DELIVERY, STORAGE AND HANDLING

1.8.1. Delivery and Acceptance Requirements: 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.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Handle and store materials in accordance with manufacturer's printed directions. Store flammable materials in safe, approved containers to eliminate fire hazards.

1.8.2.2. Do not use caulking and sealant materials that have been stored for period of time exceeding maximum recommended shelf life of materials.

1.9. PROJECT CONDITIONS

1.9.1. Ambient Conditions:

1.9.1.1. 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 (40 deg F). 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.

1.9.1.2. 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.

1.9.2. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

1.9.3. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.10. WARRANTY

1.10.1. Manufacturer Warranty: Warrant work of this Section for period of 20 years for silicone type sealants and 5 years for other sealants against defects and/or deficiencies 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 expense to Owner.

1.10.2. Defects include but are not limited to; cracking, crumbling, melting, shrinkage, sag, failure of adhesion, cohesion or reversion, air and moisture leakage, marbling or streaking due to improper mixing, discolouration due to dirt pick-up during curing and staining of adjacent materials.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

2.1.1.1. Adfast; www.adfastcorp.com

2.1.1.2. BASF; www.master-builders-solutions.basf.com

2.1.1.3. Dow Chemical Company; www.dow.com/construction

2.1.1.4. Momentive Performance Materials; www.momentive.com

2.1.1.5. Pecora Corporation; www.pecora.com

2.1.1.6. Sika Canada Inc.; www.sika.ca

2.1.1.7. Tremco Canada; www.tremcosealants.com

2.2. PERFORMANCE/DESIGN CRITERIA

2.2.1. VOC Content for Interior Applications:

2.2.1.1. Provide sealants and sealant primers that comply with SCAQMD Rule #1168 and the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

2.2.1.1.1. Architectural Sealants: 250 g/L.

2.2.1.1.2. Sealant Primers for Nonporous Substrates: 250 g/L.

2.2.1.1.3. Sealant Primers for Porous Substrates: 775 g/L.

2.2.2. Compatibility:

2.2.2.1. Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2.2.3. Joint Sealant Standard: Comply with ASTM C920 and other specified requirements for each liquid-applied joint sealant

2.2.4. Provide exterior and interior elastomeric joint sealants establishing and maintaining watertight, water resistant and air tight continuous joint seals without staining or deteriorating joint substrates.

2.2.5. Provide 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.

2.2.6. Stain Test Characteristics:

2.2.6.1. Where non-staining elastomeric sealants are applied to porous substrates, provide Products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

2.2.7. Additional Movement Capability:

2.2.7.1. Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C920 for uses indicated.

2.2.8. Continuous-Immersion-Test-Response Characteristics:

2.2.8.1. Where elastomeric sealants will be immersed continuously in water, provide products that have undergone testing according to ASTM C1247, including initial six-week immersion period and have not failed in adhesion or cohesion when tested with substrates indicated for Project.

2.2.9. Food Contact Suitability: Where sealants are required to be suitable for contact with food provide sealants complying with 21 CFR 177.2600

2.3. ELASTOMERIC JOINT SEALANTS

2.3.1. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T, NT; Group: G1.

2.3.1.1. Hardness, ASTM C661: 15 durometer Shore A.

2.3.1.2. Volatile Organic Compound (VOC) Content: 26 g/L maximum.

2.3.1.3. Staining, ASTM C1248: None on concrete, granite, limestone, and brick.

2.3.1.4. Color: As selected by Consultant.

2.3.1.1. Basis of Design Product: “DOWSIL 790 Silicone Building Sealant” by Dow.

2.3.1.2. Acceptable Alternatives:

2.3.1.2.1. “Spectrem 1” by Tremco

2.3.1.2.2. “SCS2700 SilPruf LM” by Momentive Performance Materials

2.3.1.2.3. “890NST” by Pecora

2.3.1.2.4. “290 DC PRO” by Sika Canada

2.3.2. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT; Group: G2.

2.3.2.1. Hardness, ASTM C661: 35 durometer Shore A.

2.3.2.2. Volatile Organic Compound (VOC) Content: 60 g/L maximum

2.3.2.3. Staining, ASTM C1248: None on white marble.

2.3.2.4. Color: As selected by Consultant.

2.3.2.5. Basis of Design Product: “DOWSIL 756 SMS Building Sealant” by Dow.

2.3.3. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use A, G, M, NT, Group: G3.

2.3.3.1. Hardness, ASTM C661: 34 durometer Shore A.

2.3.3.2. Volatile Organic Compound (VOC) Content: 30 g/L maximum

2.3.3.3. Staining, ASTM C1248: None on concrete, granite, limestone, and brick.

2.3.3.4. Color: As selected by Consultant.

2.3.3.5. Basis of Design Product: “DOWSIL 791 Silicone Weatherproofing Sealant” by Dow.

2.3.3.6. Acceptable Alternatives:

2.3.3.6.1. “SCS2900 UltraPruf II” by Momentive Performance Materials

2.3.3.6.2. “Tremsil 600” by Tremco

2.3.3.6.3. “864NST” by Pecora

2.3.3.6.4. “Spectrem 2” or “Spectrem 3”, by Tremco

2.3.3.6.5. “4550” by Adfast

2.3.4. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT, Group: G4.

2.3.4.1. Hardness, ASTM C661: 35-45 durometer Shore A.

2.3.4.2. Volatile Organic Compound (VOC) Content: 32 g/L maximum

2.3.4.3. Staining, ASTM C1248: None on concrete, granite, limestone, and brick.

2.3.4.4. Color: As selected by Consultant.

2.3.4.5. Basis of Design Product: “DOWSIL 795 Silicone Building Sealant” by Dow.

2.3.4.6. Acceptable Alternatives:

2.3.4.6.1. “Spectrem 2”, by Tremco

2.3.4.6.2. “Proglaze SSG” by Tremco

2.3.4.6.3. “SCS2000 SilPruf” by Momentive Performance Materials

2.3.4.6.4. “895NST” by Pecora

2.3.4.6.5. “295 UV” by Sika

2.3.4.6.6. “4940” by Adfast

2.3.5. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT; Group: G5.

2.3.5.1. Hardness, ASTM D2240: 35 - 45 durometer Shore A

2.3.5.2. Volatile Organic Compound (VOC) Content: 34 g/L maximum

2.3.5.3. Ultimate Tensile, ASTM C1135: 160 psi (1.1 MPa), at 21 day cure (TA Joint).

2.3.5.4. Color: As selected by Consultant.

2.3.5.5. Basis of Design Product: “DOWSIL 995 Silicone Structural Sealant” by Dow.

2.3.5.6. Acceptable Alternatives:

2.3.5.6.1. “Ultraglaze SSG4000” by Momentive Performance Materials

2.3.5.6.2. Ultraglaze SSG4000AC” by Momentive Performance Materials

2.3.5.6.3. “4940 Structural Series” by Adfast

2.3.6. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT; Group G6.

2.3.6.1. Hardness, ASTM D2240: 45 durometer Shore A.

2.3.6.2. Volatile Organic Compound (VOC) Content: 61 g/L maximum

2.3.6.3. Color: White.

2.3.6.4. Basis of Design Product:” DOWSIL 758 Silicone Weather Barrier Sealant” by Dow.

2.3.6.5. Acceptable Alternatives:

2.3.6.5.1. “AVB” by Pecora

2.3.7. Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant : ASTM C920, Type S, Grade NS, Class 25, for Use NT, Group: G7.

2.3.7.1. Hardness, ASTM D2240: 25 durometer Shore A minimum.

2.3.7.2. Volatile Organic Compound (VOC) Content: 36 g/L maximum

2.3.7.3. Ultimate Tensile, ASTM D412: 325 psi (1.2 MPA) at 21 day cure (Dumbbell)

2.3.7.4. Color: As selected by Consultant.

2.3.7.5. Basis of Design Product: “DOWSIL 999A Silicone Building & Glazing Sealant” by Dow.

2.3.7.6. Acceptable Alternatives:

2.3.7.6.1. “SCS1200” by Momentive Performance Materials

2.3.7.6.2. “Proglaze” by Tremco

2.3.7.6.3. “4800” by Adfast

2.3.8. Mildew-Resistant, Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT, Group: G8.

2.3.8.1. Basis of Design Product: “DOWSIL 786 Silicone Sealant” by Dow.

2.3.8.2. Hardness, ASTM D2240: 25 durometer Shore A

2.3.8.3. Volatile Organic Compound (VOC) Content: 36 g/L maximum.

2.3.8.4. Color: As selected by Consultant.

2.3.8.5. Basis of Design Product: “DOWSIL 786 Silicone Sealant” by Dow.

2.3.8.6. Acceptable Alternatives:

2.3.8.6.1. “Tremsil 200” by Tremco

2.3.8.6.2. “SCS1700 Sanitary” by Momentive Performance Materials

2.3.8.6.3. “KB 4800” by Adfast“

2.4. LATEX JOINT SEALANTS

2.4.1. Acrylic Latex or Siliconized Acrylic Latex Products: Single-Component, comply with ASTM C834, Type OP, Grade NF, Group: G9.

2.4.2. Products: provide products by one of the following:

2.4.2.1. “Chem-Calk 600”; by Bostik Inc.

2.4.2.2. “AC-20+”; by Pecora Corporation

2.4.2.3. “Sonolac”; BASF Building Systems

2.4.2.4. “Tremflex 834”; by Tremco Incorporated.

2.4.2.5. “Bondaflex 600”; by May National Associates, Inc.

2.4.2.6. “EcoTex 25”; by Everkem Diversified Products, Inc.

2.4.2.7. “Titebond GREENchoice Acoustical Smoke and Sound Sealant”; by Franklin International, Inc.

2.4.2.8. “White Lightning Bolt Quick Dry Siliconized Acrylic Latex Sealant”; by Sherwin-Williams Company.

2.4.3. Colour: as selected by Consultant.

2.5. ACOUSTICAL JOINT SEALANTS

2.5.1. Acoustical Joint Sealant Standard: Manufacturer’s standard non-sag, paintable, non-staining latex sealant complying with ASTM C834., Group: G10:

2.5.1.1. Volatile Organic Compound (VOC) Content: 31 g/L maximum

2.5.1.2. Products: provide products by one of the following:

2.5.1.2.1. “AC-20 FTR” or “AIS-919”; by Pecora Corporation.

2.5.1.2.2. “SHEETROCK Acoustical Sealant”; byUSG Corporation.

2.6. BUTYL RUBBER JOINT SEALANTS

2.6.1. Butyl Joint Sealant Standard: Single-Component, comply with ASTM C1311, Group: G11.

2.6.2. Butyl-Rubber-Based Joint Sealant Products:

2.6.2.1. Products: provide products by one of the following:

2.6.2.1.1. “Chem-Calk 300”; by Bostik Inc.

2.6.2.1.2. “BC-158”; by Pecora Corporation.

2.6.2.1.3. “Tremco Butyl Sealant”; by Tremco Incorporated.

2.6.2.1.4. “FSI-96 Butyl Rubber”; by Fastener Systems, Inc.

2.6.2.2. Colour: as selected by Consultant.

2.7. PREFORMED JOINT SEALANTS

2.7.1. Preformed Expanding Foam Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to self expand and fill joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:

2.7.1.1. Products: provide products by one of the following:

2.7.1.1.1. Dayton Superior Specialty Chemicals; Polytite Standard.

2.7.1.1.2. EMSEAL Joint Systems, Ltd.; Emseal 25V.

2.7.1.1.3. Sandell Manufacturing Co., Inc.; Polyseal.

2.7.1.1.4. Willseal USA, LLC; Willseal 600.

2.7.1.1.5. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.

2.7.1.1.6. Density: Manufacturer's standard

2.8. JOINT-SEALANT BACKING

2.8.1. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2.8.2. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Provide any Type schedule below, as approved in writing by joint-sealant manufacturer for joint application indicated, and as follows:

2.8.2.1. Schedule:

TYPE	DESCRIPTION	COMMENT
C	Closed-cell material with a surface skin	
O	Open-cell material	Not permitted for horizontal and sloped surfaces
B	Bicellular material with a surface skin	

2.9. MISCELLANEOUS MATERIALS

2.9.1. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

2.9.2. Bond Breaker Tape: As recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.9.3. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

2.9.4. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints. Leave no residue.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. 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.

3.1.1.2. Examine joint sizes and where depth of joint exceed required depth of sealant correct to achieve proper following width/depth ratio:

3.1.1.2.1. Maintain 2:1 Width/Depth Ratio: Ensure maximum sealant depth is 13 mm (1/2”) and minimum contact width with each substrate is 6 mm (1/4"). Confirm width/depth ratios with sealant manufacturers.

3.1.1.3. Verify joint surfaces are clean, sound, free of defects and dimensions are within sealant manufacturer’s size requirements.

3.1.1.4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1.1.5. Do not apply sealant to masonry until mortar has cured.

3.1.2. Preinstallation Testing: Before any sealing work is commenced, test materials for indications of staining or poor adhesion.

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

3.2. PREPARATION

3.2.1. Protection of In-Place Conditions: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2.2. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

3.2.2.1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

3.2.2.2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

3.2.2.2.1. Concrete.

3.2.2.2.2. Masonry.

3.2.2.2.3. Unglazed surfaces of ceramic tile.

3.2.2.3. Remove laitance and form-release agents from concrete.

3.2.2.4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

3.2.2.4.1. Metal.

3.2.2.4.2. Glass.

3.2.2.4.3. Glazed surfaces of ceramic tile.

3.2.2.5. Clean ferrous metals of rust, mill scale and foreign materials by wire brushing, grinding or sanding.

3.2.2.6. Wipe non-porous surfaces such as metal and glass to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol or toluol and wipe dry with clean cloth. Where joints are to be sealed with silicone based sealants clean joint with MEK or xylol. Do not allow solvent to air-dry without wiping. Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant. Check ferrous metal surfaces are painted before applying sealant.

3.2.3. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3. INSTALLATION OF JOINT SEALANTS

3.3.1. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

3.3.2. Sealant Installation Standard: Comply with recommendations of ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

3.3.3. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

3.3.3.1. Do not leave gaps between ends of sealant backings.

3.3.3.2. Do not stretch, twist, puncture, or tear sealant backings.

3.3.3.3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

3.3.4. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.

3.3.5. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

3.3.5.1. Place sealants so they directly contact and fully wet joint substrates.

3.3.5.2. Completely fill recesses provided for each joint configuration.

3.3.5.3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

3.3.6. Force sealant into joint and against sides of joints to obtain uniform adhesion. Use sufficient pressure to completely fill voids in joint regardless of variation in joint widths and to proper joint depth as prepared. Ensure full firm contact with interfaces of joint. Superficial pointing with skin bead is not acceptable.

3.3.7. Finish face of compound to form smooth, uniform beads. At recesses in angular surfaces, finish compound with flat face, flush with face of materials at each side. At recesses in flush surfaces, finish compound with concave face flush with face of materials at each side.

3.3.8. Compound may be tooled, provided such tooling does not damage seal or tear compound. Avoid pulling of sealant from sides.

3.3.9. Tool surfaces as soon as possible after sealant application or before any skin formation has occurred, particularly when using silicone sealants.

3.3.10. Ensure joint surfaces are straight, neatly finished, free from ridges, wrinkles, sags, dirt, stains, air pockets and embedded foreign matter or other defacement and be uniform in colour, free from marbling and/or colour streaking due to improper mixing or use of out of shelf life Products.

3.3.11. Tooling of Non sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

3.3.11.1. Remove excess sealants from surfaces adjacent to joint.

3.3.11.2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3.3.11.3. Provide concave joint configuration per Figure 8A in ASTM C1193, unless otherwise indicated.

3.4. INSTALLATION OF PREFORMED EXPANDING FOAM SEALANTS

3.4.1. Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints.

3.4.2. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.5. SITE QUALITY CONTROL

3.5.1. Site Tests and Inspections:

3.5.1.1. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer’s instructions and with manufacturer present and in accordance with ASTM C1193, Method A.

3.5.1.1.1. Perform 5 tests for the first 300 m (1000 feet) of joint length for each kind of sealant and joint substrate, and one test for each 300 m (1000 feet) of joint length thereafter or 1 test per each floor per building elevation, minimum.

3.5.1.1.2. For sealant applied between dissimilar materials, test both sides of joint.

3.5.1.2. 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.

3.5.1.3. Tests may include sampling of installed Product where adhesion, cohesion or reversion failure is suspected.

3.5.1.4. 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.

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

3.5.3. Manufacturer Services:

3.5.3.1. 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.

3.5.3.2. Confirm in writing by manufacturer’s representative to be on site throughout construction period work to inspect application of sealant and surface preparation.

3.5.3.3. Consult with manufacturer's technical representative about following items:

3.5.3.3.1. Weather conditions under which work will be done.

3.5.3.3.2. Anticipated frequency of joint movement.

3.5.3.3.3. Shape factor of the joint.

3.5.3.3.4. Durometer hardness, slump and curing characteristics of materials specified.

3.5.3.3.5. Joint characteristics as built.

3.5.3.3.6. Installation procedures to be adopted.

3.5.3.3.7. Mixing procedures to be adopted.

3.5.3.3.8. Conditions under which the work will be done, in order that any alternative recommendations may be made should adverse conditions exist.

3.6. CLEANING

3.6.1. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.7. PROTECTION

3.7.1. 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.

3.7.2. Maintain protection securely in place until completion of Work. Remove protection when so directed by Consultant.

3.8. JOINT-SEALANT SCHEDULE

3.8.1. Schedule Designations for Elastomeric Sealants Based on ASTM C920:

CHARACTERISTIC	MARK	DESCRIPTION
Sealant Material:	AL	Acrylic Latex

	BR	Butyl Rubber
	S	Silicone
	U	Urethane
	H	Hybrid
Sealant Type:	S	Single component
	M	Multi-component
Sealant Grade:	P	Pourable
	NS	Non Sag
Sealant Class:	100/50	100% extension / 50% compression
	50	50% extension and compression
	25	25% extension and compression
Sealant Use:	A	Aluminum
	G	Glass
	M	Mortar
	NT	Non Traffic
	O	Other
	T	Traffic
Sealant Group:	G1, G2, etc.	Applicable to sealant groups specified in Part 2 of this Section

3.8.2. Interior Joint Applications

JOINT LOCATIONS	MATERIAL	TYPE	GRADE	CLASS	USE	GROUP
Floor joints	S	S	NS	100/50	NT, T	G1
Perimeter of door and window frames	S	S	NS	50	A, G, M, NT	G3
Control joints in unit masonry	S	S	NS	50	A, G, NT, O	G4
Sanitary joints around tubs, showers, sinks, porcelain, cultured marble, glass, painted areas, food prep fixtures, casework	S	S	NS	25	NT	G8
Non-moving, paintable joints	AL	S	NS	-	NT	G9
Acoustic seal in concealed base, head, and other openings in	AL	S	NS		NT	G10

gypsum walls where indicated in Division 09						
Concealed glazing, door thresholds	BR	S	NS	25	NT	G11

END OF SECTION

PART 1 - GENERAL

1.1. SUMMARY

1.1.1. This Section includes:

1.1.1.1. Hollow metal doors

1.1.1.2. Metal frames.

1.1.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.1.2.1. Installation of snap-in clips and frames in gypsum board partitions: Section 09 22 16 - Non-Structural Metal Framing.

1.2. ADMINISTRATIVE REQUIREMENTS

1.2.1. Coordination:

1.2.1.1. Cooperate fully with door hardware distributor's representative during preparation of shop drawings and execution of shop fabrication. Be responsible to provide adequate reinforcing, clearances, for door hardware specified and for accurate installation of door and door hardware on site.

1.2.2. Preinstallation Meetings:

1.2.2.1. The following minimum items shall be reviewed at the pre-installation meeting:

1.2.2.1.1. Verify project requirements.

1.2.2.1.2. Review installation conditions under which work is to be performed including possible site concerns.

1.2.2.1.3. Inspection of surfaces to receive the work.

1.2.2.1.4. Coordination requirements with other subtrades.

1.2.2.2. Key personnel shall attend the pre-installation meeting including but not limited to:

1.2.2.2.1. Steel door and frame installer subtrade personnel.

1.2.2.2.2. Related work subtrade personnel.

1.3. ACTION SUBMITTALS

1.3.1. Product Data Sheets:

1.3.1.1. Submit manufacturer’s product data sheets for products to be used in the work of this section. Manufacturer’s product data sheets shall include:

1.3.1.1.1. Material and product physical properties and characteristics including size.

1.3.1.1.2. Performance criteria.

1.3.1.1.3. Limitations of products.

1.3.2. Shop Drawings:

1.3.2.1. Indicate door location using numbering system per door and frame schedule.

1.3.2.2. Include size, and hand of each door, elevation of each door type; beveling of door edges, construction type core and edge construction not covered in product data.

1.3.2.3. Indicate dimensions and locations of cut-outs including requirements for louver openings.

1.3.2.4. Provide details of door hardware locations, anchorage and fastening methods.

1.4. DELIVERY, STORAGE, AND HANDLING

1.4.1. Comply with CSDMA, Guide Specification For Installation and Storage of Hollow Metal Doors and Frames.

1.4.2. Inspect materials thoroughly upon receipt and report immediately any discrepancies, deficiencies and damages incurred during shipment on carriers' bill of lading and report immediately, in writing, to Supplier and Consultant.

1.4.3. Store materials properly on planks, in a dry area, out of water and covered to protect from damage from adverse weather conditions. Remove wet packaging immediately.

1.4.4. Remove wrappings or coverings from doors upon receipt at the Project Site, and store in a vertical position, spaced with blocking to permit air circulation between them.

1.5. WARRANTY

1.5.1. Manufacturer Warranty: Warrant work manufactured from ASTM A653/A653M, A40 galvannealed steel, touched up only with zinc-rich rust inhibitive primer where coating was removed during its manufacture for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant. Defects include but are not limited to; rust perforation when stored, installed and finish painted in accordance with manufacturer’s written instructions.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Steel door and frames manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:

2.1.1.1. Baron Steel Doors & Frames; www.baronmetal.com

2.1.1.2. Ceco Door: www.cecodoor.com

2.1.1.3. Daybar Industries Limited; www.daybar.com

2.1.1.4. Fleming Door Products Ltd.; www.flemingdoor.com

2.1.1.5. Gensteel Doors, Inc.; www.gensteeldoors.com

2.1.1.6. Shanahan’s Limited Partnership; www.shanahans.com

2.1.2. Basis of Design:

2.1.2.1. This Specification is based on “Imperial/Versador” by Ceco Door. Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

2.2. PERFORMANCE/DESIGN CRITERIA

2.2.1. Ensure Product is manufactured by a firm experienced in design and production of standard and custom commercial metal door and frame assemblies.

2.2.2. Cycle Test Acceptance Criteria: Ensure door and frame assembly is testing in accordance with ANSI/SDI A250.4 for “High Usage” and is certified as Level “A” (1,000,000 cycles).

2.2.3. Twist Test Acceptance Criteria: Maximum permanent deflection not to exceed 3 mm (1/8”) under a maximum 136 kg (300 lb) load, total deflection not to exceed 32 mm (1-1/4") when tested in

accordance with ANSI/SDI A250.4. Ensure tests are conducted by an independent nationally recognized accredited laboratory.

2.3. MATERIALS

2.3.1. Steel:

2.3.1.1. Fabricated from tensioned levelled steel to ASTM A924/A924M-18, galvanized to ASTM A653/A653M, Commercial Steel CS, Type B.

2.3.1.2. Steel shall be free of scale, pitting, coil breaks, surface blemishes, buckles, waves, and other defects.

2.3.1.3. Minimum sheet thickness; coated sheet steel complying with ASTM A653/A653M in accordance with Appendix 1: Steel Thicknesses and gauges of CSDMA “Recommended Specifications for Commercial Steel Door and Frame Products”.

2.3.1.4. Galvanneal coating finish, designation ZF120 (A40).

2.3.2. Door Core Materials:

2.3.2.1. Honeycomb:

2.3.2.1.1. Structural small cell, 25 mm maximum Kraft paper 'honeycomb', sanded to required thickness.

2.3.2.1.2. Minimum weight of 36.3 kg per ream.

2.3.2.1.3. Minimum density of 16.5 kg/m².

2.3.2.2. Steel stiffeners:

2.3.2.2.1. Continuous vertical formed steel sections, 0.813 mm minimum thickness, spaced not more than 150 mm apart, welded at 150 mm on center maximum to each face sheet.

2.3.2.2.2. Fill voids with minimum density of 24 kg/m3 fibreglass insulation conforming to with ASTM C665.

2.3.3. Primer: Rust inhibitive for touch-up.

2.3.4. Door Silencers (Bumpers): Single stud rubber/neoprene type.

2.3.5. Fasteners for Stops: Cadmium plated steel, counter sunk flat or oval head sheet metal Phillips screws.

2.3.6. Mortar Guard Boxes: Minimum 0.8 mm thick (22 ga) steel.

2.3.7. Frame Anchors:

2.3.7.1. Floor Anchors: Minimum 3 mm (1/8") thick adjustable floor anchors with 2 holes for bolting to floor.

2.3.7.2. Wall Anchors:

2.3.7.2.1. Masonry T-strap Type Wall Anchors: Minimum 1.2 mm thick (18 ga) steel

2.3.7.2.2. Existing Masonry/Concrete Wall Type Anchors: Minimum 0.912 mm thick (20 ga) steel.

2.3.7.2.3. Masonry Stirrup-strap Type 50 mm x 250 mm (2" x 10"): Minimum 1.519 mm thick (16 ga) steel.

2.3.7.2.4. Steel Stud Type: Minimum 0.912 mm thick (20 ga) steel.

2.3.7.2.5. Steel Stud Tension and Associated Wall Type: Minimum 0.912 mm thick (20 ga) steel.

2.4. FABRICATION

2.4.1. Welding: Carry out welding in accordance with CSA W59.

2.4.2. Grind exposed welds smooth and flush. Fill open joints, seams and depressions with filler or by continuous brazing or welding. Grind smooth to true sharp arises and profiles and sand down to smooth, true, uniform finish.

2.4.3. Hardware Requirements: Blank, mortise, reinforce, drill and tap doors and frames to receive mortised templated hardware. Check hardware list for requirements.

2.4.4. Frames - General:

2.4.4.1. Fabricate frames for doors to profiles indicated.

2.4.4.2. Ensure door frames are welded type construction. Knock-down frames are not permitted.

2.4.4.3. Reinforce frame as required for surface mounted hardware.

2.4.4.4. Protect mortise cut outs with mortar guard boxes. Omit for gypsum board applications.

2.4.4.5. Where frames occur in masonry provide strip strap, T-strap or wire type anchors. Where frames occur in gypsum board provide stud type anchors.

2.4.4.6. Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb. Provide 2 anchors for rebate opening heights up to and including 1500 mm (5') and 1 additional anchor for each additional 760 mm (30") of height or fraction thereof, except as indicated below. For frames in previously placed concrete, masonry or structural steel provide anchors located not more than 150 mm (6") from top and bottom of each jamb and intermediate anchors at 660 mm (26") on centre maximum.

2.4.4.7. Where floor finishes allow, fabricate frames to extend 38 mm (1-1/2") below finished floor level. Where frames are to terminate at finished floor level, provide plates for anchorage to slabs.

2.4.4.8. Prepare each door opening for single stud door silencers: 3 for single door openings placed opposite hinges.

2.4.4.9. Provide 0.912 mm thick (20 ga) steel snap-in or welded-in “Z” type stud anchors for door frames installed in steel stud gypsum board partitions. Ensure snap-in clips are supplied to Section 09 21 16.

2.4.4.10. Factory apply touch-up primer to areas where zinc coating has been removed during fabrication.

2.4.5. Hollow Metal Door Frames:

2.4.5.1. Steel:: Minimum 1.519 mm thick (16 ga) steel.

2.4.5.2. Reinforcements:

2.4.5.2.1. Lock and Strike Reinforcements: Minimum 1.519 mm thick (16 ga) steel.

2.4.5.2.2. Hinge Reinforcements: Minimum 3.4 mm thick (10 ga) steel.

2.4.5.2.3. Flush Bolt Reinforcement: Minimum 1.519 mm thick (16 ga) steel.

2.4.5.2.4. Reinforcement for Surface Applied Hardware: Minimum 1.2 mm thick (18 ga) steel.

2.4.5.2.5. Concealed Door Closer or Holder Reinforcements: Minimum 2.6 mm thick (12 ga) steel.

2.4.5.2.6. Top and Bottom End Channels: Minimum 1.2 mm thick (18 ga) steel.

2.4.5.3. Jamb Shipping Bars: Minimum 0.912 mm thick (20 ga) steel.

2.4.5.4. Mitre corners of frames. Cut frame mitres accurately and weld continuously on returns and inside of frame faces.

2.4.5.5. When required due to site access or due to shipping limitations, fabricate frame Product for large openings in sections, with splice joints for field assembly. Provide alignment plates or angles at each joint, fabricated of same metal thickness as frame. Indicate joints for field assembly on Shop Drawings.

2.4.5.6. Accurately cope and securely weld butt joints of mullions, transom bars, centre rails and sills. Grind welded joints to a smooth, uniform finish.

2.4.5.7. Securely attach floor anchors to inside of each jamb profile.

2.4.5.8. Weld in 2 temporary jamb shipping bars at each frame to maintain alignment during shipment.

2.4.6. Doors - General:

2.4.6.1. Fabricate doors to be swing type flush with 1 continuous face free from joints, tool markings and abrasions and with provisions for glass and/or louvre openings as indicated on Door Schedule and Drawings.

2.4.6.2. Coordinate louvre openings with Mechanical and Consultant.

2.4.6.3. For hollow metal doors, ensure longitudinal edges have continuously welded seams, filled and sanded flush full height of door.

2.4.6.4. Fabricate doors with top and bottom inverted recessed spot welded channels.

2.4.6.5. Reinforce, blank, drill and tap doors for mortised, templated hardware.

2.4.6.6. Reinforce doors for surface mounted hardware.

2.4.6.7. Undercut 19 mm (3/4") for air intake at washrooms.

2.4.6.8. Factory prepare holes 13 mm (1/2") diameter and larger. Factory prepare holes less than 13 mm (1/2") when required for function of device for knob, lever, cylinder, turn pieces or when these holes overlap function holes.

2.4.7. Interior Hollow Metal Doors:

2.4.7.1. Face Sheets: 1.519 mm thick (16 ga) minimum galvannealed steel sheet.

2.4.7.2. Vertical Stiffeners: 0.912 mm thick (20 ga) minimum unprimed steel sheet.

2.4.7.3. Glazing Stops: 1.519 mm thick (16 ga) minimum unprimed steel sheet, formed, drilled and countersunk for fastenings.

2.4.7.4. Fabricate each face sheet for exterior door using a sheet steel laminated under pressure to polyurethane core. Ensure core completely fills inside hollow of door.

2.4.7.5. Fabricate each face sheet for interior door using a sheet steel laminated under pressure to honeycomb core.

2.4.7.6. Reinforce, stiffen and sound deaden doors with core laminated to inside faces of panels. Ensure core completely fills inside hollow of door.

2.4.8. Fabrication Tolerances:

2.4.8.1. Frames:

2.4.8.1.1. Width and Height: +1.6 mm (+1/16”), -0.8 mm (-1/32”).

2.4.8.1.2. Face, Stop and Rabbet: +/-0.8 mm (+/-1/32”).

2.4.8.1.3. Jamb Depth: +/-1.6 mm (+/-1/16”).

2.4.8.2. Doors:

2.4.8.2.1. Width and Height: +/-1.2 mm (+/-3/64”).

2.4.8.2.2. Thickness: +/-1.6 mm (+/-1/16”).

2.4.8.2.3. Edge Flatness: 1.6 mm (1/16”) maximum.

2.4.8.2.4. Surface Flatness: 3 mm (1/8”) maximum.

2.4.8.2.5. Door Twist: +/-1.6 mm (+/-1/16”).

2.4.8.3. Hardware:

2.4.8.3.1. Cutouts: Template dimension +0.38 mm (+0.015”), -0 mm (-0”).

2.4.8.3.2. Location: +/-0.8 mm (+/-1/32”).

2.4.8.3.3. Between Hinge Centrelines: +/-0.4 mm (+/-1/64”).

2.4.9. Prime Painting: Apply factory touch up primer at areas where zinc coating has been damaged during fabrication.

PART 3 - EXECUTION

3.1. INSTALLATION

3.1.1. Hollow Metal Doors:

3.1.1.1. Install hollow metal doors in accordance with manufacturer's instructions.

3.1.2. Hollow Metal Frames:

3.1.2.1. Install hollow metal frames in accordance with manufacturer's instructions.

3.1.2.2. Set frames plumb, square, level and at correct elevation, maintaining uniform door width and height. Check and correct as necessary opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

3.1.2.3. Secure anchorages and connections to adjacent construction.

3.1.2.4. Remove temporary steel shipping jamb spreaders prior to setting 1-piece welded frames. Brace frames rigidly in position while being built in. Use precisely-dimensioned installation spreaders at sill and third-points of door opening height to maintain door opening width during building-in. Follow manufacturer’s instructions regarding proper use of floor and jamb anchors. Remove installation spreaders only after mortar has set, where applicable.

3.1.2.5. Allow for deflection to prevent structural loads from being transmitted to frame.

3.1.2.6. Provide batt insulation to completely fill pressed steel frames of exterior doors and adjacent cavities.

3.1.2.7. Spot Grouting:

3.1.2.7.1. Coordinate spot grouting with Section 09 22 16 - Non-Structural Metal Framing.

3.1.2.7.2. Provide spot grout to increase rigidity of frame and improve resistance to frame rotation caused by weight of door.

3.1.2.7.3. Comply with manufacturer’s recommendations for surface preparation, cleaning, forming, mixing, placement and curing of grout.

3.1.2.7.4. Mix grout in accordance with ASTM C305 requirements.

3.1.2.7.5. Spot grout at strike and hinge side jambs at steel door frames set in gypsum board partitions, walls and other similar locations in accordance with manufacturer's recommendations. Immediately insert gypsum panels into jamb and attach to framing. Do not terminate gypsum board against trim.

3.1.2.7.6. Do not use pumped slurry method to perform spot grouting.

3.1.2.8. Continuous Grouting:

3.1.2.8.1. Coordinate continuous grouting with Section 04 20 00.

3.1.2.8.2. Comply with manufacturer's recommendations for surface preparation, cleaning, forming, mixing, placement and curing of grout.

3.1.2.8.3. Mix grout in accordance with ASTM C305 requirements.

3.1.2.8.4. Provide grouting employing established procedures recommended by manufacturers. Use minimum water required to produce placement consistency.

END OF SECTION

PART 1 - GENERAL

1.1. SUMMARY

1.1.1. Section Includes: Provide access doors and frames including but not limited to following:

1.1.1.1. Access doors and frames.

1.2. ADMINISTRATIVE REQUIREMENTS

1.2.1. Coordination:

1.2.1.1. Verification: Determine specific locations, fire rating and sizes for access doors needed to gain access to concealed equipment and indicate on schedule specified in "Submittals" Article.

1.2.2. Preinstallation Meetings:

1.2.2.1. Conduct a pre-installation meeting in accordance with requirements of Section 01 10 00.

1.2.2.2. The following minimum items shall be reviewed at the pre-installation meeting:

1.2.2.2.1. Verify project requirements.

1.2.2.2.2. Review installation conditions under which work is to be performed including possible site concerns.

1.2.2.2.3. Inspection of surfaces to receive the work.

1.2.2.2.4. Coordination requirements with other subtrades.

1.3. ACTION SUBMITTALS

1.3.1. Product Data Sheets:

1.3.1.1. Submit manufacturer’s product data sheets for products to be used in the work of this section.

1.3.2. Shop Drawings:

1.3.2.1. Submit Shop Drawings for work of this Section. In addition to the minimum requirements indicate following:

1.3.2.1.1. Face or ceiling placement.

1.3.2.1.2. Tolerances and clearances.

1.3.2.1.3. Method of attaching door frames to surrounding construction.

1.3.2.1.4. Finishes.

1.3.2.1.5. Hardware.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

2.1.1.1. Acudor Products, Inc.; www.acudor.com

2.1.1.2. Bar-Co, Inc. by Alfab, Inc.; www.alfabinc.com

2.1.1.3. Cendrex Inc.; www.cendrex.com

2.1.1.4. Cesco Products; www.cescoproducts.com

2.1.1.5. Elmdor/Stoneman Manufacturing Company; www.elmdorstoneman.com

2.1.1.6. Jensen Industries; www.jensen-ind.com

2.1.1.7. Karp Associates, Inc.; www.karpinc.com

2.1.1.8. Larsen's Manufacturing Company; www.larsensmfg.com

2.1.1.9. Nystrom Building Products Co.; www.nystrom.com

2.1.1.10. Williams Brothers Corporation of America; www.wbdoors.com

2.2. MATERIALS

2.2.1. Steel Plates, Shapes and Bars: ASTM A36/A36M.

2.2.2. Hot-Dip Galvanized Steel: Coat to comply with ASTM A123/A123M for steel and iron products and ASTM A153/A153M for steel and iron hardware.

2.2.3. Steel Sheet:

2.2.3.1. Hot-Rolled: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, and surface defects; pickled and oiled.

2.2.3.2. Cold-Rolled: ASTM A1008/A1008M, Commercial Steel (CS); stretcher-leveled standard of flatness.

2.2.3.3. Electrolytic Zinc Coated: ASTM A879/A879M, Commercial Steel (CS), with Class C coating and phosphate treatment to prepare surface for painting.

2.2.3.4. Metallic Coated: ASTM A653/A653M, Commercial Steel (CS), Type B, with A60 zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness.

2.2.4. Drywall Beads: Edge trim formed from 0.759 mm (22 ga) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum panels indicated.

2.3. MANUFACTURED UNITS

2.3.1. Flush Access Doors and Frames with Exposed Trim:

2.3.1.1. Material: Prime-painted steel sheet.

2.3.1.2. Surface Type: Masonry.

2.3.1.3. Locations: Walls and ceilings.

2.3.1.4. Door: Minimum 0.912 mm (20 ga) thick sheet metal, set flush with exposed face flange of frame.

2.3.1.5. Frame: Minimum 1.519 mm (16 ga) thick sheet metal with 32 mm (1-1/4”) wide, surface-mounted trim.

2.3.1.6. Hinges: Spring-loaded concealed pin type.

2.3.1.7. Latch: Screwdriver- operated cam latch.

2.3.2. Flush Access Doors and Trimless Frames:

2.3.2.1. Material: Prime-painted steel sheet.

2.3.2.2. Surface Type: Gypsum board.

2.3.2.3. Locations: Walls and ceilings.

2.3.2.4. Door: Minimum 1.519 mm (16 ga) thick sheet metal, set flush with surrounding finish surfaces.

2.3.2.5. Frame: Minimum 1.519 mm (16 ga) thick sheet metal with bead for type of surface indicated.

2.3.2.6. Hinges: Spring-loaded concealed pin type.

2.3.2.7. Latch: Screwdriver- operated cam latch.

2.3.3. Recessed Access Doors and Trimless Frames:

2.3.3.1. Material: Prime-painted steel sheet.

2.3.3.2. Surface Type: Gypsum board.

2.3.3.3. Locations: Walls and ceilings.

2.3.3.4. Door: Minimum 1.519 mm (16 ga) thick sheet metal in the form of a pan recessed 16 mm (5/8”) for infill of finish matching surface type indicated.

2.3.3.5. Reinforce panel as required to prevent buckling.

2.3.3.6. Frame: Minimum 1.519 mm (16 ga) thick sheet metal with bead or edge for surface type indicated.

2.3.3.7. Hinges: Spring-loaded concealed pin type.

2.3.3.8. Latch: Screwdriver-operated cam latch with plastic grommet for access through pan recess.

2.4. FABRICATION

2.4.1. Shop Assembly: Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed as follows:

2.4.1.1. For cylinder lock, furnish 2 keys per lock and key locks alike.

2.4.1.2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.5. FINISHES

2.5.1.1. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in SSPC-Paint 25; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated and capability to provide sound foundation for field-applied topcoats despite prolonged exposure.

2.5.1.2. Shop Primer for Metallic-Coated Steel: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat.

2.5.1.3. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. 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.

3.1.1.2. Size and Location Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment and indicate on schedule.

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

3.2. INSTALLATION

3.2.1. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts and anchoring devices.

3.2.2. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

3.2.3. Install access doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3. ADJUSTING

3.3.1. Adjust doors and hardware after installation for proper operation.

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to:

1.1.1.1. CCDC 2 – 2020, Stipulated Price Contract as amended in the Contract Documents.

1.1.1.2. Division 01 requirements and documents referred to therein.

1.2. SUMMARY

1.2.1. Section Includes: Provide gypsum board assemblies work including but not limited to following:

1.2.1.1. Interior metal support systems for gypsum board partitions, ceilings, and other assemblies as Indicated on drawings.

1.2.1.2. Supplementary steel supports for ceilings.

1.2.1.3. Reinforcement for suspension systems for lighting fixtures.

1.2.1.4. Concealed sheet steel reinforcing.

1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.2.2.1. Miscellaneous steel sections and/or framing required to provide additional structural support to suit Project requirements: Section 05 50 00 Metal Fabrications.

1.2.2.2. Installation of hollow metal door frames and frame anchors in gypsum board partitions: Section 08 11 13 - Hollow Metal Doors and Frames.

1.2.2.3. Firestopping, smoke seals and penetration firestopping: Section 07 84 00 Firestopping and Smoke Seals.

1.2.2.4. Gypsum board, acoustic insulation: Section 09 29 00 Gypsum Board.

1.3. REFERENCES

1.3.1. Definitions:

1.3.1.1. Shaft Wall Systems: Non-structural metal framing and gypsum board assemblies designed for erection entirely from room side of shaft except for the application of finish layer on shaft side, where required to form an enclosure.

1.3.1.2. Wet Areas: Wet areas as related to non-structural; metal framing shall include showers, janitor rooms, and washrooms.

1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Coordination:

1.4.1.1. Coordinate wall mounted equipment requirements and locations with HWDSB Project Manager. Provide suitable blocking to support equipment and unistruct mounting supports.

1.4.2. Sequencing:

1.4.2.1. 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 systems.

1.4.2.2. 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.

1.5. INFORMATIONAL SUBMITTALS

1.5.1. Submit submittals in accordance with Submittal Procedures specified in Section 01 10 00.

1.5.2. Product Data Sheets:

1.5.2.1. Submit manufacturer’s product data sheets for products to be for used in the work of this section. Manufacturer’s product data sheets shall include:

1.5.2.1.1. Material and product physical properties and characteristics including physical size, finish.

1.5.2.1.2. Performance criteria.

1.5.2.1.3. Limitations of products.

1.5.2.2. Submit fire resistance rating test listings for fire rated assemblies.

1.5.3. Shop Drawings:

1.5.3.1. Submit engineered shop drawings prepared, stamped, and signed by Professional Structural Engineer for non-structural metal framing.

1.5.3.2. Submit engineered shop drawings prepared, stamped, and signed by Professional Structural Engineer for the seismic design of connections and restraint of the non-structural metal framing.

1.5.3.3. Include the manufacturer's load test data and design tables for the metal support system and hanger supports.

1.5.3.4. Submit drawings to locate all expansion and control joints in partitions and ceilings.

1.5.3.5. Submit drawings to locate all fire rated partitions.

1.6. QUALITY ASSURANCE

1.6.1. Qualifications:

1.6.1.1. Installers: 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.

1.6.1.2. Licensed Professionals: Employ a licensed engineer carrying minimum $2,000,000.00 professional liability insurance and is registered in the Province of Ontario.

PART 2 - PRODUCTS

2.1. DESIGN / PERFORMANCE REQUIREMENTS

2.1.1. Regulatory Requirements:

2.1.1.1. Fire Resistance Rating:

2.1.1.1.1. Where gypsum board systems with fire resistance ratings are Indicated or scheduled on drawings, provide materials and installations that are identical with those of applicable assemblies tested by fire testing laboratories acceptable to authorities having jurisdiction.

2.1.1.1.2. Fire rated construction, including ceilings, partitions or fire protective membranes and furring shall be constructed to approved ULC design, or other test design acceptable to authorities having jurisdiction, to provide fire ratings Indicated or scheduled on drawings.

2.1.1.1.3. Coordinate with Section 09 29 00 Gypsum Board.

2.1.2. Design Requirements:

2.1.2.1. Design non-structural metal framing to withstand own dead load, super-imposed dead loads, to maximum allowable deflection of L/360, without permanent deformation.

2.1.2.2. Design steel stud reinforcements from hollow structural steel, stud, angle and steel plate sections, galvanized sheet steel minimum 1.214 mm (18 ga) where required to support of manufactured components without limitations items such as washroom accessories, expansion control covers and similar items. Design weld connections ensuring rigid and secure installation capable of offering resistance to minimum 227 kg (500 lb) pull force. Do not design using wood blocking for this purpose.

2.1.2.3. Design fire rated construction including ceiling, partition or fire protective membranes and furring to approved ULC design or other design acceptable to authorities having jurisdiction, to provide design fire rating indicated and/or required. Submit written evidence of acceptable test design.

2.1.2.4. Sound rated construction shall have STC rating tested in accordance with ASTM E90. Coordinate with Section 09 29 00 Gypsum Board.

2.1.3. Structural Design:

2.1.3.1. Professional Structural Engineer shall design non-structural metal framing for work of this Section.

2.1.3.2. Professional Structural Engineer shall design seismic connections and restraint of the non-structural metal framing for work of this Section.

2.1.3.3. Ceiling suspension systems:

2.1.3.3.1. Design ceiling suspension system in accordance with manufacturer's printed directions and conforming to ASTM C754 requirements. Do not suspend and items from structural steel deck. Do not support work of this Section from, nor make attachments to, ducts, pipes, conduits or support framing of other trades.

2.1.3.3.2. Design suspended ceiling systems for adequate support of electrical fixtures as required by current bulletin of Electrical Inspection Department of Ontario Hydro.

2.1.3.3.3. Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.

2.1.3.3.4. Design suspension system to support weight of mechanical and electrical items such as air grilles, lighting fixtures, drapery track, drapes and with adequate support to allow rotation/ relocation of light fixtures.

2.1.3.4. Design interior partitions and ceilings using a maximum deflection criteria of L/240 with a minimum lateral load of 0.239 kPa (5 psf) unless otherwise specified herein. Where tile is being applied or height is greater than 3 m (10') use L/360 with a minimum lateral load of 0.239 kPa (5 psf).

2.1.3.5. Determine appropriate steel stud size and thickness as required for height and loading.

2.1.3.6. Ensure partitions acting as guards, including walls around shafts or where floor elevation on 1 side of a wall is more than 600 mm (23-5/8") higher than elevation of floor or ground on other side complies with OBC, Division B, Part 4, Article 4.1.5.16. Provide Shop Drawings bearing seal of a licensed engineer registered in Province of Ontario confirming this requirement.

2.1.3.7. Design sub-framing as necessary to accommodate and circumvent conflicts and interfaces where ducts or other equipment prevent regular spacing of hangers.

2.2. PARTITION SUPPORT MATERIALS

2.2.1. General:

2.2.1.1. Metal framing shall comply with ASTM C645 and as specified.

2.2.1.2. Metal framing shall be galvanized sheet steel, zinc coating designation Z120 (G40) unless otherwise specified.

2.2.1.3. Metal framing in shower rooms, other wet areas shall be galvanized sheet steel, zinc coating designation Z275 (G90) unless otherwise specified.

2.2.2. Steel Studs:

2.2.2.1. Steel Studs: CSA S136 and ASTM C645, galvanized sheet steel, minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths possible. Provide thicker steel where required due to height.

2.2.2.2. Heavy Duty Steel Studs at Openings: CSA S136 and ASTM C645, galvanized sheet steel, minimum 54 mils designation thickness 1.367 mm (0.0538") minimum base steel thickness) (previously 16 ga), minimum Z120 (G40) zinc coating, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths possible. Provide thicker steel where required due to height.

2.2.2.3. Studs Supporting Cement Boards, Abuse Resistant Gypsum Boards: CSA S136 and ASTM C645, galvanized sheet steel, minimum 33 mils designation thickness (0.836 mm (0.0329") minimum base steel thickness) (previously 20 ga structural). Provide 50 mm (2") deep flanges on ceiling tracks to allow for deflection of structure. Use 92 mm (3-5/8") width unless otherwise noted. Use 0.914 mm (20 ga) solid web members at ceiling and floor tracks.

2.2.2.4. Provide knockout openings in web at 460 mm (18") oc to accommodate (if required) horizontal mechanical and electrical service lines and bracing.

2.2.3. Floor and Ceiling Partition Track for Gypsum Board:

2.2.3.1. CSA S136 and ASTM C645, galvanized sheet steel, minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, with minimum 30 mm (1-1/4") legs, top track having longer legs where required to compensate for deflection of structure above. Width to suit steel studs.

2.2.3.2. For openings wider than 914 mm (3’-0”), provide 0.91 mm (0.035”) (20 gauge) minimum thickness for header except at heavy duty studs, header shall match metal thickness of heavy duty studs.

2.2.4. Runner Fasteners:

2.2.4.1. To concrete and masonry: Use stub nails or power-driven fasteners.

2.2.4.2. To metal concrete inserts: Use 10 mm (0.393”) Type S-12 pan head screws.

2.2.4.3. To suspended ceilings: Use prefinished clips to match ceiling grid in accordance with Section 09 51 13 - Acoustical Panel Ceilings

2.2.5. Bracing Channels:

2.2.5.1. 19 mm (3/4”) x 10 mm (0.393”) x 1.22 mm (0.048”) cold rolled galvanized steel.

2.3. CEILING SUPPORT MATERIALS

2.3.1. General:

2.3.1.1. Metal framing and support materials shall comply with ASTM C645 and as specified.

2.3.1.2. Metal framing shall be galvanized sheet steel, zinc coating designation Z120 (G40) unless otherwise specified.

2.3.1.3. Size ceiling support components to comply with ASTM C754 unless otherwise Indicated on drawings or specified.

2.3.2. Main Runners:

2.3.2.1. Steel channels, hot or cold rolled; galvanized where used in shower rooms, other wet areas, with rust inhibitive paint finish where used elsewhere indoors.

2.3.3. Hanger Wire:

2.3.3.1. ASTM A641/A641M, soft, Class 1 galvanized, minimum 3.26 mm (0.128”) (8 AWG).

2.3.4. Hanger Rods and Flats:

2.3.4.1. Galvanized steel.

2.3.4.2. Size devices for 5 times load imposed by completed system as determined in accordance with ASTM E488/E488M.

2.3.4.3. Inserts for Concrete Slabs: Tie wire anchors, “Red Head TW-1614" by ITW Canada Inc., “Parabolt Wire Hanger” distributed by Acrow-Richmond Ltd., “T-14 Eyebolt” by Ramset Ltd. or “Tie Wire Drive TW-932" by Isometric Ltd. Powder actuated fastening systems are not permitted.

2.3.4.4. Screws, clips, bolts, concrete inserts or other devices for ceiling hangers whose suitability for use intended has been proven through standard construction practices or by certified test data.

2.3.4.5. Hangers: Comply with ASTM C754 for maximum ceiling area and loads to be supported.

2.3.4.6. Tie wire: 1.519 mm (16 ga) nominal diameter galvanized, soft annealed steel.

2.3.4.7. Zinc-plated or stainless steel fasteners exposed to condensation, and corrosion.

2.3.4.8. Runner (Carry) Channels:

2.3.4.8.1. Minimum 1.50 mm (16 gauge) thick cold rolled steel, primer painted or zinc coated for interior locations:

2.3.4.8.2. 38 mm (1.5”) x 12.7 mm (1/2”) where supported at maximum 914 mm (3’-0”) on centre.

2.3.4.8.3. 38 mm (1.5”) x 19 mm (3/4”) where supported at maximum 1,220 mm (4’-0”) on centre.

2.3.5. Proprietary Direct Hung Ceiling Framing Suspension System (optional):

2.3.5.1. Fire rated and non-fire rated, provide factory fabricated, proprietary system in lieu of channel and cross furring framing system.

2.3.5.2. Provide interlocking cold-rolled sheet steel grid, ASTM C635/C635M, heavy duty.

2.4. FURRING SUPPORT MATERIALS

2.4.1. General:

2.4.1.1. Metal framing shall comply with ASTM C645 and as specified.

2.4.1.2. Metal framing shall be galvanized sheet steel, zinc coating designation Z120 (G40) unless otherwise specified.

2.4.2. Furring Channels:

2.4.2.1. CSA S136 and ASTM C645, galvanized sheet steel, minimum 33 mils designation thickness (0.836 mm (0.0329") minimum base steel thickness) (previously 20 ga structural) or minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, screw channels, 67 mm (2-5/8") wide x 22 mm (7/8") deep.

2.4.3. Carrying Channels for Gypsum Board:

2.4.3.1. CSA S136 and ASTM C645, galvanized sheet steel, minimum 43 mils designation thickness (1.087 mm (0.0428") minimum base steel thickness) (previously 18 ga), minimum Z120 (G40) zinc coating, 38 mm (1-1/2") high with 19 mm (3/4") flanges, for primary carrying member in suspended ceilings and as horizontal stiffeners or bracing in steel stud systems.

2.4.4. Carrying Channels for Cement Board: CSA S136 and ASTM C645, galvanized sheet steel, minimum 54 mils designation thickness (1.367 mm (0.0538") minimum base steel thickness) (previously 16 ga), minimum Z120 (G40) zinc coating, 38 mm (1-1/2") high with 19 mm (3/4") flanges, for primary carrying member in suspended ceilings and as horizontal stiffeners or bracing in steel stud systems.

2.4.5. “Z”-Furring:

2.4.5.1. Manufacturer's standard screw type galvanized steel, z-shaped furring members; ASTM A653/A653M G60, 0.914 mm (0.035”) (20 gauge) minimum thickness of base metal, of depth Indicated, designed for mechanical attachment of insulation boards or blankets.

2.4.6. Fasteners:

2.4.6.1. Type and size recommended by furring manufacturer for substrate and application Indicated.

2.4.7. Furring Isolator:

2.4.7.1. Basis of design:

2.4.7.1.1. “Kinetics IsoMax Sound Isolation Clips for Walls and Ceilings” by Kinetics Noise Control.

2.4.7.1.2. Substitutions in accordance with Section 01 25 00 Submittal Procedures.

2.4.8. Furring Anchorages:

2.4.8.1. 1.62 mm (16 AWG) galvanized wire ties, wire type clips, bolts, nails or screws as recommended by furring manufacturer.

2.5. ACCESSORIES

2.5.1. Backer Plates:

2.5.1.1. Galvanized steel, 1.214 mm (18 ga) thick minimum, Z275 (G90) zinc coated by hot-dip process, minimum 150 mm (6”) wide x 1.50 mm (6”) thick x lengths to suit size of items to be attached; fastened to studs for attachment of surface mounted fittings and accessories.

2.5.1.2. Elimination of backer plates or direct attachment of accessories or equipment to metal framing will not be permitted.

2.5.2. Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, width equal to track width, with self sticking adhesive on one face, lengths as required.

PART 3 - EXECUTION

3.1. INSTALLATION

3.1.1. General:

3.1.1.1. Non-structural metal framing shall comply with ASTM C754 and product manufacturer's written requirements.

3.1.1.2. Do not bridge building expansion joints with support system; frame both sides of joints.

3.1.1.3. In double stud walls, do not bridge across the studs on the opposite sides of the wall with gypsum board or metal cross bracing.

3.1.1.4. Place studs vertically at 400 mm (16") oc unless otherwise specified, not more than 50 mm (2") from abutting walls, and at each side of openings and corners. Position studs in tracks. Cross brace studs as required to provide rigid installation.

3.1.1.5. Provide heavy duty double boxed studs at each side of openings to extend in 1 piece from floor to underside of structure above.

3.1.1.6. Thermally separate the metal studs from the exterior concrete or masonry.

3.1.1.7. Provide sufficient clearances between the work of this section and structural elements to prevent the transference of structural loads.

3.1.1.8. Attach backer plates to the framing to support the load of, and to withstand, the withdrawal and shear forces imposed by the items installed upon the work of this section.

3.1.1.9. Install insulating strip under stud shoe tracks of partitions on slabs on grade.

3.1.2. Furring:

3.1.2.1. Shim furring to achieve the required installation tolerances specified in this section.

3.1.2.2. Erect the resilient furring as follows:

3.1.2.2.1. to a maximum of 610 mm (2'-0") on centre;

3.1.2.2.2. not more than 150 mm (6") from a ceiling/wall juncture, unless otherwise specified on the drawings;

3.1.2.2.3. secure to the framing support with 25 mm (1") gypsum board screws;

3.1.2.2.4. with a 150 mm (6") continuous strip of 13 mm (1/2") interior gypsum board along the base of the partitions where resilient furring is installed unless otherwise required by resilient furring manufacturer's written installation requirements.

3.1.2.2.5. with the resilient furring channel transverse to the framing members; and

3.1.2.2.6. with the outer leg of the resilient furring oriented upwards on the partitions.

3.1.3. Suspended and Furred Ceilings:

3.1.3.1. Space the hangers at a maximum of 914 mm (3'-0") on centre along the runner channels and not more than 150 mm (6") from the ends unless otherwise required by engineered shop drawings.

3.1.3.2. Space the runner channels at a maximum of 1,220 mm (4'-0") on centre and not more than 150 mm (6") from boundary walls, interruptions in the continuity; and changes in direction unless otherwise required by engineered shop drawings

3.1.3.3. Run the runner channels transversely to the structural framing members.

3.1.3.4. Lap the members by at least 200 mm (8") and wire each end with two loops where there is splicing.

3.1.3.5. Stagger the splices throughout the framing system.

3.1.3.6. Bend the hanger sharply under the bottom flange of the runner channel and securely wire with a saddle tie to attach to the rod hangers.

3.1.3.7. Erect the cross furring channels transversely across the runner channels at a maximum of 400 mm (1-3.75”) on centre except at a maximum of 305 mm (12”) on centre at fire rated assemblies.

3.1.3.7.1. Erect the cross furring channels not more than 150 mm (6”) from boundary wall openings, interruptions in the ceiling continuity, and changes in direction.

3.1.3.8. Size GWB acoustic spring hangers to suit design loads in accordance with reviewed shop drawings.

3.1.4. Partition Framing Installation

3.1.4.1. Install partition tracks at the floor and underside of the structure.

3.1.4.2. Secure partition tracks to the concrete with screwed or shot fasteners located 50 mm (2”) from each end and spaced at a maximum of 610 mm (2’-0”) on centre.

3.1.4.3. Extend one (1) runner to the end of the partition corner and butt the other runner to it, minus the clearance for the gypsum board thickness.

3.1.4.4. Place interior studs as follows, unless otherwise Indicated on drawings:

3.1.4.4.1. A minimum of 400 mm (1-3.75”) on centre;

3.1.4.4.2. A maximum of 50 mm (2”) from abutting walls, abutting openings and each side of corners;

3.1.4.4.3. A minimum of 19 mm (3/4”) on centre for the deflection under beams and structural slabs to avoid the transmission of structural loads to the studs, or install 50 mm leg ceiling tracks.

3.1.4.5. Install three studs at the corners and intermediate intersections of the partitions.

3.1.4.6. Extend partition framing above the ceilings to the underside of the structure, unless otherwise Indicated on the drawings.

3.1.4.7. Install chase walls consisting of two parallel steel stud partitions.

3.1.4.8. Install lateral support bracing channels:

3.1.4.8.1. For partitions over 3 m (10’-0”) in vertical span;

3.1.4.8.2. At mid-height to a maximum vertical spacing of 2,440 mm (8’-0”) on centre;

3.1.4.8.3. With at least one (1) 19 mm (3/4”) horizontal bracing channel;

3.1.4.8.4. To extend the full length of the partition; and

3.1.4.8.5. To overlap at least two (2) stud spaces at the ends of the bracing channels.

3.1.4.9. Stiffen partitions a maximum of 150 mm (6”) from the top and bottom of the openings and across two full stud spaces at each side of the openings with a horizontal bracing channel.

3.1.5. Concrete Anchors:

3.1.5.1. Provide anchorage points in reinforced concrete floor slab underside in accordance with gypsum board manufacturer’s written suspension requirements.

3.1.5.2. Provide anchors; minimum installation depth, and method of expansion as recommended by the anchor manufacturer’s written requirements.

3.1.6. Installation Tolerances:

3.1.6.1. Install non-structural metal framing plumb, level, straight, tight and secured, to the following maximum tolerances:

3.1.6.1.1. Plumb and level: 3 mm (1/8") in 3 m (10’-0”).

3.1.6.1.2. Variation from Indicated position: 10 mm (3/8").

3.1.6.1.3. Variation between the planes of abutting edges or ends: 1.5 mm (1/16”)

END OF SECTION

PART 1 - GENERAL

1.1. SUMMARY

1.1.1. Section Includes: Provide gypsum board assemblies work including but not limited to following:

1.1.1.1. Gypsum board ceilings, partitions and repairs to existing gypsum board.

1.1.1.2. Corner beads, casing beads, trim, control joints and corner reinforcement.

1.1.1.3. Taping and filling.

1.1.1.4. Sound attenuation batts.

1.1.1.5. Installation of access doors, and panels supplied by other Sections in gypsum board walls and ceilings as required.

1.2. QUALITY ASSURANCE

1.2.1. Qualifications:

1.2.1.1. Installers: 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.

1.3. DELIVERY, STORAGE AND HANDLING

1.3.1. Storage and Handling Requirements:

1.3.1.1. 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.

1.3.1.2. 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.

1.4. SITE CONDITIONS

1.4.1. Ambient Conditions:

1.4.1.1. 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.

1.4.1.2. Ensure temperature of surrounding areas is min 13 deg C (55 deg F) and max 21 deg C (70 deg F) 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.

1.4.1.3. 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

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

2.1.1.1. Bailey Metal Products Ltd.; www.bmp-group.com

2.1.1.2. CertainTeed Corporation; www.certainteed.com

2.1.1.3. CGC Inc; www.cgcinc.com

2.1.1.4. Georgia-Pacific Canada, Inc.; www.gpgypsum.com

2.1.1.5. Johns Manville; www.jm.com

2.1.1.6. Roll Formed Specialty; www.rollformed.com

2.1.1.7. Trim-Tex Inc.; www.trim-tex.com

2.2. GYPSUM BOARD

2.2.1. Gypsum Board: Conforming to ASTM C1396/C1396M. Unless indicated otherwise use 1200 mm (4') wide standard facing board in maximum continuous lengths up to 3600 mm (12'), beveled and/or tapered edges to suit design requirements with butted square ends:

2.2.1.1. Gypsum Board (Walls): Provide 15.9 mm (5/8") thick with tapered edges unless otherwise specified as follows:

2.2.1.1.1. Provide 9.5 mm (3/8") thick gypsum board on curved walls.

2.2.1.2. Gypsum Board (Ceiling): Provide 15.9 mm (5/8") thick with tapered edges unless otherwise specified as follows:

2.2.1.2.1. Use anti sag sheets.

2.2.2. Moisture Resistant Gypsum Board: ASTM C1658/C1658M, glass mat faced, silicone treated core gypsum board, ASTM D3273 with a rating of 10, no mould growth after 4 weeks exposure, 12.7 mm (1/2") or Type X, 15.9 mm (5/8"). Acceptable products:

2.2.2.1. “DensArmor Plus® High Performance Interior Panel” by Georgia-Pacific Canada, Inc.

2.2.2.2. “CGC Sheetrock® Brand Glass-Mat Panels Mold Tough®” by CGC Inc.

2.2.3. Fire Rated Gypsum Board having Testing Agency Fire Rating Identification Stamp on Each Sheet: ASTM C1396/C1396M, Type X, 12.7 mm (1/2") and/or 15.9 mm (5/8") thick gypsum board 1200 mm (4') wide, maximum practical length and tapered edge as required by each fire resistance assembly. Acceptable products:

2.2.3.1. “Gyproc Fireguard Type X or Type C” by Georgia-Pacific Canada, Inc.,

2.2.3.2. “CGC Sheetrock Firecode X or Firecode C” by CGC Inc.

2.2.3.3. “ProRoc Type X or Type C” by CertainTeed Corporation.

2.2.4. Gypsum Board Tile Backer Board: ASTM C1178/C1178M, glass mat faced, water-resistant gypsum core board, with a rating of 10 in accordance with ASTM D3273, no mould growth after 4 weeks exposure, 15.9 mm (5/8") thick plain or Type X;. Acceptable products:

2.2.4.1. “DensShield® Tile Backer” by Georgia-Pacific Canada, Inc.

2.2.4.2. “Durock® Glass-Mat Tilebacker” by CGC Inc.

2.2.4.3. “GlasRock® Diamondback® Tile Backer” by CertainTeed Corporation.

2.2.5. Abuse Resistant Gypsum Board: Provide 1 of following:

2.2.5.1. Enhanced gypsum core encased in heavy duty paper facers on front and back, 15.9 mm (5/8"), conforming to ASTM C1396/C1396M and attaining a maximum of 0.014" as tested to

ASTM D4060 (H-18 abrasion wheel, 500 grams, 200 cycles), a maximum of 0.123" indentation as tested to ASTM D5420 (72 in lbs) and a minimum of (133 ft lbs) as tested to ASTM E695 (50 lb bag) and ASTM C1629/C1629M Type X in fire rated assemblies. Acceptable products:

2.2.5.1.1. "Extreme Abuse with M2Tech" by CertainTeed Corporation

2.2.5.1.2. "CGC Sheetrock® Brand Mold Tough® AR Firecode Core" by CGC Inc.

2.2.5.2. Enhanced gypsum core encased in fibreglass facers on front and back, 15.9 mm (5/8"), conforming to ASTM C1396/C1396M and attaining a maximum of 0.014" as tested to ASTM D4060 (H-18 abrasion wheel, 500 grams, 200 cycles), a maximum of 0.123" indentation as tested to ASTM D5420 (72 in lbs) and a minimum of (133 ft lbs) as tested to ASTM E695 (50 lb bag) and ASTM C1629/C1629M Type X in fire rated assemblies. Acceptable products:

2.2.5.2.1. "DensAmor Plus® Abuse Guard" by Georgia-Pacific Canada, Inc.

2.2.5.2.2. "Sheetrock Mold Tough Glass Mat Abuse Resistant" by CGC Inc.

2.3. FASTENERS

2.3.1. Screws for Sheet Steel Members: ASTM C954, self-drilling, self-tapping gypsum board screws, 25 mm (1") long #6 for single layer application, 41 mm (1-5/8") long #7 for double layer application and as follows:

2.3.1.1. For single layer application over steel framing; self-drilling, self-tapping, case hardened, No. 6 contoured Phillips head or Type S bugle head, sized for minimum 15.9 mm (5/8") penetration into steel framing. Ensure fasteners are corrosion resistant. Use drill point screws for abuse resistant gypsum fibre panels.

2.3.1.2. For double layer application over gypsum backing board and existing gypsum board; 38 mm (1-1/2") Type G bugle head. For each additional layer of board, increase length of fasteners proportionally.

2.3.2. Screws; for exterior sheathing board: in accordance with manufacturer's installation instructions to comply with design wind loads.

2.3.3. Laminating Compound: Asbestos-free, as recommended by manufacturer. Manufacturer's standard, multi-purpose construction adhesive. At fire-rated construction, use adhesive which conforms to that used in applicable fire tests. Acceptable products:

2.3.3.1. "Sheetrock Brand Laminating Compound" by CGC Inc.,

2.3.3.2. "Dehydratine 9T" by Grace Construction Products

2.3.3.3. "Stangard Foamastic" by Standard Chemicals Ltd.

2.4. JOINT TREATMENT MATERIALS

2.4.1. Joint Tape: Conforming to ASTM C475/C475M, provide following:

2.4.1.1. Regular Gypsum Board: Use kraft paper joint tape with feathered edges and minute perforations 50 mm (2") wide.

2.4.1.2. Moisture Resistant Gypsum Board or Cement Board: Use glass fibre tape only, open weave, with pressure sensitive adhesive 1 side. Acceptable products:

2.4.1.2.1. "Durock Cement Board Tape" by CGC Inc.

2.4.2. Joint Fillers and Topping Compound: Either slow or fast setting, low shrinkage type free of asbestos fillers and as recommended by manufacturer. Use "Gyproc 90" by Georgia-Pacific Canada, Inc. or "Durabond 90" by CGC Inc. at exterior soffits.

2.4.3. Finish coat for level 5 finish: vinyl acrylic latex based coating to ASTM C840, spray applied, “Tuff-Hide Primer-Surfacer” by CGC Inc.

2.5. ACCESSORIES

2.5.1. Dust Barrier: Minimum 0.152 mm (6 mil) polyethylene, CAN/CGSB-51.33-M, Type 2.

2.5.2. Resilient Sponge Tape: Self-sticking adhesive on 1 side, closed cell neoprene sponge tape. Acceptable products:

2.5.2.1. “Rubatex®” by Rubatex Corp.,

2.5.2.2. “Foamflex # 1220” by Jacobs & Thompson Inc.; www.foamparts.com

2.5.2.3. “Backerseal™ (Greyflex)™” by Emseal LLC; www.emseal.com.

2.5.3. Sealant for Moisture Resistant Gypsum Board Edges: “Sheetrock Brand W/R Sealant” by CGC Inc., or similar type acceptable to Consultant.

2.5.4. Corner Beads: “PG1 Platinum Square Nose Tape-On Trims” by Bailey Metal Products Ltd. “No-Coat®” by CertainTeed or “Fast Edge” paper by Trim-Tex at corners, reveals, or similar. Provide custom shapes of similar materials and design as noted.

2.5.5. Trim: “PG4 Platinum Tape-On L-Trims” by Bailey Metal Products Ltd.

2.5.6. Flexible Casing Beads: 0.531 mm (25 ga) steel, wipe coated, angle shaped in size to fit over edge of gypsum board, to suit curved applications.

2.5.7. Control Joints: Pre-fabricated control joints prepared to suit site conditions. Certified by manufacturer for use at fire resistance rated assemblies. Acceptable products:

2.5.7.1. “No. 093” zinc alloy control joint by CGC Inc.

2.5.7.2. “DRM-50-25 2-PC” by Fry Reglet

2.5.7.3. “093V Expansion Bead” by Trim-Tex Drywall Products Inc.

2.5.8. Access Doors and Panels:

2.5.8.1. Supplied as part of Section 08 31 13 and Divisions 21, 22, 23, 26, 27 and 28 for installation as part of this Section.

2.6. SOUND CONTROL MATERIALS

2.6.1. Acoustical Insulation: CAN/ULC S702, Type 1， of sufficient thickness to meet required STC rating for sound-rated partitions and of width to suit metal framing spacing

2.6.1.1. Acoustical Insulation Batts in non-fire rated assemblies: glass fibre

2.6.1.1.1. Acceptable Products:

2.6.1.1.1.1. “EcoTouch™ QuietZone® PINK™ FIBERGLAS® Acoustical Insulation” by Owens Corning Canada LP; www.insulation-owenscorning.ca

2.6.2. Strip Impalement Clips: 25 mm (1") wide strip of “Insul-Hold” by Insul-Hold Co., Inc.; www.insulhold.com, fabricated from 0.531 mm (25 ga) galvanized sheet metal in 30 m (100') rolls with punch-out insulation securement arrows. Alternatively, use special studs with punch-out impalement strips.

2.6.3. Acoustic Sealant:

2.6.3.1. Concealed locations: Single component, non-hardening, non-skinning synthetic rubber sealant; “Tremco Acoustical Sealant” by Tremco Canada; www.tremcosealants.com.

2.6.3.2. Fire resistance locations: Smoke-seal sealant with flame-spread not more than 25 and smoke developed classification not more than 50 to CAN/ULC-S102.

2.6.4. Elastomeric Sealant: As recommended by manufacturer of fibre-reinforced gypsum sheathing board.

2.6.5. Gaskets: Closed cell neoprene, 3 mm (1/8") thick x 64 mm (2-1/2") wide.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. 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.

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

3.2. PREPARATION

3.2.1. Ensure that services, blocking and supports to be installed in partitions have been installed and inspected before closing in with gypsum board.

3.2.2. Vacuum clean stud track, suspended support framing, and spaces to be concealed before starting the days installation.

3.3. INSTALLATION

3.3.1. Gypsum Board Application:

3.3.1.1. Provide gypsum board in accordance with manufacturer's written installation instructions and finish to requirements of ASTM C840. Install Moisture Resistant Gypsum Board on any wall/partition with a paint finish containing a plumbing fixture (i.e. water closets, sinks, tubs, etc.). Install gypsum board tile backer board on any wall partition or ceiling requiring a tile finish.

3.3.1.2. Provide metal trim casing bead at junctions with dissimilar materials. Provide reveals at junctions with dissimilar materials where indicated.

3.3.1.3. Provide finished work plumb, level and true, free from perceptible waves or ridges and square with adjoining work.

3.3.1.4. Cut and fit gypsum board to accommodate or fit around other parts of the Work. Provide work of this Section accurately and neatly.

3.3.1.5. Butt gypsum board sheets together in moderate contact. Do not force into place. Place tapered or wrapped edges next to 1 another.

3.3.1.6. Provide gypsum board perpendicular to framing and in lengths that will span ceilings and walls without creating end (butt) joints. If butt joints do occur stagger and locate them as far from centre of walls and ceilings as possible. Accurately fit exposed butt joints together and make edges smooth.

3.3.1.7. Support ends and edges on framing.

3.3.1.8. Fasten gypsum board to metal furring and steel studs with screws. Space screws at 200 mm (8") oc at board edges and 300 mm (12") oc on board field.

3.3.1.9. Gypsum Board - Single Layer:

3.3.1.9.1. Ceilings: Apply gypsum board to metal furring with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Space screws at 200 mm (8") oc.

3.3.1.9.2. Partitions: Apply gypsum board to steel studs with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Locate vertical joints at least 300 mm (12") from jamb lines of openings. Space screws at 200 mm (8") oc at board edges and 300 mm (12") oc on board field.

3.3.1.9.3. Ceiling and Partition Fasteners: Ensure perimeter screws are not less than 9 mm (3/8") nor more than 13 mm (1/2") from edges and ends are opposite screws on adjacent boards. Drive screws with power screw-gun and set with countersunk head slightly below surface of board.

3.3.1.9.4. Joints: Finish all joints unless specified otherwise.

3.3.1.10. Gypsum Board - Double Layer:

3.3.1.10.1. Lay out work to minimize end joints on face layer; to offset parallel joints between face and base layers by at least 250 mm (10") and to apply face layer at right angles to base layer.

3.3.1.10.2. Base Layer: Ensure base layer is same as face layer, or backing board, and applied at right angles to framing members. Secure base layer with screws spaced 300 mm (12") oc to each member. Ensure perimeter screws are not more than 13 mm (1/2") from edges and ends are opposite screws on adjacent boards. Ensure surface of erected base layer is straight, plumb or level and without protrusions before face layer is applied.

3.3.1.10.3. Face Layer: Apply face layer at right angles to base layer with screws.

3.3.1.10.4. Joints: Finish joints in face layers only, unless otherwise required to achieve fire resistant ratings indicated, as hereinafter specified. Ensure setting compound for fire rated construction conforms to requirements of authorities having jurisdiction to obtain fire rating shown on Drawings.

3.3.2. Interior Ceilings:

3.3.2.1. Comply with recommendations of CGC Drywall Steel-Framed Systems Folder 09250-SA 923.

3.3.2.2. Provide hanger wires spaced at maximum 1200 mm (4') oc along carrying channels and within 150 mm (6") of ends of carrying channel runs. Secure hanger wires to inserts in structure above.

3.3.2.3. Provide carrying channels maximum 1200 mm (4') oc and within 150 mm (6") of walls. Secure with hanger wire saddle-tied along channels. Provide 25 mm (1") clearance between runners and walls. Provide splicers behind joints. Level channels to a maximum tolerance of 3 mm (1/8") over 3600 mm (12').

3.3.2.4. Provide metal furring channels at right angles to carrying channels at maximum 600 mm (24") oc and within 150 mm (6") of walls. Provide 25 mm (1") clearance between furring ends and abutting walls. Attach furring channels to carrying channels with saddle-tie of double strand tie wire.

3.3.2.5. Provide additional cross-reinforcing at bulkheads and other openings.

3.3.2.6. Provide ceiling gypsum board, smooth and level. In areas with a high humidity content (ie. Washrooms, janitor closets, etc.) install MRGB.

3.3.3. Metal Trim and Accessories:

3.3.3.1. Provide metal trim casing beads at reveals; at ceiling-wall intersections and partition perimeters; and at intersection of dissimilar constructions such as gypsum board to concrete.

3.3.3.2. Provide metal trim casing beads where gypsum board abutts against a surface having no trim concealing junction.

3.3.3.3. Provide a 13 mm (1/2") separation gasket between metal trim casing beads and window frames or other cold surfaces or provide sponge tape between gypsum board partition or furring framing, where such framing abuts exterior door or window frame, sponge tape between floor and gypsum board partition track. Ensure tape is either full width or 1 strip 9 mm (3/8") wide on each side of framing member.

3.3.3.4. Provide casing bead and sponge tape where gypsum board abuts materials other than itself and acoustic tile ceilings including at exterior door and window frames, where juncture is not concealed with trim; or elsewhere where indicated on Drawings. Unless indicated otherwise, use tape 3 mm (1/8") narrower than casing bead to provide recess at exposed side. Compress tape by 25%.

3.3.3.5. Provide metal trim casing beads where indicated on Drawings.

3.3.3.6. Access Doors and Panels: Install access doors and panels supplied as part of work of Divisions 22, 23 and 26 and where required as part of work of this Section in walls, bulkheads, ceilings and soffits.

3.3.4. Control Joints:

3.3.4.1. Provide either manufactured control joint devices or field fabricated control joints from suitable materials to suit site conditions in accordance with manufacturer's instructions and/or ASTM C840.

3.3.4.2. Set in gypsum facing board, supporting control joints with studs or furring channels on both sides of joint. Ensure double studs with discontinuous tracks and double suspended ceiling furring channels have been installed prior to commencing board and bead application at control joints. Provide control joints as required to prevent cracks at following locations:

3.3.4.2.1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic or building control element) in base building structure

3.3.4.2.2. Where a wall or partition runs in an uninterrupted straight plane exceeding 9.1 m (30') (Note: A full height door frame may be considered a control joint).

3.3.4.2.3. interior ceilings with perimeter relief: installed so linear dimensions between control joints do not exceed 15 m (50') and total area between control joints does not exceed 230 m^2 (2,500 sq ft).

3.3.4.2.4. Interior ceilings without perimeter relief: installed so linear dimensions between control joints do not exceed 9.1 m (30') and total area between control joints does not exceed 84 m^2 (900 sq ft).

3.3.4.2.5. Exterior ceilings and soffits: installed so linear dimensions between control joints do not exceed 15 m (50') and total area between control joints does not exceed 230 m^2 (2,500 sq ft).

3.3.4.2.6. At stress points (ie corners of openings or changes in direction of surfaces).

3.3.4.3. Provide additional control joints at long and narrow surfaces.

3.3.4.4. Provide control joints full height floor to ceiling or door header to ceiling in partitions and furring runs.

3.3.4.5. Provide control joints from wall to wall in ceiling areas.

3.3.4.6. Provide continuous polyethylene dust barrier behind and across control joints.

3.3.4.7. Ensure Consultant reviews exact locations of control joints.

3.3.5. Sound Control:

3.3.5.1. Where indicated on Drawings, provide sound rated partitions and ceiling in locations indicated to meet required minimum STC rating. Apply gypsum board on both sides of sound-proofed partitions. Follow manufacturer's details and recommendations.

3.3.5.2. Provide sound attenuation insulation to completely fill height of stud cavities. Tightly butt ends and sides of blankets within cavities. Cut blankets to fit small spaces. Carefully fit blankets behind electrical outlets, bracing, fixture attachments and mechanical and electrical services.

3.3.5.3. Mechanically fasten blankets to back of gypsum board as recommended by gypsum board manufacturer.

3.3.5.4. At sound attenuating suspended ceiling and enclosures having spring isolator hangers, terminate ceiling or enclosure at adjacent construction by providing continuous isolator strip and sealed joint.

3.3.6. Joint Treatment - Gypsum Board:

3.3.6.1. Verify board is firm against framing members and screw heads are properly depressed.

3.3.6.2. Mix joint compound or ready-to-use compounds according to manufacturer's directions. Use pure, unadulterated, clean water for mixing. Permit mixed material to stand 30 minutes before using. Do not mix more material than can be used within 1 hour. Do not use set or hardened compound. Clean tools and equipment after mixing each batch.

3.3.6.3. Tape and fill joints and corners in accordance with gypsum board manufacturer's printed instructions. Fill either manually, using hand tools of trade, or by a mechanical taping and filling machine of proven efficiency.

3.3.6.4. Remove plastic tape from control joints after finishing with joint compound.

3.3.6.5. After final coats of filler have dried at least 24 hours, sand surface lightly with No. 00 sandpaper to leave it smooth, ready for decoration.

3.3.6.6. Provide finished work smooth, seamless, plumb and true, flush and with square plumb neat corners.

3.3.6.7. Levels of Finish: Provide Level 4 finish in accordance with ASTM C840.

3.3.7. Cutting and Patching: Cooperate and coordinate with other Sections to obtain satisfactory gypsum board finish work. Do cutting, patching and Make Good as required by installation of work of other Sections.

3.4. CLEANING

3.4.1. Clean off beads, casings, joint cement droppings and similar items and remove surplus materials and rubbish on completion and as directed.

3.5. PROTECTION

3.5.1. Provide protection of materials and work of this Section from damage by weather and other causes. Perform work in areas closed and protected from damage due to weather. Protect work of other trades from damage resulting from work of this Section. Make Good such damage immediately.

END OF SECTION

PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to:

1.1.1.1. Division 01 requirements and documents referred to therein.

1.2. SUMMARY

1.2.1. Section Includes: All labour, materials, tools and other equipment, services and supervision required to complete all exterior and interior painting work as indicated on Finish Schedules and to the full extent of the drawings and specifications.

1.2.2. Work under this contract shall also include, but not necessarily be limited to following:

1.2.2.1. Surface preparation of substrate: cleaning and preparation of surfaces for application of paint systems.

1.2.2.2. Priming except where pre-primed with an approved primer under other Sections of work and painting of structural steel, miscellaneous metal, ornamental metal and primed steel equipment.

1.2.2.3. Priming and back-priming of wood materials as noted herein.

1.2.2.4. Painting of all semi-concealed areas e.g. inside of light troughs and valances, behind grilles, and projecting edges above and below sight lines.

1.2.2.5. Painting and finishing of all exposed to view elevator equipment and components (i.e. doors and door frames) unless pre-finished.

1.2.2.6. Painting of exposed to view mechanical (heating, ventilating and plumbing) services and equipment, e.g., ducts, sprinkler piping, etc., and electrical work to extent noted on Finish Schedule unless pre-finished.

1.2.2.7. Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.

1.2.2.8. Waste management and disposal of paint, stain and wood preservatives and other related hazardous materials.

1.2.3. Section Excludes: Painting of:

1.2.3.1. Pre-finished metal flashing and similar components. Refer to other sections for special finishes and their effects work of this section.

1.2.3.2. Chrome, stainless steel, vinyl, plastic laminate and aluminum surfaces throughout unless specified otherwise.

1.2.3.3. Wallcoverings unless otherwise noted.

1.2.3.4. Primed and finish painted equipment furnished by manufacturer unless required to be field painted in 1 common corporate colour as identified in room finish schedule.

1.2.3.5. Areas indicated as “unfinished” or “exposed” on room finish schedule.

1.2.3.6. Special finishes for cast-in-place concrete.

1.2.3.7. Sealers over concrete.

1.2.3.8. Shop priming of steel including structural steel, joists and steel decking.

1.2.3.9. Shop priming of metal fabrications and custom metal work.

1.2.3.10. Shop priming and finishing of finish woodwork.

1.2.3.11. Pre-finishing of wood doors and frames.

1.2.3.12. Electrostatic painting (powder coating).

1.2.3.13. Fluoropolymer thermal setting enamels or other organic coatings.

1.2.4. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.2.4.1. Surface preparation and shop priming of miscellaneous metal work: Section 05 50 00, Metal Fabrications.

1.2.4.2. Priming and/or back painting of wood: Section 06 10 00 - Rough Carpentry.

1.2.4.3. Shop priming of steel doors, frames and screens: Section 08 11 13 - Steel Doors and Frames.

1.2.4.4. Application of Level 5 finish to gypsum board: Section 09 29 00 – Gypsum Board.

1.2.4.5. Instructions on painting, stenciling and banding of mechanical and electrical work: Mechanical and Electrical.

1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. DFT: Dry Film Thickness.

1.3.1.2. MSDS: Material Safety Data Sheets.

1.3.2. Definitions:

1.3.2.1. Exposed: Visible in completed work. In case of closets, cabinets and drawers, it includes their interiors. Exposed surfaces in underground parking areas are considered “Exterior” for purpose of this Specification. Exposed surfaces in aboveground parking areas are considered “Interior” for the purpose of this Specification.

1.3.2.2. Gloss or Sheen: Capacity of a finish on a surface to reflect light at specific angles as tested in accordance with ASTM D523.

1.3.2.3. Hazardous Waste: Construction and demolition materials that are regulated for disposal by local, city, county, province or federal authorities having jurisdiction.

1.3.2.4. Painting: In this Section refers to application of various types of paint, stain, varnishes and lacquers, etc.

1.3.2.5. Surface Preparation: Cleaning or treating of surface to be painted to ensure best possible bond between surface and painting to be applied to surface; remove surface contaminants that will affect performance of painting, without limitations such as oil, grease, salts, dust, dirt, rust, rust scale, mill scale and old coatings where applicable; remove surface imperfections without limitation including but not limited to such as weld spatter, sharp edges, burrs, slivers, laminations, pits, porosities and crevices; prepare surfaces to provide anchor profile or surface profile which improve mechanical bonding of coating to prepared surface by increasing surface area.

1.3.3. Reference Standards:

1.3.3.1. ASTM D523-22 - Standard Test Method for Specular Gloss

1.3.3.2. CAN/CGSB – Painting

1.3.3.3. CAN/CGSB- Methods of Test for Toxic Trace Elements in Protective Coatings

1.3.3.4. SSPC-08 - Systems and Specifications - Steel Structures Painting Manual, Volume 1 & 2

1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Preinstallation Meetings:

1.4.1.1. Review Drawings, details and Schedules, determine intent, extent, materials, types of surfaces, locations and be fully cognizant of intent of Work. Review Product literature, MSDS, related safety data, proper disposal requirements and inform those involved in work of this Section.

1.4.1.2. Review Specifications and Drawings for work of other Sections regarding provisions for prime and finish coats and ensure compatibility with each other and substrate prior to application.

1.4.1.3. Prior to start of work, arrange for Project site meeting of parties associated with Work of this Section. Presided over by Consultant include HWDSB Project Manager, Consultant, Subcontractor, manufacturer's representative, any sub-trades whose work will be painted (including Mechanical and Electrical trades) or whose work is adjacent to, or whose work or schedule may be affected by work of this Section.

1.4.1.4. 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 requiring painting and other matters affecting construction, to permit compliance with intent of this Section.

1.4.2. Scheduling:

1.4.2.1. Schedule painting operations to prevent disruption of and by other trades. Ensure painting is completed for locations requiring application of finishes by other trades in a timely fashion to prevent delays.

1.5. SUBMITTALS

1.5.1. Submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.5.2. Product Data:

1.5.2.1. Submit Product data and a Schedule of Finishes listing manufacturer's Product name, colour, textures, MSDS and test reports requested for each paint system. Submit test reports for odourless, low or zero VOC Products when requested.

1.5.2.2. Painting Subcontractor to receive written confirmation of specific surface preparation procedures and primers used for fabricated steel items from fabricator/supplier to ensure appropriate and manufacturer compatible finish coat materials prior to commencement of painting.

1.5.2.3. Submit Product data for concrete and concrete block primers.

1.5.3. Samples: Submit samples 30 Days before materials are required.

1.5.3.1. Submit following samples in sizes indicated:

1.5.3.1.1. 2 copies of brushouts minimum 200 mm x 250 mm (8" x 10") of each finish including colour, sheen and texture. Identify each sample with job, finish, colour name, number, sheen and gloss values, substrate to be applied to, date and name of Subcontractor.

1.5.4. Certificates:

1.5.4.1. Surface Preparation: Submit manufacturer's representative's written approval of surface preparation methods and any specific recommendations for alternative methods.

1.5.5. Site Quality Control Submittals:

1.5.5.1. Submit site instruction reports in accordance with 01 33 00 - Submittal Procedures containing information required by this Section.

1.5.5.2. Progress Reports: Arrange to have paint manufacturer's representative inspect work of this Section on a regular basis and prepare weekly job progress reports. Submit copy of reports to Consultant.

1.6. CLOSEOUT SUBMITTALS

1.6.1.1. Operation and Maintenance Data:

1.6.1.1.1. Upon completion of Project, submit a coating maintenance manual, such as Dulux “Project Colour and Product Information” report or equal.

1.6.1.1.2. Ensure manual includes an ‘Area Summary’ with finish schedule.

1.6.1.1.3. ‘Area Detail’ designating where each Product/colour/finish was used.

1.6.1.1.4. Product data pages.

1.6.1.1.5. MSDS.

1.6.1.1.6. Care and cleaning instructions, touch-up procedures and colour samples of each colour and finish used.

1.7. MAINTENANCE MATERIAL SUBMITTALS

1.7.1. Extra Stock Materials: Submit to Owner 1 - unopened 4 litre (1 gal) can of each different type and colour and degree of gloss of paint used (batch mix) on this Project for touch-ups. Ensure paint is boxed and in sealed, unopened cans in undamaged condition, with name of manufacturer, contents, type and colour clearly indicated on a label securely adhered to can.

1.7.2. Label each can with locations where product was used.

1.7.3. If paint colour was a mix or custom blend, include complete formulae to achieve the same colour in the future.

1.8. QUALITY ASSURANCE

1.8.1. Qualifications:

1.8.1.1. Applicators:

1.8.1.1.1. Execute work of this Section by a firm which has adequate plant, equipment and skilled workers to perform work expeditiously and which is known to have been responsible, during immediate past 5 years, for installations similar to work contained herein. Ensure firm is fully conversant with applicable laws, bylaws, codes, fire, health and safety regulations and other regulations which govern.

1.8.1.2. Mock-Ups:

1.8.1.2.1. Provide mock-up at location established by Consultant, complete with required lighting. Mock-up to establish standard of workmanship, texture, gloss and coverage.

1.8.1.2.2. Apply minimum 300 mm x 300 mm (12" x 12"), or where required, full size mock-up of each finish on each type of surface to be coated with correct material, number of coats, colour, texture and degree of gloss required.

1.8.1.2.3. Provide additional mock-ups of each finish in modified colour, texture or degree of gloss when required, to obtain acceptance.

1.8.1.2.4. Prepare surfaces and apply treatment to galvanized or other components as required for Consultant's review.

1.8.1.2.5. Accepted mock-up to become standard of comparison for painting work on site. Correct and refinish work which does not compare with accepted finishes.

1.8.1.2.6. Accepted full size mock-up may become integral part of finished work if permitted by Consultant.

1.9. DELIVERY, STORAGE AND HANDLING

1.9.1. Delivery and Acceptance Requirements:

1.9.1.1. Deliver to site, materials manufacturer's original, sealed and labeled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, degree of gloss, batch number, standard compliance, materials content as well as mixing, reducing and application requirements.

1.9.2. Storage and Handling Requirements:

1.9.2.1. Store on site, materials in manufacturer's sealed and labeled containers.

1.9.2.2. Comply with applicable local fire and building code requirements during storage and application.

1.9.2.3. Store containers of paint, thinner and other volatile materials in secure, well ventilated location, heated to minimum 10 deg C (50 deg F), where they will not be exposed to excessive heat or direct solar radiation. Keep tightly closed when not in actual use.

1.9.2.4. Presence of any unauthorized materials or containers on site is sufficient cause for rejection of paint materials on site at that time.

1.9.2.5. Protect floor and wall surfaces in storage areas from paint drips and splatters.

1.9.2.6. Be totally responsible for prevention of fire or explosion caused by improper storage of paints, solvents, rags and similar items. Store fire hazardous materials in location and in manner approved by local fire authority. Post "No Smoking" signs in areas of storage and mixing and strictly enforce this requirement. Provide and maintain CO_2 fire extinguishers of minimum 9 kg (20 lb) capacity. Repair damage to storage area or surrounding area at no cost to Owner.

1.10. SITE CONDITIONS

1.10.1. Ambient Conditions:

1.10.1.1. Paint and finish in clean, dust-free, properly ventilated and adequately lit areas minimum 323 Lx (30 ft candles) on surfaces to be painted or decorated.

1.10.1.2. Provide each paint materials in accordance with manufacturer's recommended tolerances for:

1.10.1.2.1. Substrate Moisture Content: Perform tests with a properly calibrated electronic moisture meter to ensure compliance with manufacturer's recommendations. Without limitation, maximum moisture content as follows:

1.10.1.2.1.1. Concrete and Concrete Unit Masonry: Maximum 12 - 14% for solvent coatings and as recommended by manufacturer for each water based system.

1.10.1.2.1.2. Gypsum Based Board and Plaster: Maximum 12 - 14%.

1.10.1.2.1.3. Wood: Maximum 15%.

1.10.1.3. Temperature and Ventilation:

1.10.1.3.1. Do not provide paint under ambient and surface temperatures less those required below in any instance for 24 hours before, during and 7 Days after installation.

1.10.1.3.2. Provide ventilation to remove odours, evaporating solvents and moisture. Maintain adequate ventilation at all times to control excessive humidity.

1.10.1.3.3. Interior Paint:

1.10.1.3.3.1. Water Based Paints: Maintain minimum interior surface and ambient air temperature of between 18 deg C (65 deg F) and 32 deg C (90 deg F) during application and drying of paint and maintain until building occupancy occurs.

1.10.1.3.3.2. Solvent Based Paints: Maintain minimum interior surface and ambient air temperature of between 7 deg C (45 deg F) and 35 deg C (95 deg F) during application and drying of paint and maintain until building occupancy occurs.

1.10.1.3.3.3. Do not undertake interior painting on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.

1.10.1.3.4. Exterior Paint:

1.10.1.3.4.1. Do not undertake exterior painting if air and surface temperature are expected to fall below 10 deg C (50 deg F) before coating has dried. Avoid painting during winds, weather conditions which may affect paint application or following rain. Wait until frost, dew or condensation has evaporated. Avoid painting surfaces exposed directly to hot summer sun.

1.10.1.3.4.2. Do not apply paint in snow, rain, fog or mist or when relative humidity exceeds 85% or dew point is less then 3 deg C (5 deg F) difference between air and surface temperature, or damp or wet surfaces unless surface to be painted is enclosed and conditioned to required temperatures and ambient conditions required for application.

1.10.1.3.4.3. Where required, suitable weatherproof covering and sufficient heating facilities are to be provided which will enable required ambient and surface temperatures.

1.11. WARRANTY

1.11.1. Manufacturer Warranty: Warrant work of this Section for a period of 2 years against defects and/or deficiencies 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 expense to Owner. Defects include but are not limited to material and workmanship defects such as: improper cleaning and preparation of surfaces, entrapped dust and dirt, material shrinkage, cracking, splitting and defective workmanship including but are not limited to failure in bubbling, drips, runs, blistering, uneven coverage, misses, poor cutting in and delamination.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications

2.1.1.1. Dulux Paints www.dulux.ca

2.1.1.2. Sherwin Williams www.sherwin-williams.com

2.1.2. Basis of Design: for interior latex applications (PT-1): “Promar 200 HP Zero VOC” by Sherwin Williams

2.1.3. Substitution Limitations: Substitution Limitations: Comparable Products from other manufacturers not listed herein will be accepted provided:

2.1.3.1. They are submitted in accordance with Section 01 25 00 - Substitution Procedures

2.1.3.2. Meet requirements of this Specification.

2.1.3.3. Acceptance by Consultant.

2.2. MATERIALS

2.2.1. Description:

2.2.1.1. Regulatory Requirements:

2.2.1.1.1. Conform to latest edition of Industrial Health and Safety Regulations issued by applicable authorities having jurisdiction in regard to site safety (ladders, scaffolding, ventilation, etc.).

2.2.1.1.2. Comply with more stringent of applicable laws, bylaws, codes, fire regulations, health and safety regulations of authorities having jurisdiction or requirements of this Specification. Ensure standards used for work of this Section are considered a minimum.

2.2.1.1.3. Where required, ensure paints and coatings meet flame spread and smoke developed ratings designated by local code requirements and/or authorities having jurisdiction.

2.2.1.1.4. Comply with toxic trace limitations stipulated by authorities having jurisdiction as tested in accordance with CAN/CGSB-1.500.

2.2.1.1.5. Conform to requirements of local authorities having jurisdiction in regard to storage, mixing, application and disposal of paint and related waste materials.

2.2.2. Performance/Design Criteria:

2.2.2.1. Provide best practices specified or recommended in CAN/CGSB-85.100.

2.2.2.2. Consultant reserves right to refuse any paint or finishing material if in its opinion it is not suitable or adequate for proposed use.

2.2.2.3. Provide paint and finishing materials of highest grade, top quality line of Products from manufacturer. Paint material containers not displaying manufacturer’s Product identification will not be acceptable. Ensure paint is not diluted.

2.2.2.4. Use brand of paint chosen throughout work of this Section, except where specified otherwise. As far as practical, factory mix paint for immediate application without thinning or alteration at site.

2.2.2.5. Provide primers in recommended DFT/coat.

2.2.2.6. Only materials (primers, paints, coatings, varnishes, stains, lacquers, etc.) recommended by manufacturer are acceptable for use on this Project.

2.2.2.7. Ensure materials used are lead and mercury free and have low VOC content where possible.

2.2.2.8. Provide paint materials with good flowing and brushing properties and dry or cure free of blemishes, sags, air entrapment, etc.

2.2.2.9. Paint materials which from time to time will become hot, such as convector covers and similar item, a paint type approved by paint manufacturer for particular condition.

2.2.3. Finishes:

2.2.3.1. Colours: to be selected by Consultant

2.2.3.2. Gloss Values Definition, as determined by ASTM D523:

		Light Reflection Unit
G1	Gloss Level 1 – Traditional matte finish, Flat	< 5
G2	Gloss Level 2 – High side sheen Flat, “Velvet-like” finish	< 10
G3	Gloss Level 3 – Traditional “Eggshell-like” finish	10 - 25
G4	Gloss Level 4 – “Satin-like” finish	20 - 35
G5	Gloss Level 5 – Traditional Semi-Gloss	35 - 70
G6	Gloss Level 6 – Traditional Gloss	70 - 85
G7	Gloss Level 7 – High Gloss	> 85

2.2.3.3. Gloss Values unless otherwise specified:

2.2.3.3.1. Walls: G4

2.2.3.3.2. Floors: G5 or G6

2.2.3.3.3. Ceilings: G1

2.2.3.3.4. Trim and Doors: G5

2.2.3.3.5. Signage: G1

2.2.4. Slip Resistant Additive: rubber aggregate, clean/washed silica sand for use with or as a component part of paint on horizontal surfaces as required to provide slip resistance. Where site applied, material to either mixed into paint (and mixed constantly to keep material in suspension) or broadcast into first or prime coat as required.

2.2.5. Equipment:

2.2.5.1. Painting and Decorating Equipment: to best trade standards for type of product and application.

2.2.5.2. Spray Painting Equipment: of ample capacity, suited to the type and consistency of paint or coating being applied and kept clean and in good working order at all times.

2.2.6. Mixing and Tinting:

2.2.6.1. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.

2.2.6.2. Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

2.2.7. Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

2.2.8. If required, thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

2.3. INTERIOR FINISH SCHEDULE:

2.3.1. Concrete Vertical Surfaces:

2.3.1.1. 1 coat primer alkali resistant water based: Dulux Gripper Universal Acrylic Primer/ Sealer code 60000A

2.3.1.2. 2 coats latex: Dulux Lifemaster code 59311

2.3.1.3. Finish: G3 -Eggshell.

2.3.2. Concrete Masonry Units (CMU's): (concrete block and concrete brick):

2.3.2.1. 1 coat latex block filler: Dulux X-Pert Acryluc

2.3.2.2. 2 coats latex: Dulux Lifemaster code 59311

2.3.2.3. Finish: G3 -Eggshell.

2.3.3. Structural Steel and Metal Fabrications: (with existing shop coat primer):

2.3.3.1. Unexposed: No further finishing required except for touch-up of damaged surfaces.

2.3.3.2. Exposed:

2.3.3.2.1. 1 coat quick dry metal primer: PPG Pitt-Tech Plus EP WB Acrylic Primer

2.3.3.2.2. 2 coats quick dry enamel: PPG HPC Alkyd Industrial Semi-Gloss Enamel code 4336H

2.3.3.2.3. Finish: G5 - Semi-Gloss.

2.3.4. Galvanized Metal (Not Chromate Passivated): (High contact/high traffic areas (doors, frames, railings, pipes, etc.) low contact/low traffic areas (overhead decking, pipes, ducts, etc.):

2.3.4.1. 1 coat waterborne primer: PPG Pitt-Tech Plus EP WB Acrylic Primer

2.3.4.2. 2 coats latex: Dulux acrylic eggshell code 14220

2.3.4.3. Finish: G3 - Eggshell

2.3.5. Structural Steel, (underside roof deck, OWSJ, beams):

2.3.5.1. 2 coats latex dry fall: Spraymaster Latex Dryfall code 10113 or PPG Speedhide Super Tech WB Interior Flat Latex Dry-Fog code 6-723XI

2.3.5.2. Finish: G1 - Flat

2.3.6. Gypsum Board:

2.3.6.1. 1 coat latex primer sealer: Dulux X-Pert code 11000

2.3.6.2. 2 coats latex:

2.3.6.2.1. Walls: Dulux Lifemaster code 59311

2.3.6.2.1.1. Finish: G3 - Eggshell

2.3.6.2.2. Ceilings: Dulux Lifemaster code 59111

2.3.6.2.2.1. Finish: G1 - Flat.

2.3.7. Plywood Backer Panels:

2.3.7.1. 2 coats Albi Cote FRL-X

2.3.7.2. Finish: G1 – Flat

2.3.8. PT-2: WB Epoxy: Water based (W.B.) light industrial coating:

2.3.8.1. Primer Coat: As recommended by top coat manufacturer unless otherwise specified.

2.3.8.2. Top coats (2 coats unless otherwise specified):

2.3.8.2.1. Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy V341 / V342.

2.3.8.2.2. Sherwin Williams Pre-Catalyzed Waterbased Epoxy K45 / K46-150 Series.

2.3.8.2.3. PPG Pitt-Glaze WB1 Interior Pre-Catalyzed Water-Borne Epoxy 16-310 / 16-510.

2.3.9. Metal fabrications (steel doors and frames and miscellaneous items including pipes, ducts, equipment and related brackets and supports). Includes factory primed and galvanized or galvanneal metal.

2.3.9.1. Primer coat and tie coat: Acrylic DTM Rust Inhibitive Primer.

2.3.9.1.1. Field applied, factory primed, or unpainted surfaces.

2.3.9.1.2. Acceptable Products as recommended by top coat manufacturer:

2.3.9.1.2.1. Sherwin Williams B66W1 or B66W310 DTM Primer.

2.3.9.1.2.2. PPG Pitt-Tech 90-712 or 90-912 Series DTM Primer.

2.3.9.2. Top coats:

2.3.9.2.1. WB Epoxy.

2.3.10. Primed Miscellaneous Metals and Architectural Metals supplied by Division 05.

2.3.10.1. Primer: in accordance with Section 05 50 00 and as recommended by top coat manufacturer.

2.3.10.2. Touch up primer and tie coat: 100% Acrylic DTM Rust Inhibitive Primer for Interior or Exterior Surfaces.

2.3.10.2.1. Field applied as required to repair damage, defects or contamination.

2.3.10.2.2. Acceptable Products:

2.3.10.2.2.1. Sherwin Williams B66W1 or B66W310 DTM Primer (spray applied).

2.3.10.2.2.2. PPG Pitt-Tech 90-712 or 90-912 Series DTM Primer.

2.3.10.2.3. Top coats:

2.3.10.2.3.1. WB Epoxy.

2.3.11. Galvanized Miscellaneous Metals and Architectural Metals supplied by Division 05.

2.3.11.1. Primer coat: 100% Acrylic DTM Rust Inhibitive Primer for Interior or Exterior Surfaces.

2.3.11.1.1. Acceptable Products:

2.3.11.1.1.1. Sherwin Williams B71Y1 DTM Wash Primer.

2.3.11.1.1.2. Carboline Sanitile 120 Heavy Duty Bonding Primer.

2.3.11.1.1.3. PPG Pitt-Tech 90-712 Series DTM Primer.

2.3.11.2. Top coats:

2.3.11.2.1. WB Epoxy.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. Do work only when surfaces and conditions are satisfactory for production of quality work. Report to Consultant in writing any surfaces which are found to be unsatisfactory.

3.1.1.2. Ensure temperature of surfaces to be finished are as required for application of finish. Refer to “Temperature and Ventilation” article specified herein. Ensure surfaces are dry and free of dirt, grease or other contaminants that may affect applied finish.

3.1.1.3. Verify moisture content of surfaces with electronic moisture meter. Do not proceed without written directions if moisture reading is higher than as required for application. Refer to “Ambient Conditions” article specified herein for substrate moisture content requirements.

3.1.1.4. If substrate is steel, do not apply coatings over moisture or when surface temperature is within 3 deg C (5 deg F) of dew point.

3.1.1.5. If substrate is wood, do not stain or paint if moisture reading is higher than 15%. Inspect work to assure surfaces are smooth, free from machine marks and nail heads have been countersunk.

3.1.1.6. If substrate is cast-in-place concrete, allow to cure for 60 to 90 Days before proceeding with priming.

3.1.1.7. If substrate is precast prestressed concrete, inspect and accept or reject filled-in surface blow holes.

3.1.1.8. If substrate is new plaster or masonry, allow to cure for 30 to 90 Days. Ensure moisture content is between 12% and 14% and test for alkalinity and neutralize (pH 6.5 - 7.5) before proceeding with priming.

3.1.1.9. If substrate is gypsum board, inspect to ensure joints are completely filled and sanded smooth. Inspect surfaces for "nail popping", screw heads not recessed and taped, breaks in surface or other imperfections and have repaired as required.

3.1.1.10. Verify each substrate is dry and not frozen and free from tool and sandpaper marks, dust, rust, insects, grease and other foreign matter liable to impair finished work.

3.1.2. Evaluation and Assessment:

3.1.2.1. Prior to commencement of work of this Section, thoroughly examine (and test as required) conditions and surfaces scheduled to be painted and report in writing to Contractor and Consultant any conditions or surfaces that will adversely affect work of this Section.

3.1.2.2. Do not commence painting work until adverse conditions and defects have been corrected and surfaces and conditions are acceptable to this Subcontractor.

3.1.2.3. Commencement of work does not imply acceptance of surfaces except as qualified herein. Surfaces such as concrete, masonry, structural steel and miscellaneous metal, wood, gypsum board and plaster, is not responsibility of this Subcontractor. Commencement of work implies acceptance of previously completed work.

3.2. PREPARATION

3.2.1. Protection of In-Place Conditions:

3.2.1.1. Provide scaffolding, staging, platforms and ladders, as required for execution of work. Erect scaffolding to avoid interference with work of other trades. Comply with Occupational Health and Safety Act.

3.2.1.2. During work of this Section, provide drop cloths, plastic, plywood or metal sheets to protect floors in areas assigned for storage and mixing of paints. Cover finished floors, walls, ceilings and other work in vicinity and protect from paint and damage.

3.2.1.3. Protect work of other trades against paint splattering and Make Good at own expense any such damage.

3.2.1.4. Remove and securely store miscellaneous and finish hardware and surface fittings, electrical switch and outlet covers, receptacle plates, louvres, fittings and fastenings, to protect from paint splatter. Mask items not removable. Use sufficient drop cloths and protective coverings for full protection of floors, furnishings, mechanical, electrical and special equipment, other components of building which do not require painting or to be removed, from paint spotting and other soiling. Carefully clean and re-install items when paint is dry. Clean any components that are paint spotted or soiled. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes).

3.2.1.5. Prohibit traffic, where possible, from areas where painting is being carried out and until paint is cured. Post “wet paint” or other warning signage during and on completion of work. Provide also warning signs at points of entry to areas where painting is applied and drying.

3.2.2. Surface Preparation:

3.2.2.1. Prepare defective surfaces to obtain a satisfactory substrate and in accordance with paint manufacturer's instructions.

3.2.2.2. Prior to painting, wipe down wall surfaces, vacuum clean floors, ensure all surfaces are dust-free.

3.2.2.3. Clean soiled surfaces to be painted.

3.2.2.4. Remove efflorescence, chalk, dust, dirt, oil, grease, rust, form oil, release agents, loose mill scale and other extraneous matter from surfaces.

3.2.2.5. Remove mildew by scrubbing affected area with solution of 150 g (5.3 oz) TSP and 125 g (4.4 oz) bleach in 3.5 ℓ (0.92 gal) water. Rinse well with clean water and allow to dry. If condition is serious, source out finishes with extra mildew resistance.

3.2.2.6. Be responsible for surface preparation to suit surface condition and conform to level of cleaning based on SSPC, recommended metal cleaning procedures most commonly used to suit site conditions.

3.2.2.7. Concrete and Masonry:

3.2.2.7.1. Form Oil Removal: Remove with Xylol or TSP.

3.2.2.7.2. Efflorescence Removal: Remove by dry brushing or washing with 1 part commercial muriatic acid to 20 parts water by volume and thoroughly rince with clean water.

3.2.2.7.3. Mildew Removal: Remove by scrubbing affected area with 1 part sodium hypochlorite to 3 parts water. Where dirt is also evident, add 1.36 kg (3 lbs) TSP to 6.8 ℓ (1.5 gal) of above solution.

3.2.2.7.4. Concrete Vertical Surfaces: Use sand blasting, high pressure water blasting, high pressure water blasting with abrasives, vacuum blasting with abrasives or alternatively, needle guns or power grinders equipped with suitable grinding stone, to remove concrete, loose mortar, fins, projections and surface contaminants. Vacuum or blow down and remove dust and loose particles from surface. Fill large cracks and/or voids in consultation with design engineer using either polyester, epoxy or acrylic resin, block

filler or cement sand mixture in accordance with design engineer's written instructions. Fill only flush to surface and allow to set.

3.2.2.7.5. Concrete Block Masonry: Fill voids and cracks in masonry block wall to provide uniform surface for subsequent coats.

3.2.2.8. Metals:

3.2.2.8.1. Ensure application of paint and coatings occurs within appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications.

3.2.2.8.2. SSPC-SP 3 (Power Tool Cleaning): Use of power sanders and wire brushes, impact tools, grinders and power chipping hammers to remove loose mill scale, loose rust, paint or other foreign matter. Do not employ power tool cleaning excessively causing burnished mill scale preventing primers to adhere properly.

3.2.2.8.3. Ferrous Metal: Clean to SSPC-SP 1/2/3, to suit site conditions. Remove loose rust and prime bare metal with rust inhibitive steel primer. Touch-up damaged shop applied primer using compatible Product. Provide full coat primer only if damage is extensive. Treat weld areas with phosphoric acid (5% solution).

3.2.2.8.4. Structural Steel/Miscellaneous Steel (previously painted and exposed by alterations work): Remove oil, grease, dirt, rust scale, loose mill scale, loose paint or coating by brush-off blast cleaning to SSPC-SP 7.

3.2.2.8.5. Hot Dipped Galvanized Steel (Unweathered): Allow to weather minimum of 26 weeks and Xylene clean to SSPC-SP 1 specified herein prior to coating to remove dust, dirt, grease, oxides and other foreign material. Remove silicates or similar surface treatments or any deposits of white rust by sanding or similar abrasive methods (bronze wool). Use of acetic acid to prepare galvanized surfaces is not acceptable.

3.2.2.8.6. Galvanized Steel (Weathered): Remove dust, dirt, grease, oxides and other foreign material and clean to SSPC-SP 1 specified herein prior to coating.

3.2.2.8.7. Galvanized Steel (Pre-Treated)(Non-Crystal Appearance): Follow manufacturer's recommendations for preparation, priming and coating of pre-treated galvanized steel.

3.2.2.8.8. Light Zinc Coated or Satin Coated Products (ZF075) mostly found in environmentally controlled areas. Follow manufacturer's recommendations for preparation, priming and coating.

3.2.2.8.9. Heavy Coated Zinc Z275 (G90) for high humidity areas and as specified. Follow manufacturer's recommendations for preparation, priming and coating.

3.2.2.8.10. Metal Doors: Remove doors before painting to paint bottom and top edges and re-hang once dry. Do not paint stainless steel or bronze door butts. Paint or finish top and bottom edges of doors. Touch-up or refinish tops and edges after fitting.

3.2.2.9. Previously Finished Surfaces:

3.2.2.9.1. Clean existing interior and exterior surfaces to be repainted or varnished to provide bond. Remove rust, scale, oil, grease, mildew, chemicals and other foreign matter. Remove loose paint and fill flush with suitable

patching material. Clean off bubbled, cracked, peeling or otherwise defective paint by stripping with suitable environmental strippers or by burning. Do not burn off paints suspected of having lead content. Treat residue from stripping as Hazardous Waste.

3.2.2.9.2. Flatten gloss paint and varnish with sandpaper and wipe off dust. If previous coatings have failed so as to affect proper performance or appearance of coatings to be applied, remove previous coatings completely and prepare substrates properly and refinish as specified for new work.

3.2.2.9.3. Leave entire surface suitable to receive designated finishes and in accordance with finish manufacturer's instructions.

3.2.2.10. Woodwork:

3.2.2.10.1. Verify and determine wood species, grain direction and structure, properties of finish, application method and exposure to elements. Check moisture content to avoid movement of wood caused by expansion and contraction due to changes in moisture content. Verify grain cut as it may interfere with adhesion of paint.

3.2.2.10.2. Apply wood finishing Product in following order and as needed for specific appearance and application specified herein. Sanding sealer to control penetration of subsequent coats to create more uniform finish. Stain to colour wood and highlight grain for final finish. Filler to fill pores of wood and control penetration of subsequent coats. Apply filler across grain forcing it into pores followed with rubbing and sanding when dried. For staining requirements mix stain with filler before applying for uniform finish. Finish coats to provide protection to wood.

3.2.2.10.3. Wood work for Opaque Coating: Seal knots and sapwood in surfaces to receive paint with alcohol-based primer-sealer. Seal door edges. Sand smooth rough surfaces of woodwork to be finished using No. 150 grit paper followed by a second sanding using No. 220 grit paper. Sand in direction of grain. Clean surfaces free of dust before applying first coat using brush, compressed air or tack rags. Fill nail holes, splits and scratches with non-shrinking filler after first coat is dry.

3.2.2.10.4. Prepare plywood surface by removing dirt and debris. Fill screw and nail holes or minor imperfections with recommended filler and sand properly to receive finish coating. Ensure plywood requiring stained or painted finish is primed with top quality alkyd primer. Use only penetrating quality stain over plywood.

3.2.2.10.5. Woodwork for Clear Finish or Stain: Sand smooth woodwork to be finished using No. 150 grit paper followed by a second sanding using No. 220 grit paper and clean surfaces free of dust using brush, compressed air or tack rags before applying first coat. Abrade surfaces with stiff brush to remove loose fibres and splinters. Fill nail holes, splits and scratches with non-shrinking filler tinted to match local grain condition after first coat is dry. Sand lightly between coats with No. 220 grit sandpaper and remove dust.

3.2.2.10.6. Remove salt deposits that may appear on wood surfaces treated with fire retarder.

3.2.2.10.7. Obtain inspection of glue laminated beams by assigned painting inspector to ensure shop sealer has been applied. Where non-specified shop sealer has been applied to beams or columns, remove and refinish in accordance with manufacturer's written instructions.

3.2.2.10.8. Wood Doors: Remove doors before painting to paint bottom and top edges and re-hang once dry. Paint or finish top and bottom edges of doors to be painted or stained. Touch-up or refinish tops and edges after fitting.

3.2.2.11. Plastics (PVC): Solvent clean to SSPC-SP 1. Sand lightly with No. 120 grit sandpaper and remove dust.

3.2.2.12. Gypsum Board:

3.2.2.12.1. Examine and ensure gypsum board surfaces are without defects or deficiencies and suit able to receive painting applications. Commencement implies acceptance of gypsum board work. Examine surfaces after for imperfections showing through and fill small nicks or holes with patching compound and sand smooth. Examine surfaces after priming for imperfections showing through.

3.2.2.12.2. Clean surfaces dry, free of dust, dirt, powdery residue, grease, oil, wax or any other contaminants.

3.2.2.13. Fire Resistive Coatings: Coordinate with coating manufacturer for surface preparation requirements to ensure proper adhesion of finish.

3.2.2.14. Asphalt Surfaces: Ensure surface is free of mud and deleterious materials, clean and dry.

3.3. APPLICATION

3.3.1. Safety Precautions: When handling solvent coating materials, wear approved vapour/particulate respirator as protection from vapours. Dust respirators do not provide protection from vapours.

3.3.2. Material Compatibility: Provide primers and finish coat materials compatible with each other and substrate including fillers.

3.3.3. Obtain colour chart giving colour schemes and gloss value for various areas from Consultant. Ensure colour chart gives final selection of colours and surface textures of finishes and whether finishes are transparent (natural) or opaque (paint).

3.3.4. Provide finish uniform in sheen, colour and texture, free from streaks, shiners and brush or roller marks or other defects.

3.3.5. Apply materials in accordance with manufacturer's directions and specifications paying particular attention to appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications. Do not use adulterants. Do any reduction of coating’s viscosity in accordance with manufacturer’s directions.

3.3.6. Use up paints within period of shelf life recommended by paint manufacturer.

3.3.7. Ensure successive coatings are harmonious chemical compositions and materials of same manufacturer.

3.3.8. Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1 m (39").

3.3.9. Ensure each coat is dry and hard before a following coat is applied.

3.3.10. Continue through paint finish behind wall-mounted items (e.g. chalk and tack boards).

3.3.11. Finish listed surfaces indicated on Room Finish Schedule(s) and/or noted on Drawing(s) and as specified. Refer to Finish Room Schedule for type, location and extent of finishes required and include touch-ups and field painting necessary to complete work shown, scheduled or specified.

3.3.12. Finishes and number of coats specified in Room Finish Schedule are intended as minimum requirements guide only. Refer to manufacturer’s recommendations for exact instructions for

thickness of coating to obtain optimum coverage and appearance. Some materials and colours may require additional coats and deeper colours may require use of manufacturers' special tinted primers.

3.3.13. Paint entire plane of areas exhibiting incomplete or unsatisfactory coverage and of areas which have been cut and patched. Patching is not acceptable. Vary each coat slightly in successively darker tones to permit supervision identity.

3.3.14. Do not paint baked paint surface, chrome plated, stainless steel, aluminum or other surfaces finished with final finish in factory. Finish paint primed surfaces.

3.3.15. Advise Consultant when each applied paint coat can be inspected. Do not recoat without inspection. Tint each coat slightly to differentiate between applied coats.

3.3.16. Apply additional paint coats, beyond number of coats specified for any surface, to completely cover and hide substrate and to produce a solid, uniform appearance.

3.3.17. Apply primer coat soon after surface preparation is completed to prevent contamination of substrate.

3.3.18. Primer/Sealers: Apply primer-sealer coats by brush or roller. Permit to dry in accordance with manufacturer's recommendations before applying succeeding coats. Touch up suction spots and sand between coats with No. 120 sandpaper.

3.3.19. Metals:

3.3.19.1. Apply primer coat to unprimed ferrous metal surfaces. Where sandblast preparation is specified, apply specified primer immediately after blast cleaning.

3.3.20. Woodwork:

3.3.20.1. Fill open grain woods with filler tinted to match wood and work well into grain. Wipe excess from surface before filler sets.

3.3.20.2. Sand smooth paint and varnish undercoats prior to recoating.

3.3.20.3. Prime woodwork designated for painting as soon as possible after delivery to site and before installation. Prime cut surfaces, whether exposed or not, i.e. 6 edges of wood doors, before installation. Prime cut surfaces of woodwork to receive transparent finish with 1 coat of transparent finish reduced 25% or as directed by manufacturer.

3.3.20.4. Apply final coats on smooth surfaces by roller or brush. Hand brush wood trim surfaces.

3.3.21. Allow each coat of paint to cure and become dry and hard before application of succeeding coats (unless manufacturer's directions require otherwise).

3.3.22. Before finishing paint coats are applied, inspect and touch-up shop coats of primers previously applied by other trades or fabricators.

3.3.23. Provide paint coating thicknesses indicated, measured as minimum DFT.

3.3.24. Apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.

3.3.25. Ledges: Finish projecting ledges, both above and below sight lines, as specified for adjacent surfaces.

3.3.26. Light Coves: Paint light coves white whether a light lens is installed or not, unless otherwise indicated.

3.3.27. Interior Columns: Finish interior columns same as walls of room unless otherwise indicated.

3.3.28. Mechanical and Electrical Services:

3.3.28.1. Co-ordinate painting of mechanical and electrical equipment, piping, conduit, system Identification with appropriate Mechanical and Electrical Specification Sections. Unless otherwise specified or noted, paint "unfinished" conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, in following areas:

3.3.28.1.1. Where exposed-to-view in exterior and interior areas.

3.3.28.1.2. In interior high humidity interior areas.

3.3.28.1.3. In mechanical and electrical rooms.

3.3.28.2. Read Divisions 21, 22, 23, 26, 27 and 28 for their requirements and further instruction on painting Mechanical and Electrical work and perform such work under supervision of respective Mechanical and Electrical Divisions.

3.3.28.3. Finish paint primed mechanical equipment: heaters, convectors, radiators, wall fin perimeter induction units, fan coil units and similar items. Ensure use of heat resistant paint on surfaces where operating surface temperature will exceed 65 deg C (150 deg F).

3.3.28.4. Prime and paint exposed, unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items.

3.3.28.5. Take steps to protect gauges, identification plates and similar items from being painted over or paint splattered.

3.3.28.6. Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately, if these items are not factory finished. Paint adjacent surfaces after removal and reinstall when surfaces are dry.

3.3.28.7. Paint work to match surfaces they are seen against unless directed otherwise.

3.3.28.8. Paint interior surfaces of air ducts visible through grilles and louvres, with 1 coat of flat black metal paint to limit of sight line.

3.3.28.9. In unfinished areas leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

3.3.28.10. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

3.3.28.11. Do not paint over nameplates.

3.3.28.12. Paint behind louvres grilles and diffusers for minimum of 460 mm (18”) or beyond sight line, whichever is greater, to be painted with primer and 1 coat of matt black (non-reflecting) paint.

3.3.28.13. Paint each surface inside of light valances.

3.3.28.14. Paint disconnect switches for fire alarm system and exit light systems in red enamel.

3.3.28.15. Paint or band fire protection piping and sprinkler lines in accordance with mechanical requirements. Keep sprinkler heads free of paint.

3.3.28.16. Paint yellow or band natural gas piping in accordance with mechanical requirements.

3.3.28.17. Back prime and paint face and edges of plywood service panels for telephone and electrical equipment before installation to match adjacent wall surface. Leave equipment in original finish except for touch-up as required and paint conduits, mounting accessories and other unfinished items.

3.4. SITE QUALITY CONTROL

3.4.1. Site Tests and Inspections:

3.4.1.1. Provide and coordinate site inspection service by manufacturer’s representative in advance of work commencing and during progress of work to ensure correct use and application of each specified material. Manufacturer’s representative to review and submit approval of surface preparation methods in Specifications or obtain specific recommendations for alternative methods. Report such conditions to Consultant.

3.4.1.2. As work progresses and upon completion of work, submit written reports and manufacturers' confirmation that materials and application methods conform to manufacturers' requirements.

3.4.1.3. Inspect surfaces, preparation and paint applications.

3.4.2. Non-Conforming Work:

3.4.2.1. Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction to Consultant at no cost to Owner. Touch up small affected areas, repaint large affected areas or areas without sufficient DFT of paint. Remove runs, sags of damaged paint by scraper or by sanding prior to application of paint.

3.4.2.2. Following are considered non-conforming qualities:

3.4.2.2.1. Lack of Uniformity:

3.4.2.2.1.1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas and foreign materials in paint coatings.

3.4.2.2.1.2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

3.4.2.2.1.3. Damage due to touching before paint is sufficiently dry or any other contributory cause.

3.4.2.2.1.4. Damage due to application on moist surfaces or caused by inadequate protection from weather.

3.4.2.2.1.5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

3.4.2.2.2. Aesthetic Problems: If following are evident under final lighting source (including daylight) for interior surfaces:

3.4.2.2.2.1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1 m (39").

3.4.2.2.2.2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1 m (39").

3.4.2.2.2.3. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.

3.4.2.2.2.4. When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture and hiding across full surface area.

3.4.3. Manufacturer Services: Arrange for manufacturer's representative to visit site at intervals during surface preparation and paint coating application to ensure proper specified surface preparation is being performed, specified Product are being used, appropriate number of coats are being applied and specified finishing procedures are being carried out.

3.5. CLEANING

3.5.1. Keep waste rags in covered metal drums containing water and remove from building at end of each Day. Remove other combustible rubbish materials and empty paint cans each Day from site and safely dispose of same in accordance with requirements of authorities having jurisdiction.

3.5.2. Clean equipment and dispose of wash water/solvents as well as other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with safety requirements of authorities having jurisdiction.

3.5.3. Clean containers used for storage, mixing and application of materials free of foreign materials and residue.

3.5.4. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

3.5.5. Clean adjacent surfaces which have been painted, soiled or otherwise marred. Remove spilled, splashed, splattered or sprayed paint as work progresses using means and materials that are not detrimental to affected surfaces.

3.5.6. Remove masking and other protection provided under this Section.

3.5.7. Remove temporary protective wrappings provided by others for protection of work after completion of painting operations unless instructed otherwise.

3.5.8. Painting work will not be considered complete until spatters, drippings, smears and overspray have been cleaned and removed to satisfaction of Consultant.

3.5.9. Make Good any damage to structure building surfaces or furnishings resulting from painting operations at no cost to Owner.

3.5.10. Waste Management:

3.5.10.1. Dispose paint waste in accordance with local regulations.

3.5.10.2. Set aside and protect surplus and uncontaminated finish materials not required by Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

END OF SECTION