Government of Canada

Existing Building Renovation

Halon Fire Suppression Removal and Fire Alarm Upgrades

14421017.210

Red Deer, Alberta

Specifications

November 07, 2016

Stantec

END OF SECTION

1 GENERAL

1.01 STATUS OF AVAILABLE INFORMATION

.1 Available information identified in this section, or any part thereof, are not part of Contract unless specifically incorporated into Contract Documents by means of copying, transcribing or referencing.

1.02 USE AND RELIANCE UPON AVAILABLE INFORMATION

.1 Available Information is made available for the purpose of providing access to information available to Owner, Contractor, and Consultant.

.2 Available Information shall not be considered a representation or warranty that information contained therein is accurate, complete, or appropriate.

.3 Interpretation and conclusions drawn about Available Information is at risk of the Contractor.

.4 The Owner assumes no responsibility for such interpretations and conclusions.

.5 Information contained in Available Information may be time sensitive and dates shall be considered when interpreting.

1.03 AVAILABLE INFORMATION – LEAD ABATEMENT REPORT

.1 The following Lead Abatement Report has been attached to the end of this section, but are not incorporated into Contract Documents:

Initial Lead Surface Dust Contamination and Asbestos Assessment

Prepared by Stantec Consulting Ltd.
200 – 325 25 Street SE
Calgary, Alberta

April 20, 2013
File 144202775.210

END OF SECTION

Stantec Consulting Ltd.
200 – 325 25th Street SE
Calgary, AB T2A 7H8

April 20, 2016
File: 144202775.210

Attention: Mr. Chuck Koch
Government of Canada

Dear Mr. Koch,

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

As part of a systems upgrade project, Stantec Consulting Limited (Stantec) was retained by the Government of Canada to provide consulting services related to lead abatement within an area of their Facility (subject area) located in Red Deer, AB.

The purpose of this Initial Lead Surface Dust Contamination and Asbestos Assessment was to gather information regarding the concentrations of lead in dust on various surfaces throughout the subject area, as well as information regarding asbestos-containing materials (ACMs) that may be impacted by planned upgrade/renovation work. The information obtained through this assessment will be utilized in the preparation of technical specification documents pertaining lead and/or asbestos abatement required to facilitate the systems upgrade project within the subject area, in accordance with applicable occupational health and safety guidelines and regulations.

The site work for this assessment was conducted by Mr. David Siemens of Stantec on May 26, 2015.

1 SCOPE OF WORK

The scope of work for this Initial Lead Surface Dust and Asbestos Assessment involved the following:

- A review of existing information, including site drawings, previous assessment documentation and discussions with site personnel, where available.
- The collection of thirteen (13) lead surface wipe samples (plus one (1) blank sample for laboratory and sampling media QA/QC) to evaluate lead dust concentrations.
- A visual assessment and collection of samples, where practical, of suspected asbestos containing materials (ACMs) that are expected to be impacted by the renovation/upgrade project, for analysis of asbestos content.
- Submission of samples collected to an independent laboratory for analysis.
- Evaluation and interpretation of field findings and laboratory analytical results.

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

2 SAMPLING METHODOLOGY

Site work was carried out in general compliance with the requirements of Alberta Occupational Health and Safety Codes and Regulations and Stantec's Safe Work Practices.

The methodologies used for analysis of samples collected during the Initial Lead Surface Dust and Asbestos Assessment are provided in the following sections.

2.1 LEAD WIPE SAMPLING

2.1.1 Sampling Methodology

In the absence of specific guidelines published in Alberta with respect to acceptable lead dust concentrations With respect to "acceptable" concentrations of lead in surface dust, various agencies have published "clearance criteria", or standards to which surfaces should be cleaned during lead abatement. For example, the US Environmental Protection Agency (EPA) has published the following criteria for maximum lead dust concentrations (in micrograms per square foot [µg/ft²]) that can remain on surfaces after remediation:

- Floors: 40 µg/ft² (or 4.3 µg per 100 square centimetres (µg/100cm²)
- Interior windowsills: 250 µg/ft² (or 27 µg/100cm²)
- Window troughs: 400 µg/ft² (or 43 µg/100cm²)

The above-noted criteria are referenced and/or utilized by other agencies for reference – including Worksafe Alberta (through their 2013 document entitled "Lead at the Work Site"), and WorkSafe BC through their 2011 document entitled "Lead-Containing Paints and Coatings – Preventing Exposure in the Construction Industry" (BC Lead Guideline). It should be noted, however, that the BC Lead Guideline also indicates that:

> "*These levels were originally intended for residential settings, public housing, and locations frequented by children. Many jurisdictions in the U.S. and Canada have adopted these values (or derivatives of them) to protect the health of workers (including pregnant workers) and the general public, as well as children. However, some commercial and industrial buildings may have little or no association with children, so clearance criteria could take this into account.*"

Further to the above, the BC Lead Guideline provides recommended lead clearance criteria for surfaces equivalent to the above for residences, schools, daycare centres, and other public, but as follows for commercial buildings, including retail stores, offices (administrative), and laboratories (other than lead assay laboratories):

- Floors: 200 µg/ft² (or 22 µg/100cm²)
- Sill/ledge: 500 µg/ft² (or 54 µg/100cm²)
- Troughs: 800 µg/ft² (or 86 µg/100cm²)

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

In addition to the above, the Environmental Abatement Council of Ontario (EACO) has recently (October 2014) published "Lead Guideline For Construction, Renovation, Maintenance or Repair" (EACO Lead Guideline), which provides additional criteria for "clearance" samples collected subsequent to abatement work. According to the EACO Lead Guideline, lead concentrations for clearance wipe samples, when at or below the clearance criteria listed below, provide analytical confirmation that an area has been adequately cleaned.

Area or Surface to be Tested	Clearance Criteria	
	µg/100 cm²	µg/ft²
Exterior concrete and rough surfaces	86.1	800
Interior concrete, window troughs, rough surfaces	43	400
Interior window sills	26.9	250
Firing ranges and work places where lead is used	21.5	200
Floors and other surfaces: Non-Residential	21.5	200
Floors and other surfaces: Residential	4.3	40
Child care facilities, primary schools, food preparation, food processing, pediatrics, labour and delivery, and maternity areas of hospitals (all surfaces routinely accessible by occupants or used in food processing)	4.3	40

In order to obtain data to compare with the above-referenced criteria, dust samples were collected from various surfaces throughout the subject area. The surfaces were sampled using Ghost Wipe™ sampling media to wipe an area of 100 square centimeters (cm²) in discrete locations on each selected surface type. Each used Ghost Wipe was then placed into a clean plastic container, which was labelled and sealed appropriately for transport to the laboratory.

This process was repeated for each discrete area and/or surface sampled using a separate (new) Ghost Wipe, and new clean nitrile gloves.

2.1.2 Laboratory Analysis

The samples were submitted to EMSL Canada. (EMSL) located in Mississauga, Ontario for lead in dust analysis by Flame Atomic Absorption Spectrophotometry (SW 846 3050B/7000B).

EMSL's analytical laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

2.2 ASBESTOS SAMPLING

2.2.1 Sampling Methodology

The presence of asbestos in the workplace in Alberta is governed by the Alberta Occupational Health and Safety Act, Regulations and Code (2009). The Alberta Asbestos Abatement Manual (2012—further referred to as the AAAM), which is published by Alberta Human Services, is used by Occupational Health and Safety officers as a guide when reviewing abatement work practices and employer codes of practice.

With respect to the definition of ACM, the AAAM indicates that the employer must comply with the asbestos requirements when:

- The individual material in question contains more than one percent asbestos (by weight).
- The material contains less than one percent asbestos, but it is known that a "restricted area" is likely to occur when it is disturbed (e.g., vermiculite).
- The material contains less than one percent asbestos and there is a reasonable chance that asbestos fibres may be released when the material is disturbed, either due to the condition of the material or the work procedures that will be used (e.g., removal of friable stipple material, dry removal of wall and ceiling plaster or drywall where the materials contain low levels of asbestos).

Based on these criteria, a visual assessment of accessible areas was undertaken in order to check for the presence of materials suspected to contain asbestos, which were expected to require disturbance (alteration or demolition) during the planned systems upgrade project. Locations to collect discrete bulk asbestos samples of suspect building materials were identified. Samples of representative materials were then collected at these locations.

Multiple samples were collected from each "homogenous application" of observed suspected ACMs (materials suspected to contain asbestos that are uniform in material type, colour, texture application and estimated installation date). The number of samples to be collected for each homogenous application of a suspected ACM was based on accepted occupational hygiene standards and protocols, along with the assessor's experience and understanding of the consistency of that building material's application.

2.2.2 Laboratory Analysis

The samples were submitted to EMSL Canada Inc. (EMSL) in Mississauga, Ontario for analysis of asbestos content using polarized light microscopy (PLM) with dispersion staining, in accordance with the United States Environmental Protection Agency (EPA) 600/R-93/116 method. Non-Friable Organically Bound (NOB) samples such as floor tiles, mastics, roofing materials, cove base molding, caulking, etc. were gravimetrically reduced prior to analysis.

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

EMSL's analytical laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

3 ASSESSMENT LIMITATIONS

In preparation of this report, Stantec used professional judgment based on experience. The work was conducted in accordance with generally accepted professional standards. Stantec relied on information gathered during the site investigation and laboratory analytical reports.

This report reflects the observations made within accessible and accessed portions of the subject area, and the results of analyses performed on the specific material sampled during the assessment. Analytical results reflect the sampled materials at the specific sample locations.

Sampling and assessment associated with this report were limited surfaces within the primary assessment area and associated areas (for lead dust), and building materials that were expected to be impacted by the planned systems upgrade project (for asbestos), within the subject area.

This report does not constitute a comprehensive asbestos assessment for the subject area or the subject building.

This report has been prepared for the exclusive use of the Government of Canada for the purpose of assessing general conditions in the subject area as the pertain to lead dust and ACMs. Any use that a third party makes of this report, or reliance on, or decisions to be made on it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

4 ASSESSMENT RESULTS

4.1 LEAD WIPE SAMPLING

The following table summarizes the sampled surfaces (materials), locations, lead dust concentrations detected by the laboratory and applicable reference standards. A copy of the EMSL Laboratory Report for the samples collected is provided in **Appendix A**.

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

Sample Number	Sampled Surface/Location	Surface Lead Dust Concentration (µg/100 cm²)	Reference Standards (µg/100 cm²)
LW-Blank	Field Blank	24 µg/wipe	N/A
LW-01	**West end of primary assessment area (floor)**	**18,000**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-02	**south wall of primary assessment area (wall)**	**310**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-03	**east end of primary assessment area (floor)**	**590**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-04	**north wall primary assessment area (wall)**	**350**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-05	**east end of primary assessment area (floor)**	**790**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-06	**north wall of primary assessment area (wall)**	**1,600**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-07	**south wall of primary assessment area (wall)**	**120**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-08	**east end of primary assessment area (floor)**	**220**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-09	**office area outside east end of primary assessment area (floor)**	**79**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**
LW-10	**washroom (floor)**	**110**	**US EPA: 4.3 BC Lead Guideline: 22 EACO Lead Guideline: 21.5**

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

Sample Number	Sampled Surface/Location	Surface Lead Dust Concentration (µg/100 cm²)	Reference Standards (µg/100 cm²)
LW-11	**washroom (south wall)**	**58**	**US EPA: 4.3** **BC Lead Guideline: 22** **EACO Lead Guideline: 21.5**
LW-12	**exhaust duct – downstream of HEPA filter**	**65,000**	**US EPA: 4.3** **BC Lead Guideline: 22** **EACO Lead Guideline: 21.5**
LW-13	**exhaust duct – upstream of HEPA filter**	**2.641 x 10^6**	**US EPA: 4.3** **BC Lead Guideline: 22** **EACO Lead Guideline: 21.5**

Table notes:
1. Bold text and highlighting indicates samples with lead concentrations exceeding one or more of the applicable criteria for clearance.
2. As samples are for background/initial contamination assessment purposes, they have not been blank-corrected.

The surface dust lead concentrations for the wipe sampling undertaken at the sampling locations noted above ranged between 58 µg/100 cm² and 2.641 x 10^6 µg/100 cm².

The lead dust levels were found to be greater than all of the applicable reference criteria listed in in all locations tested.

These results would indicate that the above-noted areas should be included for cleaning under lead abatement precautions, as part of the systems upgrade project.

4.2 ASBESTOS SAMPLING

The following table summarizes the results of bulk samples collected for analysis of asbestos content. A copy of the EMSL Laboratory Report for the samples collected is provided in **Appendix B**.

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

Sample Number	Material Description	Sample Location	Result (% Asbestos)
S-01A	Drywall joint-filling compound	Primary Assessment Area – East wall	None Detected
S-01B	Drywall joint-filling compound	Primary Assessment Area – East wall	None Detected
S-01C	Drywall joint-filling compound	Primary Assessment Area – East wall	None Detected
S-02A	12" x 12" acoustic ceiling tile	Primary Assessment Area	None Detected
S-02B	12" x 12" acoustic ceiling tile	Primary Assessment Area	None Detected
S-02C	12" x 12" acoustic ceiling tile	Primary Assessment Area	None Detected
S-03A	Duct mastic (painted white)	Mechanical Room – West of Primary Assessment Area	None Detected
S-03B	Duct mastic (painted white)	Mechanical Room – West of Primary Assessment Area	None Detected
S-03C	Duct mastic (painted white)	Mechanical Room – West of Primary Assessment Area	None Detected
S-04A	Brown duct mastic	Mechanical Room – South of Primary Assessment Area	None Detected
S-04B	Brown duct mastic	Mechanical Room – South of Primary Assessment Area	None Detected
S-04C	Brown duct mastic	Mechanical Room – South of Primary Assessment Area	None Detected
S-05A	Grey caulking/sealant	Mechanical Room – South of Primary Assessment Area	None Detected
S-05B	Grey caulking/sealant	Mechanical Room – South of Primary Assessment Area	None Detected
S-05C	Grey caulking/sealant	Mechanical Room – South of Primary Assessment Area	None Detected
S-06A	Grey mastic on rooftop fan	Roof – West end	None Detected
S-06B	Grey mastic on rooftop fan	Roof – West end	None Detected
S-06C	Grey mastic on rooftop fan	Roof – West end	None Detected

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use), on our understanding of the expected system upgrade project requirements and on our interpretations of suspected ACM sample analytical results, no asbestos was detected in materials that may require disturbance (alteration or demolition) during the expected system upgrade project.

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

5 RECOMMENDATIONS

5.1 LEAD WIPE SAMPLING

As concentrations of lead in dust in excess of accepted "clearance" criteria were identified, lead dust should be abated (removed) from surfaces prior to disturbances that will be required as part of the planned systems upgrade project.

Lead dust abatement should be conducted by appropriately trained professionals (typically, abatement contractor personnel), in accordance with accepted standards and practices for such work.

5.2 ASBESTOS

ACMs that are anticipated to require disturbance (alteration/demolition) as part of the planned systems upgrade project were not identified through this assessment.

If encountered during renovation activities, any suspected ACMs not accessible during this assessment should be considered as asbestos-containing and handled as such, unless proven otherwise, through analytical testing.

6 CLOSURE

This report has been prepared for the sole benefit of the Government of Canada. Any use which a third party makes of this report, or any reliance on decisions based on it, is the responsibility of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The information and conclusions contained in this report are based upon work undertaken by trained professionals and technical staff in accordance with generally accepted engineering, scientific and occupational health and safety practices current at the time the work was performed. Conclusions presented in this report should not be construed as legal advice.

The conclusions presented in this report represent the best technical judgment of Stantec Consulting Ltd. based on the data obtained from the work.

The conclusions are based on the site conditions encountered by Stantec Consulting Ltd. at the time the work was performed at the specific assessment and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on building construction and conditions, weather, building usage and other factors. Due to the nature of the investigation and the limited data available, Stantec Consulting Ltd. cannot warrant against undiscovered environmental or health and safety liabilities.

Reference: Government of Canada Existing Building Renovation
Initial Lead Surface Dust Contamination and Asbestos Assessment
Red Deer, AB

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

We trust that the above is satisfactory for your purposes at this time. Should you have any questions or concerns, or require additional information, please do not hesitate to contact the Stantec Project Manager at your convenience.

Regards,

STANTEC CONSULTING LTD.

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Attachment: Appendix A – Laboratory Analytical Report –Flame Atomic Absorption Spectrophotometer Analysis
Appendix B – Suspect ACM Sample Analytical Certificates

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APPENDIX A

Laboratory Analytical Reports –

Flame Atomic Absorption Spectrophotometer Analysis

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	551505794
CustomerID:	55JACQ30Z
CustomerPO:	144202775
ProjectID:	

Attn: **Lovy Mangat**
Stantec Consulting, Ltd.
200-325 25th Street SE
Calgary, AB T2A 7H8

Phone: (403) 781-4143
Fax: (403) 716-8049
Received: 06/02/15 10:09 AM
Collected:

Project: **144202775.210.600**

Test Report: Lead in Dust by Flame AAS (SW 846 3050B/7000B)*

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Area (cm²)*	*Lead Concentration*
LW-BLANK	*551505794-0001*		6/8/2015	n/a	24 µg/wipe
	Site: WIPE SAMPLE FOR LEAD Desc: BLANK				
LW-01	*551505794-0002*		6/8/2015	100 cm²	18000 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: WEST END OF PRIMARY ASSESSMENT AREA - FLOOR				
LW-02	*551505794-0003*		6/8/2015	100 cm²	310 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: SOUTH WALL OF PRIMARY ASSESSMENT AREA - WALL				
LW-03	*551505794-0004*		6/8/2015	100 cm²	590 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: EAST END OF PRIMARY ASSESSMENT AREA - FLOOR				
LW-04	*551505794-0005*		6/8/2015	100 cm²	350 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: NORTH WALL OF PRIMARY ASSESSMENT AREA - WALL				
LW-05	*551505794-0006*		6/8/2015	100 cm²	790 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: EAST END OF PRIMARY ASSESSMENT AREA - FLOOR				
LW-06	*551505794-0007*		6/8/2015	100 cm²	1600 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: NORTH WALL OF PRIMARY ASSESSMENT AREA - WALL				
LW-07	*551505794-0008*		6/8/2015	100 cm²	120 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: SOUTH WALL OF PRIMARY ASSESSMENT AREA - WALL				
LW-08	*551505794-0009*		6/8/2015	100 cm²	220 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: EAST END OF PRIMARY ASSESSMENT AREA - FLOOR				
LW-09	*551505794-0010*		6/8/2015	100 cm²	79 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: OFFICE AREA OUTSIDE EAST END OF PRIMARY ASSESSMENT AREA - FLOOR				

Shiraz Saloojee
or other approved signatory

*Analysis following Lead in Dust by EMSL SOP/ Determination of Environmental Lead by FLAA. Reporting limit is 10 ug/wipe. ug/wipe = ug/ft2 x area sampled in ft2. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities (such as volume sampled) or analytical method limitations. Samples received in good condition unless otherwise noted. The lab is not responsible for data reported in µg/ft² which is dependant on the area provided by non-lab personnel. The test results contained within this report meet the requirements of NELAC unless otherwise noted. "<" (less than) results signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Report Amended: 04/14/2016 15:26:31 Replaces the Inital Report 06/08/2015 21:53:42. Reason Code: Client-Change to Location

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	551505794
CustomerID:	55JACQ30Z
CustomerPO:	144202775
ProjectID:	

Attn: **Lovy Mangat**
Stantec Consulting, Ltd.
200-325 25th Street SE
Calgary, AB T2A 7H8

Phone: (403) 781-4143
Fax: (403) 716-8049
Received: 06/02/15 10:09 AM
Collected:

Project: **144202775.210.600**

Test Report: Lead in Dust by Flame AAS (SW 846 3050B/7000B)*

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Area (cm²)*	*Lead* ***Concentration***
LW-10	*551505794-0011*		6/8/2015	100 cm²	110 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: WASHROOM - FLOOR				
LW-11	*551505794-0012*		6/8/2015	100 cm²	58 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: WASHROOM - SOUTH WALL				
LW-12	*551505794-0013*		6/8/2015	100 cm²	65000 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: EXHAUST DUCT (DOWNSTREAM OF HEPA FILTER)				
LW-13	*551505794-0014*		6/8/2015	100 cm²	2.641e+006 µg/100 cm²
	Site: WIPE SAMPLE FOR LEAD Desc: EXHAUST DUCT (UPSTREAM OF HEPA FILTER)				

Shiraz Saloojee
or other approved signatory

*Analysis following Lead in Dust by EMSL SOP/ Determination of Environmental Lead by FLAA. Reporting limit is 10 ug/wipe. ug/wipe = ug/ft2 x area sampled in ft2. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities (such as volume sampled) or analytical method limitations. Samples received in good condition unless otherwise noted. The lab is not responsible for data reported in µg/ft² which is dependant on the area provided by non-lab personnel. The test results contained within this report meet the requirements of NELAC unless otherwise noted. "<" (less than) results signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Report Amended: 04/14/2016 15:26:31 Replaces the Inital Report 06/08/2015 21:53:42. Reason Code: Client-Change to Location

APPENDIX B

Suspect ACM Sample Analytical Certificates

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 551505772
Customer ID: 55JACQ30Z
Customer PO: 144202775.210
Project ID:

Attn: David Siemens
Stantec Consulting, Ltd.
200-325 25th Street SE
Calgary, AB T2A 7H8

Phone: (403) 781-4143
Fax: (403) 716-8049
Collected:
Received: 6/02/2015
Analyzed: 6/09/2015

Proj: 144202775.210.600

Test Report: Asbestos Analysis of Bulk Materials for OHS Alberta Abatement Manual via EPA600/R-93/116 Method

Client Sample ID: S-01A **Lab Sample ID:** 551505772-0001
Sample Description: DRYWALL JOINT FILL COMPOUND PRIMARY ASSESSMENT AREA - EAST WALL

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/08/2015	White	0%	100%	None Detected	

Client Sample ID: S-01B **Lab Sample ID:** 551505772-0002
Sample Description: DRYWALL JOINT FILL COMPOUND PRIMARY ASSESSMENT AREA - EAST WALL

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/08/2015	White	0%	100%	None Detected	

Client Sample ID: S-01C **Lab Sample ID:** 551505772-0003
Sample Description: DRYWALL JOINT FILL COMPOUND PRIMARY ASSESSMENT AREA - EAST WALL

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/09/2015	White	0%	100%	None Detected	

Client Sample ID: S-02A **Lab Sample ID:** 551505772-0004
Sample Description: 12"X12" ACOUSTIC CEILING TILE- PRIMARY ASSESSMENT AREA

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/08/2015	Brown	60%	40%	None Detected	

Client Sample ID: S-02B **Lab Sample ID:** 551505772-0005
Sample Description: 12"X12" ACOUSTIC CEILING TILE- PRIMARY ASSESSMENT AREA

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/08/2015	Brown	65%	35%	None Detected	

Client Sample ID: S-02C **Lab Sample ID:** 551505772-0006
Sample Description: 12"X12" ACOUSTIC CEILING TILE- PRIMARY ASSESSMENT AREA

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/09/2015	Gray	80%	20%	None Detected	

Client Sample ID: S-03A **Lab Sample ID:** 551505772-0007
Sample Description: DUCT MASTIC (PAINTED WHITE) MECHANICAL ROOM WEST/PRIMARY ASSESSMENT AREA-EXHAUST DUCT WORK

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/05/2015	White	0.0%	100%	None Detected	

EMSL Canada Inc.

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Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 551505772
Customer ID: 55JACQ30Z
Customer PO: 144202775.210
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for OHS Alberta Abatement Manual via EPA600/R-93/116 Method

Client Sample ID: S-03B **Lab Sample ID:** **551505772-0008**

Sample Description: DUCT MASTIC (PAINTED WHITE) MECHANICAL ROOM WEST/PRIMARY ASSESSMENT AREA-EXHAUST DUCT WORK

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/05/2015	Brown/White	0.0%	100%	None Detected	

Client Sample ID: S-03C **Lab Sample ID:** **551505772-0009**

Sample Description: DUCT MASTIC (PAINTED WHITE) MECHANICAL ROOM WEST/PRIMARY ASSESSMENT AREA -EXHAUST DUCT WORK

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/09/2015	Brown/White	0.0%	100%	None Detected	

Client Sample ID: S-04A **Lab Sample ID:** **551505772-0010**

Sample Description: BROWN DUCT MASTIC MECHANICAL ROOM SOUTH OF PRIMARY ASSESSMENT AREA/EAST SIDE OF AHU2

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/09/2015	Brown	0%	100%	None Detected	

Client Sample ID: S-04B **Lab Sample ID:** **551505772-0011**

Sample Description: BROWN DUCT MASTIC MECHANICAL ROOM SOUTH OF PRIMARY ASSESSMENT AREA/EAST SIDE OF AHU2

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/09/2015	Brown	0%	100%	None Detected	

Client Sample ID: S-04C **Lab Sample ID:** **551505772-0012**

Sample Description: BROWN DUCT MASTIC MECHANICAL ROOM SOUTH OF PRIMARY ASSESSMENT AREA/EAST SIDE OF AHU2

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	6/09/2015	Brown	0%	100%	None Detected	

Client Sample ID: S-05A **Lab Sample ID:** **551505772-0013**

Sample Description: GREY CAULKING/SEALANT MECHANICAL ROOM SOUTH PRIMARY ASSESSMENT AREA/WEST SIDE OF AHU2

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/05/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: S-05B **Lab Sample ID:** **551505772-0014**

Sample Description: GREY CAULKING/SEALANT MECHANICAL ROOM SOUTH PRIMARY ASSESSMENT AREA/WEST SIDE OF AHU2

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/05/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: S-05C **Lab Sample ID:** **551505772-0015**

Sample Description: GREY CAULKING/SEALANT MECHANICAL ROOM SOUTH PRIMARY ASSESSMENT AREA/WEST SIDE OF AHU2

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/09/2015	Gray	0.0%	100%	None Detected	

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EMSL Canada Order 551505772
Customer ID: 55JACQ30Z
Customer PO: 144202775.210
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for OHS Alberta Abatement Manual via EPA600/R-93/116 Method

Client Sample ID: S-06A ***Lab Sample ID:*** **551505772-0016**

Sample Description: GREY MASTIC ROOF - FAN ON WEST END OF ROOF

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/05/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: S-06B ***Lab Sample ID:*** **551505772-0017**

Sample Description: GREY MASTIC ROOF - FAN ON WEST END OF ROOF

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/05/2015	Gray	0.0%	100%	None Detected	

Client Sample ID: S-06C ***Lab Sample ID:*** **551505772-0018**

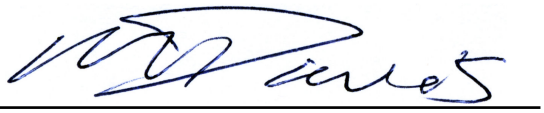
Sample Description: GREY MASTIC ROOF - FAN ON WEST END OF ROOF

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	6/09/2015	Gray	0.0%	100%	None Detected	

Analyst(s):

Nicole Dimou	PLM Grav. Reduction (6)
Nicole Yeo	PLM (5) PLM Grav. Reduction (3)
Romeo Samson	PLM (4)

Reviewed and approved by:



Matthew Davis
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 04/19/201610:42:19 Replaces initial report from: 06/09/201511:33:15 Reason Code: Data Entry-Change to Sample ID

1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises renovations to existing buildings for Halon Fire Suppression Removal and Fire Alarm Upgrades in Alberta Canada for the Government of Canada; and further identified as Project No. 144210170.210.

1.02 CONTRACT METHOD

.1 Construct Work under single, stipulated price contract.

1.03 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.

.3 Construct Work in stages to provide for continuous public and staff usage. Do not close off public and staff usage of facilities until use of one stage of Work will provide alternate usage.

.4 Maintain fire access/control

1.04 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for Work, storage, and for access, to allow:
.1 Owner occupancy.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.05 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.06 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations occupants and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

.2 Refer also to Section 01 35 16 - Alteration & Renovation Procedures.

1.07 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian and vehicular traffic and building operations.

.3 Provide alternative routes for pedestrian and vehicular traffic as required.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services to maintain critical building systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.08 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.

.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.02 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.5 Use only elevators existing in building for moving workers and material.
.1 Protect walls of passenger elevators, to approval of Departmental Representative prior to use.
.2 Accept liability for damage, safety of equipment and overloading of existing equipment.

.6 Closures: protect work temporarily until permanent enclosures are completed.

1.03 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

.2 Meet or exceed requirements under Federal Halocarbon Regulations, 2003:
- .1 S.7(2) – Recovery – a person shall use recovery equipment with a transfer efficiency of at least 99% at referred to in ULC/ORD-C1058.5-2004
- .2 S.8(1) – Before dismantling any system a person shall recover all halocarbons contained in the system
- .3 S.8(2) – Before dismantling a person must affix a notice to the system containing information set out in colum 3 item 1 of schedule 2
- .4 S8(3) – no person shall remove the notice referred to in ss(2)
- .5 S.8(4) – in the case of dismantling an system the owner shall keep a record of the information contained in the notice referred to in subsection (2)
- .6 S.36(1) – Owners shall keep record onsite for 5 years.

1.04 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service

throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .

1.05 SPECIAL REQUIREMENTS

.1 Carry out noise generating Work Monday to Friday from 17:00 to 7:00 hours and on Saturdays and Sundays.

.2 Work in rooms 210, 212, 213, 214 and 218 shall be completed during a single shutdown. Work in this area shall proceed on a 24/7 basis until completion, no break in work will be allowed.

.3 Submit schedule in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM).

.4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.5 Keep within limits of work and avenues of ingress and egress.

.6 Ingress and egress of Contractor vehicles at site is limited .

.7 Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

1.06 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

.2 Security clearances:

.1 The successful Contractor Team must provide personal data including the full name, date of birth, present address and other data as requested by the Departmental Representative, for each person working on this project, if requested. This information will be used for security clearance purposes. Fingerprinting may be required. This information must be provided within three (3) days of request.

.2 Ensure that all persons who will have access to Departmental Representative’s protected information, hold a valid Departmental Representative’s reliability status secure clearance issued by Departmental Representative’s Security.

.3 The Prime Contractor's Project Manager and Site Supervisor will be required to/ Personal requiring access to the Detachment that are operational or otherwise so identified at time of construction may be required to:

- .1 Complete and submit all security clearance forms.
- .2 Attain and provide copies of the following documents
  - .1 drivers licence.
  - .2 birth certificate.
  - .3 2 passport pictures.
  - .4 2 sets of fingerprints.

.3 If born outside of Canada, attain and provide copies of one of the following:
.1 Permanent Residence Card for Canada.
.2 Canada Citizenship Card.
.3 immigration papers (certificate of landing).
.4 valid work permit for Canada
.4 Participate in a Security/ Reliability Interview.
.5 Sign disclosure documents for Departmental Representative's protected material.

.4 All other personal requiring access to the site will be to:
.1 Complete and submit all required security clearance forms
.2 Attain and provide a copy of their drivers licence or passport.

.3 Security escort:

.1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.

.2 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.

.3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 24 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.

.4 Calculation of costs will be based on average hourly rate of security officer for minimum of 8 hours per day for late service request and of 4 hours for late cancellations.

1.07 BUILDING SMOKING ENVIRONMENT

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

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.02 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM) .
- .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Delivery schedule of specified equipment .
- .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 Owner provided products.
.9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
.10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
.12 Monthly progress claims, administrative procedures, photographs, hold backs.
.13 Appointment of inspection and testing agencies or firms.
.14 Insurances, transcript of policies.

1.03 PROGRESS MEETINGS

.1 During course of Work and two weeks prior to project completion, schedule progress meetings monthly.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 5 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.5 Agenda to include the following:
.1 Review, approval of minutes of previous meeting.
.2 Review of Work progress since previous meeting.
.3 Field observations, problems, conflicts.
.4 Problems which impede construction schedule.
.5 Review of off-site fabrication delivery schedules.
.6 Corrective measures and procedures to regain projected schedule.
.7 Revision to construction schedule.
.8 Progress schedule, during succeeding work period.
.9 Review submittal schedules: expedite as required.
.10 Maintenance of quality standards.
.11 Review proposed changes for affect on construction schedule and on completion date.
.12 Other business.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Definitions:

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (Gantt chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars.

.3 Baseline: original approved plan (for Project, work package, or activity), plus or minus approved scope changes.

.4 Cash Flow: projection of progress payment requests based on cash loaded construction schedule.

.5 Completion Milestones: they are firstly Substantial Completion and secondly Final Certificate.

.6 Constraint: applicable restriction or limitation, either internal or external to project, that will affect performance of Project. Factors that affect activities can be scheduled.

.7 Control: process of comparing actual performance with planned performance, analyzing variances, evaluating possible alternatives, and taking appropriate corrective action as needed.

.8 Critical Activity: any activity on a critical path.

.1 Most commonly determined by using critical path method.

.9 Critical Path: sequence of activities that determines duration of Project. Generally, it is the longest path through Project.

.1 Usually defined as those activities with float less than or equal to specified value, often zero.

.10 Critical Path Method (CPM): network analysis technique used to determine the amount of scheduling flexibility (amount of float) on various logical network paths in Project schedule network, and to determine the minimum total Project duration.

.11 Data Date: date through which project status and progress were last determined and reported for analyses, such as scheduling and performance measurements.

.12 Duration: total number of work periods (not including holidays or other non-working periods) required to complete activity or other Project element.

.1 Usually expressed as workdays or work weeks.

.13 Early Finish Date: in critical path method, earliest possible point in time on which uncompleted portions of activity (or Project) can finish, based on network logic and schedule constraints.

.1 Early finish dates can change as Project progresses and changes are made to Project plan.

.14 Early Start Date: in critical path method, earliest possible point in time on which uncompleted portions of activity (or Project) can start, based on network logic and schedule constraints.

.1 Early start dates can change as Project progresses and changes are made to Project Plan.

.15 Finish Date: point in time associated with activity's completion.

.1 Usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.

.16 Float: amount of time that activity may be delayed from its early start without delaying Project finish date.

.1 This resource is available to Contractor.

.17 Impact Analysis: schedule analysis technique that adds a modeled delay to an accepted construction schedule to determined possible outcome of that delay on project completion.

.18 Lag: modification of logical relationship that directs delay in successor activity.

.19 Late Finish Date (LF): in critical path method, latest possible point in time that activity may be completed without delaying specified milestone (usually Project finish date).

.20 Late Start Date (LS): in critical path method, latest possible point in time that activity may begin without delaying specified milestone (usually Project finish date).

.21 Lead: modification of logical relationship that allows acceleration of successor task.

.22 Logic Diagram: see Project network diagram.

.23 Master Schedule: summary-level schedule that identifies major deliverable; work breakdowns structure and key milestones.

.24 Milestone: significant point or event in Project, usually completion of major deliverable.

.25 Monitoring: capture, analysis, and reporting of Project performance, usually as compared to plan.

.26 Non-Critical Activities: activities which when delayed, do not affect specified Contract duration.

.27 Project Control System: fully computerized system utilizing commercially available software packages.

.28 Project Network Diagram: schematic display of logical relationships of Project activities.

.1 Always drawn from left to right to reflect Project chronology.

.29 Project Plan: formal, approved document used to guide both Project execution and Project control.

.1 Primary uses of Project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines.

.2 Project plan may be summary or detailed.

.30 Project Planning: development and maintenance of Project Plan.

.31 Project Planning, Monitoring and Control System: overall system operated to enable monitoring of Project Work in relation to established milestones.

.32 Project Schedule: planned dates for performing activities and planned dates for meeting milestones.

.33 Quantified days duration: working days based on 5 day work week, discounting statutory holidays.

.34 Risk: uncertain event or condition that, if it occurs, has positive or negative effect on Project's objectives.

.35 Start Date: point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.

.36 Work Breakdown Structure (WBS): deliverable-oriented hierarchical decomposition of Work to be executed by contractor to accomplish project objectives and create required deliverables. It organizes and defines total scope of Project. Each descending level represents an increasingly detailed definition of Project Work. WBS is decomposed into Work packages.

.2 Reference Standards:
  .1 Project Management Institute (PMI Standards)
    .1 A Guide to the Project Management Body of Knowledge (PMBOK Guide) -
    .2 Practice Standard for Scheduling .

1.02 ADMINISTRATIVE REQUIREMENTS

.1 Project Meeting:
  .1 Meet with Departmental Representative within five (5) working days of Award of Contract date, to establish Work requirements and approach to project construction operations.
  .2 Participate in regular project progress meetings with Departmental Representative specifically intended to discuss update of detailed schedule and contract changes.

.2 Scheduling:
  .1 Planning: ensure that planning process is iterative and results in generally top-down processing with more detail being developed as planning progresses, and decisions concerning options and alternatives are made.
  .2 Ensure project schedule efficiencies through monitoring of Project in detail to ensure integrity of Critical Path, by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that has started but are not yet completed.
  .3 Monitor sufficiently often so that causes of delays can immediately be identified and removed.

.3 Project monitoring and reporting:
  .1 Keep team aware of changes to schedule, and possible consequences as project progresses.
  .2 Use narrative reports to provide advice on seriousness of difficulties and measures to overcome them.
  .3 Begin narrative reporting with statement on general status of Project followed by summarization of delays, potential problems, corrective measures and Project status criticality.

.4 Critical Path Method (CPM) Requirements:
  .1 Ensure Master Plan and Detail Schedule are practical and remain within specified Contract duration.
  .2 Revise Master Schedule and Detail Schedule deemed impractical by Departmental Representative and resubmit for approval.
  .3 Change to Contract Duration:
    .1 Acceptance of Master Schedule and Detail Schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract.
    .2 Duration of Contract may only be changed through bilateral Agreement.
  .4 Consider Master Schedule and Detail Schedule deemed practical by Departmental Representative, showing Work completed in less than specified Contract duration, to have float.
  .5 First Milestone on Master Schedule and Detail Schedule will identify start Milestone with an "ES" constraint date equal to Award of Contract date.

.6 Calculate dates for completion milestones from Plan and Schedule using specified time periods for Contract.
.7 Interim Certificate with "LF" constraint equal to calculated date.
.8 Calculations on updates to be such that if early finish of Interim Certificate falls later than specified Contract duration then float calculation to reflect negative float.
.9 Delays to non-critical activities, those with float may not be basis for time extension.
.10 Do not use float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times and imposed dates other than required by Contract.
.11 Allow for and show Master Plan and Detail Schedule adverse weather conditions normally anticipated.
.1 Specified Contract duration has been predicated assuming normal amount of adverse weather conditions.
.12 Provide necessary crews and manpower to meet schedule requirements for performing Work within specified Contract duration.
.1 Simultaneous use of multiple crews on multiple fronts on multiple critical paths may be required.
.13 Arrange participation on and off site of subcontractors and suppliers, as required by Departmental Representative, for purpose of network planning, scheduling, updating and progress monitoring.
.1 Approvals by Departmental Representative of original networks and revisions do not relieve Contractor from duties and responsibilities required by Contract.
.14 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit to Departmental Representative Project Control System for planning, scheduling, monitoring and reporting of project progress.

.2 Submit Project Control System to Departmental Representative for approval.
.1 Failure to comply with each required submission, may result in progress payment being withheld in accordance with Federal Government's GC 5 Terms of Payment.

.3 Include costs for execution, preparation and reproduction of schedule submittals in bid documents.

.4 Submit letter ensuring that schedule has been prepared in co-ordination with major sub-contractors.

.5 Refer to article "PROGRESS MONITORING AND REPORTING" of this specification Section for frequency of Project control system submittals.

.6 Submit impact analysis of schedule for changes that result in extension of contract duration.
.1 Include draft schedule update and report as outlined in article "PROGRESS MONITORING AND REPORTING".

.7 Submit Project planning, monitoring and control system data as part of initial schedule submission and monthly status reporting as required by Departmental Representative in

following form.

.1 CD files in original scheduling software containing schedule and cash flow information, labelled with data date, specific update, and person responsible for update.
.2 Master Schedule Bar Chart.
.3 Construction Detail schedule Bar Chart.
.4 Listing of project activities including milestones and logical connectors, networks (sub-networks) from Project start to end. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes and float.
.5 Criticality report listing activities and milestones with up to 5 days total float used as first sort for ready identification of critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.
.6 Progress report in early start sequence, listing for each trade, activities due to start, underway, or finished within 2 months from monthly update date. List activity identification number, description and duration. Provide columns for entry of actual start and finish dates, duration remaining and remarks concerning action required.

1.04 QUALITY ASSURANCE

.1 Use experienced personnel, fully qualified in planning and scheduling to provide services from start of construction to Final Certificate, including Commissioning.

1.05 WORK BREAKDOWN STRUCTURE (WBS)

.1 Prepare construction Work Breakdown Structure (WBS) within five (5) working days of Award of Contract date.
  .1 Develop WBS through at least five levels: project, stage, element, sub-element and work package.

1.06 PROJECT MILESTONES

.1 Project milestones form targets for both Master Schedule and Detail Schedule of CPM construction network system. Indicate the project milestone dates for the following items:
  .1 Mobilization
  .2 Demolition.
  .3 Superstructure completed.
  .4 Interior finishing and fitting, mechanical and electrical work.
  .5 Interim Certificate (substantial completion).
  .6 Final Certificate completion.

1.07 MASTER SCHEDULE

.1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.

.2 Prepare comprehensive construction Master Schedule (CPM logic diagram) and dependent Cash Flow Projection within five (5) working days of finalizing Agreement to confirm validity or alternates of identified milestones.
  .1 Master Schedule will be used as baseline.

.1 Revise baseline as conditions dictate and as required by Departmental Representative.
.2 Departmental Representative as Project progresses will review and return revised baseline within ten (10) work days.

.3 Reconcile revisions to Master Schedule and Cash Flow Projections with previous baseline to provide continuous audit trail.

.4 Initial and subsequent Master Schedule will include:
.1 CD containing schedule and cash flow information, clearly labelled with data date, specific update, and person responsible for update.
.2 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.
.3 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.
.4 Actual/projected monthly cash flow: expressed monthly and shown in both graphical and numerical form.

1.08 DETAIL SCHEDULE

.1 Provide detailed project schedule (CPM logic diagram) within twenty (20) working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:
.1 Shop drawings.
.2 Samples.
.3 Approvals.
.4 Procurement.
.5 Construction.
.6 Installation.
.7 Site works.
.8 Testing.
.9 Commissioning and acceptance.

.2 Detail CPM schedule to cover in detail minimum period of six (6) months beginning from Award of Contract date with each activity duration indicated in days.
.1 Show remaining activities for CPM construction network system up to Final Certificate and develop complete detail as project progresses.
.2 Detail activities completely and comprehensively throughout duration of project.

.3 Relate Detail Schedule activities to basic activities and milestones developed and approved in Master Schedule.

.4 Clearly show sequence and interdependence of construction activities and indicate:
.1 Start and completion of all items of Work, their major components, and interim milestone completion dates.
.2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:
.1 Time for submittals, resubmittals and review.
.2 Time for fabrication and delivery of manufactured products for Work.
.3 Interdependence of procurement and construction activities.

.3 Include sufficient detail to assure adequate planning and execution of Work. Activities should generally range in duration from 3 to 15 workdays each.

.5 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow co-ordination and control of project activities. Show continuous flow from left to right.

.6 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout length of Project to form "Critical Path". Increased number of critical activities is seen as indication of increased risk.

.7 Insert Change Orders in appropriate and logical location of Detail Schedule. After analysis, clearly state and report to Departmental Representative for review effects created by insertion of new Change Order.

1.09 REVIEW OF THE CONSTRUCTION DETAIL SCHEDULE

.1 Allow 5 work days for review by Departmental Representative of proposed construction Detail Schedule.

.2 Upon receipt of reviewed Detail Schedule make necessary revisions and resubmit to Departmental Representative for review within 5 work days.

.3 Promptly provide additional information to validate practicability of Detail Schedule as required by Departmental Representative.

.4 Submittal of Detail Schedule indicates that it meets Contract requirements and will be executed generally in sequence.

1.10 COMPLIANCE WITH DETAIL SCHEDULE

.1 Comply with reviewed Detail Schedule.

.2 Proceed with significant changes and deviations from scheduled sequence of activities that cause delay, only after written receipt of approval by Departmental Representative.

.3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.

.1 Corrective measures may include:

.1 Increase of personnel on site for effected activities or work package.

.2 Increase in materials and equipment.

.3 Overtime work.

.4 Submit to Departmental Representative, justification, project schedule data and supporting evidence for approval of extension to Contract completion date or interim milestone date when required. Include as part of supporting evidence:

.1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved contract schedule.

.2 Prepared schedule indicating how change will be incorporated into the overall logic

diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.

.3 Other supporting evidence requested by Departmental Representative.

.4 Do not assume approval of Contract extension prior to receipt of written approval from Departmental Representative.

.5 In event of Contract extension, display in Detail Schedule that scheduled float time available for work involved has been used in full without jeopardizing earned float.

.1 Departmental Representative will determine and advise Contractor number of allowable days for extension of Contract based on project schedule updates for period in question, and other factual information.

.2 Construction delays affecting project schedule will not constitute justification for extension of contract completion date.

1.11 PROGRESS MONITORING AND REPORTING

.1 On ongoing basis, Detail Schedule on job site must show "Progress to Date". Arrange participation on and off site of subcontractors and suppliers, as, and when necessary, for purpose of network planning, scheduling, updating and progress monitoring. Inspect Work with Departmental Representative at least once monthly to establish progress on each current activity shown on applicable networks.

.2 Update and reissue project Work Breakdown Structure and relevant coding structures as project develops and changes.

.3 Perform Detail Schedule update monthly with status dated (Data Date) on last working day of month. Update to reflect activities completed to date, activities in progress, logic and duration changes.

.4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.

.5 Submit to Departmental Representative copies of updated Detail Schedule.

.6 Requirements for monthly progress monitoring and reporting are basis for progress payment request.

.7 Submit monthly written report based on Detail Schedule, showing Work to date performed, comparing Work progress to planned, and presenting current forecasts. Report must summarize progress, defining problem areas and anticipated delays with respect to Work schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate any potential delay. Include in report:

.1 Description of progress made.

.2 Pending items and status of: permits, shop drawings, change orders, possible time extensions.

.3 Status of Contract completion date and milestones.

.4 Current and anticipated problem areas, potential delays and corrective measures.

.5 Review of progress and status of Critical Path activities.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.02 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow fourteen (14) days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

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

.8 Submissions include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.1 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.2 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.3 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
.2 Testing must have been within 3 years of date of contract award for project.

.4 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after award of project contract complete with project name.

.5 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.6 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.7 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.8 Submit electronic copies and two (2) hard copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.9 Delete information not applicable to project.

.10 Supplement standard information to provide details applicable to project.

.11 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.12 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
.1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication

processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.03 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.04 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.05 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic copy of colour digital photography in .jpg format, fine resolution monthly with progress statement as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: 24 interior locations.
.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation: monthly as directed by Departmental Representative.

1.06 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 SCOPE OF WORK

.1 The scope of work of this Section is the performance of alteration work which applies to the contract in general, and miscellaneous items to be administered by the Contractor.

1.02 SITE CONDITIONS

.1 Verify existing conditions during Bidding period. If existing conditions are found to be different from what is indicated or expected, notify the Department Representative immediately. Extra payments will not be authorized for work required by situations which could have been determined by a careful examination of existing conditions during the Bidding period.

.2 When on site, if anything is found to be out of the ordinary, or is found in poor condition that has not been previously noted, the contractor is to bring the item to the attention of the Departmental Representative.

1.03 RESPONSIBLILTY AND ASSIGNMENT TO TRADES

.1 The Contractor will assign the work of moving, removal, cutting, patching and repair to trades under his supervision, so as to cause the least damage to each type of work encountered, and so as to return the building as much as possible to the appearance of new work.

.2 Assign patching and finishing materials to mechanics skilled in the Work of the finish trade involved.

2 PRODUCTS

2.01 MATERIALS

.1 Refer to the individual specifications sections for other materials.

3 EXECUTION

3.01 ALTERATIONS / RENOVATIONS

.1 Do all Work as indicated on drawings and as specified in the applicable specification Section.

.2 Schedule and co-ordinate Work with the Departmental Representative before commencement.

.3 Where structural changes are required to be made, carry out proper investigations to determine whether the required changes can be made safely. Immediately advise the Departmental Representative when existing conditions differ from the drawings.

.4 During Owner occupation, temporarily protect portions of the existing building where work is to be demolished, cut or removed and where new work is to be done, connections made, materials handled, or equipment moved and relocated. Provide temporary protection to protect and secure the interior of the building at all times from dust and interior environmental conditions are maintained.

.5 Furnish and install adequate guards and other temporary protection to prevent injury to persons.

.6 Where alterations occur, or where new and existing work join, cut, remove, patch, repair or refinish, the immediate adjacent surfaces, or so much thereof as is required by the involved conditions, and leave in as good a condition as existed prior to the commencing of the work. Ensure that the materials and workmanship employed in the alterations involving new construction, unless otherwise shown or specified, matches that of the original work. Perform each portion of the alteration work using trades which generally perform these portions. Maintain the integrity of fire rated construction.

.7 Ensure that operations will not interfere with existing fire safety measures and arrangements, including supply of water, electric power, gas and other services, alarm systems, and approaches to the building which may be needed for fire fighting.

.8 If it becomes necessary for performance of contract work to interfere with the fire safety measures or arrangements, make application to the Departmental Representative for directions including any alternative fire safety precautions to be taken.

.9 Maintain safe passage to and from exits. Maintain access to and from the building at all times.

3.02 PREPARATION OF SURFACES

.1 After demolition of existing finishes, and the like, prepare surfaces for the new finishes. Include all work required to produce surfaces suitable to receive the new construction, or new finishes.

.2 Where existing walls or other existing construction is removed, patch and fill in existing substrates such as floors, walls and ceilings which are to remain. Where existing floors are damaged due to removal of partitions, patch and fill in floor level and smooth, ready to receive floor finish.

.3 Repair all surfaces affected by demolition or otherwise requiring preparation, and leave ready to receive new finish.

.4 Infill all walls, floors and ceilings to match existing construction where mechanical, electrical and other items are removed.

.5 Fill in existing openings with fire stop and smoke seal specified in Section 07 84 00, as required to maintain fire ratings. Infill other openings as detailed on the drawings or as otherwise required.

3.03 PATCHING, EXTENDING AND MAKING GOOD EXISTING WORK

.1 Skill:

.1 Patch, extend and make good existing work to match existing remaining surfaces. The quality of work must match existing and as specified in the Sections of this Specification.

.2 Where new materials are specified to be patched into or are to be installed adjacent to existing materials that are to remain as a part of the finished Work, ensure the new materials matches the existing as closely as possible in colour, texture, pattern and thickness. Provide tight joints or seamed joints as applicable. Provide a sample area(s) for Departmental Representative's review prior to proceeding with the work.

.2 Patching:

.1 In all areas where a portion of an existing finished surface is damaged by scope of this work, patch or replace the imperfect portion of the surface with matching material, to Departmental Representative's acceptance. Finish to match existing finishes unless specified otherwise. When existing material cannot be matched, salvaged material may be used subject to acceptance by the Departmental Representative.

.2 If the patched or imperfect surface was originally painted, repaint the entire surface area to logical boundaries.

.3 Carefully remove and store modular, manufactured type finishes, such as lay-in existing ceiling tile in component ceiling systems, that are to remain in the finished work, and stored for re-installation. Replace damaged tile with tiles salvaged from existing areas where the ceiling is to be demolished. Where matching material is not available, Departmental Representative may accept the most similar product locally available, which meets the same performance requirements as existing product. If matching product is not available, replace with new materials. Obtain acceptance of Departmental Representative prior to installation of other than a matching product.

.3 Transitions:

.1 Where new work abuts or finishes flush with existing work, make the transition as smooth and workmanlike as possible. Install patched work to match existing adjacent work in texture and appearance so as to make the patch or transition acceptable to the Departmental Representative.

.2 Where masonry, tile, metal or other finished surface is cut by demolition in such a way that a smooth transition is not possible, terminate the existing surface in a neat fashion along a straight line at a natural point of division and provide trim to Departmental Representative's acceptance.

.3 Where two or more spaces are indicated to become one space, refinish substrate, floors, walls and ceilings so that horizontal planes meet without breaks, steps or bulkheads.

.4 In cases of extreme change of level, obtain instructions from the Departmental Representative as to method of executing transition by means of stepping, bulkheading, encasement, ramping or sloping.

.5 All means and methods must be to the Departmental Representative's acceptance.

.4 Matching:

.1 Restore existing Work that is to remain in place but which is damaged during construction, to condition equal to that at the time of the start of work, to the satisfaction of the Departmental Representative.

.5 Overall Requirements:

.1 Where an existing product or type of construction occurs in the existing building, which is required to be patched and made good, but which is not specified as part of the new work, provide such products or types of construction as needed to patch, and match the existing work, as noted in this Section.

3.04 SPECIAL PATCHING REQUIREMENTS

.1 In areas where any portion of an existing fire or acoustically rated finished surface structure is damaged, lifted, stained or otherwise made or found to be imperfect as a result of Work of this Contract, patch or replace the damaged area of the surface with matching material to provide same or better rating.

.2 Provide solid support or substrate for patching of finishes.

3.05 WORK TO EXISTING

.1 Perform all work to existing as required to accommodate new construction as indicated and as otherwise required to complete the Work of this project.

3.06 MISCELLANEOUS ITEMS

.1 Where new openings are being cut into existing partitions, take care not to damage existing adjacent flooring.

.2 Take care not to damage existing electrical panels and cables which are to remain.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Alberta
- .1 Occupational Health and Safety Act, R.S.A..

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
- .1 Results of site specific safety hazard assessment.
- .2 Results of safety and health risk or hazard analysis for site tasks and operation.

.3 Submit three (3) copies of Contractor's authorized representative's work site health and safety inspection reports to authority having jurisdiction, weekly to the Departmental Representative.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within ten (10) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

.7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.03 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.04 SAFETY ASSESSMENT

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

1.05 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.06 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.07 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with: Local Office Manager.

1.08 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.09 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg.

1.11 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Alberta having jurisdiction and advise Departmental Representative verbally and in writing.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator or Safety Officer and follow procedures in accordance with Acts and Regulations of Alberta having jurisdiction and advise Departmental Representative verbally and in writing.

1.12 HEALTH AND SAFETY COORDINATOR

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

1.13 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Alberta having jurisdiction, and in consultation with Departmental Representative.

1.14 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.16 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.17 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 REFERENCES AND CODES

.1 Perform Work in accordance with Alberta Building Code 2014 and National Building Code 2015 including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:
- .1 Contract documents.
- .2 Specified standards, codes and referenced documents.

1.02 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 INTENT

.1 All references to codes, standards and standard specifications and any amendments or updates referred to in these Specifications or used on drawings means those that are in force on the day of receipt of Bids are applicable to the Work during the duration of the Contract regardless of the date of the reference indicated in the individual specification Sections.

.2 Where referenced standards contain provisions on required methods of fabrication, procedure, and the like, comply with all such provisions.

.3 Where these specifications are in conflict with a referenced standard, the most stringent requirements govern.

.1 In some Sections of these specifications, items from the referenced standards are duplicated, in short form. Interpret these as advisory and to facilitate inspection. The full provisions of the referenced standards govern

1.02 BUILDING CODE

.1 Conform to and perform work in accordance with the Alberta Building Code 2014 and National Building Code of Canada 2015, as a minimum, except as indicated as being performed to a higher standard in the Contract Documents.

1.03 STANDARD ORGANIZATIONS

.1 The following list of standards organizations indicate the most common standards that may be referenced within the technical specifications:

.1 ANSI - American National Standards Institute
.2 ASTM - American Society for Testing and Materials
.3 CGA - Canadian Gas Association
.4 CGSB - Canadian General Standards Board
.5 CSA - Canadian Standards Association
.6 CAN1 - National Standard of Canada (published by CGA)
.7 CAN2 - National Standard of Canada (published by CGSB)
.8 CAN3 - National Standard of Canada (published by CSA)
.9 CAN4 - National Standard of Canada (published by ULC)
.10 ULC - Underwriters Laboratories of Canada
.11 UL or ULI - Underwriters Laboratories Inc.
.12 WHI - Warnock Hersey / Intertek Testing Services

.2 The following limitations on marks issued by standards organizations will apply to the standards issued by the organizations listed in 1.3.1 above:

.1 Underwriters Laboratories Inc.: Only systems designated by “cUL” or “cULus” will be acceptable for use on this project. Systems indicating “UL” or “ULus” will only be considered where local authorities having jurisdiction have reviewed and accepted the systems in writing.

.2 Warnock Hersey Intertek: Only materials designated by “cWHI” or cWHIus will be acceptable for use on this project. Materials bearing a “WH”, “WHI” or “WHIus” mark will only be considered where local authorities having jurisdiction have reviewed and accepted the materials in writing.

.3 Contractor will be responsible for obtaining written acceptance of materials and submitting them to the Departmental Representative prior to installation.

1.04 REFERENCES

.1 Within the text of the specifications, reference may be made to published standards and codes, including but not limited to the following:

ABC	-	Alberta Building Code 2014
ACI	-	American Concrete Institute
AFCA	-	Alberta Floor Covering Association
AISC	-	American Institute of Steel Construction
AISI	-	American Iron & Steel Institute
AMCA	-	Air Movement & Control Association
ANSI	-	American National Standards Institute
ARCA	-	Alberta Roofing Contractor's Association
ASA	-	American Standards Association
ASHRAE		American Society of Heating, Refrigerating & Airconditioning Engineers
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
AWCC	-	Association of Wall and Ceiling Contractors
AWMAC	-	Architectural Woodwork and Millwork Association of Canada
AWPA	-	American Wood Preservers' Association
CAN	-	National Standard of Canada, as follows: CAN1: CGA - Canadian Gas Association CAN2(or CAN/CGSB): CGSB - Canadian General Standards Board CAN3(or CAN/CSA): CSA - Canadian Standards Association CAN4: ULC - Underwriters' Laboratories of Canada
CEC	-	Canadian Electrical Code (published by CSA)
CEMA	-	Canadian Electrical Manufacturer's Association
CGSB	-	Canadian General Standards Board
CISC	-	Canadian Institute of Steel Construction
CLA	-	Canadian Lumberman's Association
CSA	-	Canadian Standards Association
CWB	-	Canadian Welding Bureau
FM	-	Factory Mutual Engineering Corporation
HRAI	-	Heating, Refrigerating and Air-Conditioning Institute of Canada

HI	-	Hydronics Institute
IEEE	-	Institute of Electrical and Electronic Engineers
ICEA	-	Insulated Cable Engineers Association
IFAI	-	Industrial Fabric Association International
IGMAC	-	Insulated Glass Manufacturers Association of Canada
ITS	-	Intertek Testing Services
MPI	-	Master Painters Institute
NAAMM	-	National Association of Architectural Metal Manufacturers
NBCC	-	National Building Code of Canada 2010
NEMA	-	National Electrical Manufacturers' Association
NFPA	-	National Fire Protection Association
NLGA	-	National Lumber Grades Authority
SSPC	-	The Society for Protective Coatings
TTMAC	-	Terrazzo, Tile and Marble Association of Canada
ULC	-	Underwriters' Laboratories of Canada
ULI	-	Underwriters' Laboratories Incorporated (U.S.)
WHI	-	Warnock Hersey Inc.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give minimum five (5) days notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.02 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

.5 Coordinate and assist with Owner's Fire Engineer for inspections and testing.

1.03 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.04 PROCEDURES

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.05 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.06 REPORTS

.1 Submit 4 copies of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

1.07 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.08 MILL TESTS

.1 Submit mill test certificates as required of specification Sections.

1.09 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and fire alarm systems.

.2 Refer to Division 26, 27 and 28 for definitive requirements.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 U.S. Environmental Protection Agency (EPA) / Office of Water
- .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.03 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.04 WATER SUPPLY

.1 Departmental Representative will provide continuous supply of potable water for construction use.

.2 Departmental Representative will pay for utility charges at prevailing rates.

1.05 TEMPORARY HEATING AND VENTILATION

.1 Within existing building:
- .1 The permanent heating system will be in operation during the work of this Contract. The Departmental Representative will pay all costs for operation of permanent heating system.
- .2 Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction. Provide and pay for additional heating as may be required, beyond that provided by the Departmental Representative.

.2 Ventilating:
- .1 To existing building:
  - .1 The permanent ventilating system will be in operation during the work of this Contract. The Departmental Representative will pay all costs for operation of permanent ventilation system.
  - .2 Provide and pay for additional ventilation to heated areas and keep building free of exhaust or combustion gases and to meet health regulations for a safe working environment. Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .3 Use whatever means necessary to prevent passage of dust from construction area into remainder of building.

.3 Permanent heating system of building, to be used when available. Be responsible for damage to heating system if use is permitted.

.4 On completion of Work for which permanent heating system is used, replace filters and restore heating equipment to new condition.

.5 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Departmental Representative.

.6 Pay costs for maintaining temporary heat, when using permanent heating system within the new addition. Departmental Representative will pay utility charges when temporary heat source is existing building equipment.

.7 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
- .1 Conform with applicable codes and standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.
- .5 Vent direct-fired combustion units to outside.

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

1.06 TEMPORARY POWER AND LIGHT

.1 The Departmental Representative will provide and pay for temporary power required during construction from a designated existing source for lighting and operating power tools and other temporary power requirements for construction, as available in the existing building. Provide and pay for additional power as may be required, beyond that available in the existing building. Connect to existing power supply in accordance with Canadian Electrical Code and provide meters and switching.

.2 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

.3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.07 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax and data hook up, lines and equipment necessary for own use and use of Departmental Representative.

1.08 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction, governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB 1.189, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-0121, Douglas Fir Plywood.
- .3 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.
- .4 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.

.3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

.4 U.S. Environmental Protection Agency (EPA) / Office of Water
- .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.03 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.04 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs.

1.05 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products. Space for one bin or secure storage container (approximately 10' X 20' area) will be provided on site. No storage area will be provided in the building.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.06 CONSTRUCTION PARKING

.1 Parking for one vehicle will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean runways and taxi areas where used by Contractor's equipment.

1.07 OFFICES

.1 Space will be provided for meeting space and site office.

1.08 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.09 SANITARY FACILITIES

.1 The Contractor and all Subcontractors may use designated existing sanitary facilities.

.2 Keep area and premises in sanitary condition.

1.10 CONSTRUCTION SIGNAGE

.1 Not permitted.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 Not Used

.1 Not used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CGSB 1.59, Alkyd Exterior Gloss Enamel.
- .2 CAN/CGSB 1.189, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)
- .1 CSA-O121, Douglas Fir Plywood.

1.02 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.03 HOARDING

.1 Erect hoarding to protect the public, workers, building staff and visitors, public and private property from injury or damage and to the approval of the authority having jurisdiction and to maintain access to areas which are to remain operational. Erect hoarding to separate areas of the building and site which are to remain open, and construction area.

.2 Erect site fencing/hoarding and gates around temporary parking area for construction personnel and temporary Contractor's laydown area.

.3 Obtain and pay for all necessary permits to erect hoarding as required.

.4 Provide all other temporary safeguards and protection to adequately protect against accident or injury to any workers or other persons on the site, and adjacent work and property, roads and walks, damage to any part of the work, while under construction and to any adjacent structure, property, pavements, walks, services and other similar items, by frost, weather, overloading and any other cause resulting from the execution of the work.

.5 Provide hoarding with prefabricated temporary steel framed construction fence with mesh, 2400 mm high, with sections interlocked together and fence being self supporting, protecting public and private property from injury or damage.

.6 Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.

.7 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.04 GUARD RAILS AND BARRICADES

.1 Provide guard rails and barricades as required by governing authorities.

1.05 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.06 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.07 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.08 FIRE ROUTES

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

1.09 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule [3] days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.11 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in Section 01 42 00.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.02 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.03 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.04 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.05 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.06 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.07 QUALITY OF WORK

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

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.08 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.09 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.10 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.12 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.15 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 LAYOUT REQUIREMENTS

.1 Establish lines and levels, locate and layout, by instrumentation.

.2 Verify all lines, levels, datum, and dimensions as shown on the drawings, and report errors or inconsistencies in the above to the Departmental Representative before commencing work. Failure to do so does not relieve the Contractor from the responsibility of correcting same.

.3 Correctly lay out Work to lines and levels in accordance with the drawings; in all cases figured dimensions are to be followed rather that those scaled from the drawings.

.4 Exercise every possible precaution to verify the figures shown on the drawings and to obtain from the Departmental Representative any additional dimensions or information required before laying out the work. Be responsible for rectifying any errors or incorrect work due to his failure to exercise such precautions.

.5 Examine surfaces on, to or against which work is to go to ensure that same are square, true, level, plumb, or correct shape, and the like, or in the proper condition to receive such new work. Should any surface not be suitable notify the Departmental Representative, otherwise replace in an acceptable manner, any or all work as directed to correct any defects which may occur.

1.02 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

1.03 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.02 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.03 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.04 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.

.12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

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

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.02 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, caused by the Work.

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs, gutters, areaways, and sunken wells.

.16 Sweep and wash clean paved areas.

.17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.18 Clean roofs, downspouts, and drainage systems.

.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.20 Remove snow and ice from access to building.

1.03 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 WASTE MANAGEMENT GOALS

.1 This project is NOT a LEED project, but all efforts are to be taken to recycle and divert as much waste as possible from landfill.
.2 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Waste Management Plan and Goals.
.3 Accomplish maximum control of solid construction waste.
.4 Preserve environment and prevent pollution and environment damage.

1.02 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.
.2 Inert Fill: inert waste - exclusively asphalt and concrete.
.3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
.4 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
.5 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
.6 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
.7 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
.8 Returning reusable items including pallets or unused products to vendors.
.9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
.10 Separate Condition: refers to waste sorted into individual types.
.11 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

1.03 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
.2 Unless specified otherwise, materials for removal become Contractor's property.
.3 Protect, stockpile, store and catalogue salvaged items.
.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
.5 Protect structural components not removed for demolition from movement or damage.
.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
.7 Protect surface drainage, mechanical and electrical from damage and blockage.
.8 Separate and store materials produced during dismantling of structures in designated areas.
.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.10 On-site source separation is recommended.
.11 Remove co-mingled materials to off-site processing facility for separation.

.12 Provide waybills for separated materials.

1.04 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil, and paint thinner into waterways, storm, or sanitary sewers.

.3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.05 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility.

1.06 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative's inspection.

.2 Departmental Representative's Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested, adjusted, balanced and fully operational.

.4 Certificates required by Boiler Inspection Branch, Fire Commissioner and Utility companies: submitted.

.5 Operation of systems: demonstrated to Owner's personnel.

.6 Commissioning of mechanical systems: completed in accordance with 01 91 13 - General Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to Departmental Representative.

.7 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.

.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment:
.1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.02 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.
.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with Contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements and manufacturer's installation instructions.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, one (1) final hard copy and three (3) unprotected PDF electronic copies on CDs of as built drawings and two (2) final hard copies and three (3) unprotected electronic copies on CDs, of operating and maintenance manuals and Building Management Manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.03 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.
.1 Bind in with text; fold larger drawings to size of text pages.

1.04 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;
.1 Date of submission; names.
.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:
.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.
.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.6 Training: refer to Section 01 79 00 - Demonstration and Training.

1.05 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, at site for Departmental Representative one record copy of:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.
.1 Provide files, racks, and secure storage.

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

.4 Maintain record documents in clean, dry and legible condition.
.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.06 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative, and on two electronic unprotected PDF drawing sets and two electronic unprotected PDF copies of the Project Manual.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

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

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

.5 Specifications: mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Addenda and change orders.

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

.7 Provide digital photos, if requested, for site records.

1.07 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.
- .1 Give function, normal operation characteristics and limiting conditions.
- .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

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

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

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

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Provide installed control diagrams by controls manufacturer.

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

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

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

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.

.15 Additional requirements: as specified in individual specification sections.

1.08 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .1 Provide information for re-ordering custom manufactured products.

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

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

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

1.09 MAINTENANCE MATERIALS

.1 Spare Parts:
- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock Materials:
- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools:
- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Departmental Representative.
  - .2 Include approved listings in Maintenance Manual.

1.10 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.11 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.

.3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.

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

.8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

.9 Include information contained in warranty management plan as follows:
- .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
- .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, commissioned systems, fire protection, alarm systems, sprinkler systems and the like.
- .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
  - .1 Name of item.
  - .2 Model and serial numbers.
  - .3 Location where installed.
  - .4 Name and phone numbers of manufacturers or suppliers.
  - .5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
.7 Cross-reference to warranty certificates as applicable.
.8 Starting point and duration of warranty period.
.9 Summary of maintenance procedures required to continue warranty in force.
.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
.11 Organization, names and phone numbers of persons to call for warranty service.
.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
.5 Procedure and status of tagging of equipment covered by extended warranties.
.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification to follow oral instructions.
.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.12 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:
.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of Substantial Performance.

.2 Departmental Representative: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.

.3 Preparation:
- .1 Verify conditions for demonstration and instructions comply with requirements.
- .2 Verify designated personnel are present.
- .3 Ensure equipment has been inspected and put into operation.
- .4 Ensure testing, adjusting, and balancing has been performed in accordance with Divisions 26 and 27 and equipment and systems are fully operational.

.4 Demonstration and Instructions:
- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment or designated location.
- .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
- .3 Review contents of manual in detail to explain aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

.5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system is adequate to fully demonstrate equipment use, trouble shooting, maintenance and the like as required.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.

.3 Submit reports within [one week] after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

.5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.03 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized

representative to demonstrate operation of equipment and systems:

.1 Instruct Owner's personnel.

.2 Provide written report that demonstration and instructions have been completed.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)
- .1 ULC-S115, Fire Tests of Fire stop Systems.

1.02 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: ABC 2014 Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.
- .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.

.3 Shop Drawings:
- .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.
- .2 Construction details should accurately reflect actual job conditions.

.4 Samples:
- .1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

.5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.04 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
.2 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
.3 Deliver, store and handle materials in accordance with manufacturer's written instructions.
.4 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.2 Storage and Protection:
.1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

.3 Waste Management and Disposal:
.1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended.
.2 Fire stop system rating: to match existing.

.2 Service penetration assemblies: systems tested to CAN-ULC-S115.

.3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.4 Fire-resistance rating of installed fire stopping assembly in accordance with ABC 2014.

.5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: non-sagging.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

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

3.02 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.03 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

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

3.04 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: [certified] fire stop system component.
.1 Ensure pipe insulation installation precedes fire stopping.

3.05 CLEANING

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.06 SCHEDULE

.1 Fire stop and smoke seal at:
.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
.2 Edge of floor slabs at curtain wall and precast concrete panels.
.3 Top of fire-resistance rated masonry and gypsum board partitions.
.4 Intersection of fire-resistance rated masonry and gypsum board partitions.
.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
.7 Openings and sleeves installed for future use through fire separations.
.8 Around mechanical and electrical assemblies penetrating fire separations.
.9 Rigid ducts: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

1. GENERAL

1.1 Work Included

.1 Removal of fire alarm monitoring for Halon system and complete fire alarm replacement.

1.2 Designation of Parties and Definition

.1 The following defines various items used within the Electrical Specification Division 26:

.1 'Engineer or Electrical Engineer': This refers to Owner or Owner appointed representative.

.2 'Electrical Trade of Contractor': The Contractor undertaking to do the electrical work described in the Electrical Specification and on the electrical drawings.

.3 'General Contractor or General Construction Trade': The Contractor that has the agreement with the Owner for the construction of the project.

.4 'Mechanical Trade or Mechanical Contractor': Sub-contractors undertaking to do the work described in the mechanical specifications and/or on the mechanical drawings.

.5 'Provide': Means supply and install or supply labour and materials required for the installation of.

.6 'Approved Equal': Items listed under Approved Manufacturer's in specification or addendum that shall be included in base bid.

.7 'Concealed': Where used in connection with the installation of electrical raceways and wiring, means that they are hidden from sight as in furred out spaces, ceiling spaces, etc.

.8 'Exposed': Where used in connection with the installation of electrical raceways and wiring and electrical equipment, means that they are visible to persons within the building.

1.3 Drawings and Specifications

.1 All work is to comply with the 2015 National Building Code and the 2014 Alberta Building Code. The most stringent requirements/interpretations to be followed.

.2 The General Conditions, Supplementary Conditions and Division 01 are a part of this specification and shall apply to this Division.

.3 The intent of the drawings and specifications is to include all labour, products and services necessary for complete work, tested and ready for operation. Drawings and

specifications are complementary each to the other and what is called for by one shall be binding as if called for by both.

.4 Symbols used to represent various electrical devices often occupy more space on the drawing than the actual device does when installed. In such instances, do not scale locations of devices from electrical symbols. Install these devices with primary regard for usage of wall space, convenience of operation and grouping of devices.

.5 These specifications and the drawings and specifications of all other divisions shall be considered as an integral part of the accompanying drawings. Any item or subject omitted from either the specifications or the drawings but which is mentioned or reasonably specified in and by the others, shall be considered as properly and sufficiently specified and shall be provided.

.6 Provide all minor items and work not shown or specified but which are reasonably necessary to complete the Work. Electrical drawings indicate general location and route to be followed by conduit and/or wire and do not show all structural and mechanical details. In some cases, conduit or wiring is not as shown on the plans or shown diagrammatically on schematic or riser diagrams. Conduit and wire to be installed to provide a complete operating job and to be installed physically to conserve headroom, furring spaces, etc.

.7 If discrepancies or omissions in the drawings or specifications are found, or if the intent or meaning is not clear, advise the Consultant for clarification before submitting tender.

.8 Responsibility to determine which Division provides various products and work rests with the Contractor. Additional compensation will not be considered because of differences in interpretation of specifications.

1.4 Quality Assurances

.1 Codes, Rules, Permits & Fees

.1 Comply with all laws, ordinances, rules, regulations, codes and orders of all authorities having jurisdiction relating to this work.

.2 Comply with all rules of the Canadian Electrical Code, CSA Standard C22.1 and the applicable building codes.

.3 Quality of work specified and/or shown on the drawings shall not be reduced by the foregoing requirements.

.4 Give all required notices, submit drawings, obtain all permits, licenses and certificates and pay all fees required for this work.

.5 Furnish a Certificate of Final Inspection and approvals from inspection authority to the Consultant.

.2 Standards of Workmanship

.1 Execute all work in a competent manner and to present an acceptable appearance when completed.

.2 Employ a competent supervisor (consistency is essential) and a sufficient number of licensed tradesmen to complete the Work in the required time.

.3 Arrange and install products to fit properly into designated building spaces.

.4 Unless otherwise specified or shown, install products in accordance with recommendations and ratings of manufacturers.

1.5 Submittals

.1 Within 30 days of award of contract, the contractor shall submit a completed equipment procurement schedule which lists the manufacturer and model of equipment, indicating the projected ordering, shop drawing submittal date and delivery dates of all products to meet the required construction schedule.

.2 Submit samples as required where specified in Division 26.

.3 Prior to delivery of any products to job site and sufficiently in advance of requirements to allow ample time for checking, submit shop drawings for review as specified in Division 01. Submit shop drawings for all equipment as required in each section of this specification.

.4 Prior to submitting the shop drawings to the Consultant, the Contractor shall review the shop drawings to determine that the equipment complies with the requirements of the specifications and drawings.

.5 The term “shop drawing” means drawings, diagrams, illustrations, schedules, performance characteristics, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.

Indicate materials, methods of construction and attachment of support wiring, diagrams, connections, recommended installation details, explanatory notes and other information necessary for completion of Work. Where equipment is connected to other equipment, indicate that such items have been coordinated, regardless of the section under which the adjacent items will be supplied and installed. Indicate cross-references to design drawings and specifications.
Adjustments made on shop drawings by the Consultant are not intended to change the contract price. If adjustments affect the value of the work state such in writing to the Consultant prior to proceeding with the Work.

.6 Manufacture of products shall conform to revised shop drawings.

.7 Keep one complete set of shop drawings at job site during construction.

1.6 Record Drawings

.1 Refer to Section 01 77 00 Closeout Procedures – Operating and Maintenance Manuals and Record Drawings.

.2 The Contractor shall keep one complete set of white prints at the site office, including all addendums, change orders, site instructions, clarifications and revisions for the purpose of record drawings. As the work on site proceeds, the Contractor shall clearly record in Red Pencil all as-built conditions which deviate from the original contract documents. Record drawings to include circuiting of all devices, conduit and feeder runs (complete with conductor size and number) and locations of all electrical equipment. Include actual room names and numbers on these drawings.

.3 Prior to substantial performance, the contractor shall obtain CAD files of all electrical drawings, using AutoCAD, and use the services of a competent CAD operator to transfer all as-built information, including: Addendums, Change Orders, Clarifications, Revisions, Site Instructions and shop drawings. Upon completion, the contractor shall certify, in writing, that the as-built record drawings are complete and that they accurately indicate all electrical services, including exposed as well as concealed items.

.4 Contractor to forward letter of certification and as-built CAD drawings to the Consultant for final review. As-Built drawings to be submitted in the form of one set of CAD files on CD discs. Contractor is also to forward the hard copy red-lined as-built drawing to the consultant.

.5 The contractor may borrow copies of the electrical contract drawings on disc from the Consultant.

1.7 Operation and Maintenance Manuals

.1 Provide hard copy and electronic copies of both Operating & Maintenance Manuals and Record Drawings.

.2 Within 30 days prior to substantial performance, the Contractor shall submit a draft copy of the proposed contents of each maintenance manual to the Consultant for review. Once the draft copy is approved, the Contractor will supply 4 copies in suitably labelled, hard back, D-Ring type commercial binders, each complete with an index and tabbed title sheets for each section. Final copies of manuals to be received by Consultant not less than 7 days prior to substantial performance.

.3 All maintenance manual data shall be printed on 8 1/2" x 11" heavy bond, indexed, tabbed, punched and bound in the binders. each manual shall have a title sheet which is labelled "Operation & Maintenance Manual", and lists the Project name, Contractor's & Consultant's names, date submitted, and a Table of Contents for each volume. If a manual exceeds 75 mm in thickness, provide additional manuals as required.

.4 Provide an electronic version of complete manual.

.5 Each section of the manual shall contain the following information:

.1 Systems Descriptions. A brief synopsis of each system typed and inserted at the beginning of each section. Include sketches and diagrams where appropriate.

.2 Descriptive and technical data.

.3 Maintenance and operating instructions for all electrical equipment and controls. (These operating instructions need not be manufacturer's data but may be typewritten instructions in simple language to guide the Owner in the proper operation and maintenance of his installation.)

.4 Servicing intervals recommended.

.5 A copy of all wiring diagrams complete with wire coding.

.6 List of spare parts of all electrical equipment complete with names and addresses of sales, service representatives and suppliers.

.7 Copy of data testing.

.8 Include type and accuracy of instruments used to obtain test data.

.9 Copy of final inspection certificate.

.10 Copy of the purchase order, showing equipment make and model numbers issued to the manufacturer complete with all addendums. All cost details may be hidden.

.11 Copy of all warranty certificates.

.12 Set of final reviewed Shop Drawings.

.13 Names, addresses, phone numbers and facsimile numbers of Contractor, Consultants, sub-contractors and suppliers used on the Work together with a specification reference of the portion of the Work they undertook.

1.8 Product Handling

.1 Use all means necessary to protect the products of this Division before, during and after installation and to protect products and installed work of all other trades.

.2 Immediately make good any damage by repair or replacement at no additional cost to the Owner and to the approval of the Consultant.

.3 Remove advertising labels from all electrical equipment. Do not remove identification of certification labels.

.4 Remove dirt, rubbish, grease, etc. resulting from this work from all surfaces, including the inside of all cabinets, equipment enclosures, panelboard tubs, etc.

1.9 Alternate and Separate Prices

.1 In accordance with the Instructions to Bidders, state on the Tender Form in the space provided, the amount to be added or deleted from the base bid tender amount for the use and installation of equipment as an alternate to those specified.

1.10 Guarantee

.1 Furnish a written guarantee to the Owner prior to final contract payment, which will be in effect for one year from the date of final acceptance of the complete work. Replace or repair at no cost to the Owner any defective material or workmanship except where, in the opinion of the Consultant, such defects are due to the misuse or neglect by the Owner.

.2 This general guarantee shall not act as a waiver of any specified or special equipment guarantees, which cover a greater length of time.

.3 Note: Certain sections of this Electrical Specification are subject to the following warranty clause:

In the event of an emergency failure during the warranty period of any product(s), material(s) or system(s) installed under this Section, and the issuer of the warranty is unable to or chooses not to respond to a request by the owner for immediate emergency repair/replacement of the affected product, material or system, then the owner reserves the right to recover, from the issuer of the warranty, all costs incurred by the owner or owner engaged forces in effecting the immediate repair/replacement.

1.11 Progress Claims

.1 Within thirty (30) days after award of contract, a breakdown of material and equipment items including labour and expense components shall be compiled on the Departmental Representative format. Subsequent requests for payment shall be documented accordingly.

1.12 Waste Management and Disposal

.1 Separate and recycle waste materials.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with the Waste Management Plan.

.3 Fold up metal banding, flatten and place in designated area for recycling.

.4 Ensure emptied containers are sealed and stored safely for disposal away from children.

.5 Place materials defined as hazardous or toxic waste in designated containers.

.6 Collect, package and store any salvaged or remaining materials such as wire, conduit, busbars, wireways, copper ground straps and other associated components for recycling and reuse.

2. PRODUCTS

2.1 Selected Products & Equivalents

.1 Products and materials provided shall be new and free from all defects. Defective products or materials will be rejected, regardless of previous inspections. The Contractor shall be responsible to remove and replace defective products at their expense, and shall be responsible for any resulting delays and associated expenses, which result from defective products being rejected. Related materials shall be of the same manufacturer throughout the project.

.2 Products and materials referred to in the specifications by trade names, manufacturer's name and catalogue reference are those which shall be used as the basis for the Tender.

.3 The design has been based on the use of the specified product.

2.2 Alternative Products

.1 All product substitutions must be approved by the Consultant. Failure to obtain approval from the Consultant will result in the alternative product being rejected, in which case the Contractor shall provide an approved product at no additional cost to the owner.

.2 The Contractor shall assume full responsibility for ensuring that when providing alternative products or materials, all space, weight, connections, power and wiring requirements etc. are considered. Any costs incurred for additional components, changes to services, structural or space requirements, layouts and plans, etc. that may be necessary will be borne by the contractor.

.3 Suppliers to submit all requests for alternative product approval to the Consultant. Submissions must be received by the Consultant not less than seven (7) working days prior to the close of tenders. Submissions received after the “Cut-Off” date will not be reviewed.

All submissions, which are approved by the Consultant, shall be identified as “Approved Alternatives” in an Addendum. Alternative products not listed in the Addendum will be rejected.

.4 Approval of an alternate is not intended to change the original specifications unless specifically stated in the addenda. The submitter is responsible for all costs incurred by other trades as well as his own, to install the product/system in accordance with the contract documents.

.5 All submissions to be provided with technical data and whatever pertinent information that may be required by the Consultant to evaluate equivalency to the specified product.

The responsibility to provide sufficient technical data with respect to submissions will remain solely with those making the submission.

2.3 Quality of Products

.1 All products provided shall be CSA Approved, Canadian Underwriters' Laboratory approved where applicable, and new, unless otherwise specified.

.2 If products specified are not CSA approved, obtain special approval from the local regulatory authority. Pay all applicable charges levied and make all modifications required for approval.

.3 Products provided, if not specified, shall be new, of a quality best suited to the purpose required and their use subject to approval by the Consultant.

2.4 Uniformity of Manufacture

.1 Unless otherwise specifically called for in the Specifications, uniformity of manufacture shall be maintained for similar products throughout the work.

2.5 Product Finishes

.1 Touch up all damaged painted finishes with matching lacquer, or, if required by the Consultant, completely repaint damaged surface.

2.6 Use of Products During Construction

.1 Any equipment used for temporary or construction purposes shall be approved by the Construction Manager and in accordance with the General Conditions, "Use of Premises." Clean and restore to "as new" condition all equipment prior to the time of substantial completion.

.2 The warranty period shall not begin until the date of substantial performance of the work.

3. EXECUTION

3.1 Site Examination

.1 Examine the site of work and become familiar with all features and characteristics affecting this work before submitting tender.

.2 No additional compensation will be given for extra work due to existing conditions, which such examination should have disclosed.

.3 Report to the Consultant any unsatisfactory conditions, which may adversely affect the proper completion of this work.

3.2 Co-ordination with Other Divisions

.1 Examine the drawings and specifications of all divisions and become fully familiar with their work. Before commencing work, obtain a ruling from the Consultant if any conflict exists, otherwise no additional compensation will be made for any necessary adjustments.

.2 Lay out the work and equipment with due regard to architectural, structural and mechanical features. Architectural and structural drawings take precedence over electrical drawings regarding locations of walls, doors and equipment.

.3 Do not cut structural members without approval of the Consultant.

.4 Coordinate with all Division installing equipment and services, and ensure that there are no conflicts.

.5 Install anchors, bolts, pipe sleeves, hanger inserts, etc. in ample time to prevent delays.

.6 Examine previously constructed work and notify the Consultant of any conditions, which prejudice the proper completion of this work. Commencement of this work without such notification shall constitute acceptance of other work.

3.3 Location of Outlets

.1 Electrical drawings are, unless otherwise indicated, drawn to scale and approximate distances and dimensions may be obtained by scaling. Figured dimensions shall govern over scaled dimensions. Where exact dimensions and details are required, refer to Architectural drawings.

.2 Equipment locations shown on the drawings are approximate. Locations may be revised up to 3 meters to suit construction and equipment arrangements without additional cost to the Owner, provided that the Contractor is notified prior to the installation of the outlets, or equipment.

.3 Unless otherwise specified or shown, install products in accordance with recommendations and ratings of manufacturers.

3.4 Separation of Services

.1 Maintain separation between electrical wiring system and building piping, ductwork, etc. so that wiring system is isolated (except at approved connections to such systems) to prevent galvanic corrosion.

.2 In particular, contact between dissimilar metals, such as copper and aluminium, in damp or wet locations is not permitted.

.3 Do not support wiring from pipes, ductwork, etc. Hangers for suspended ceilings may be used for the support of wiring only when approval is obtained from the Consultant and the ceiling installer, and approved clips or hangers are used.

3.5 Equipment Identification

.1 3 mm thick plastic lamacoid name plates, coloured face to match system colour, white core, mechanically attached with self tapping screws, 6 mm high lettering, to be attached to the front face of the following equipment:

.1 Fire Alarm panel and Fire Alarm annunciator

.2 Colour code concealed conduits (including conduits above T-bar ceilings and under raised floor), concealed junction and pull boxes, and metallic sheathed cables with paint or plastic tape (25 mm wide band) at 15 metre intervals and at both side of transition through walls. All conduit, junction boxes and pull boxes in service rooms to be colour coded. Colour coding to be as follows:

SYSTEM	**MAJOR BAND**	**MAJOR BAND**
Fire Alarm System	Red	

3.6 Wiring to Equipment Supplied by Others

.1 Equipment supplied by the Owner or under other Division will be moved to the installation site by others. However, the electrical connection to the equipment shall be done by this Division.

3.7 Access Panels

.1 Where electrical equipment, junction boxes, remote ballasts or the like are concealed, access panels shall be supplied. Panels shall be of adequate size for servicing of the electrical work and complete with necessary frames and hinged doors held closed with captive fasteners. Coordinate type and size of panels with the Consultant.

3.8 Mounting Heights

.1 Unless a conflict exists, use the following as mounting heights from finished floors to center of device.

Receptacles in Mechanical Rooms	1000 mm
Fire Alarm Manual Stations	1400 mm
Fire Alarm Horn/Strobes	2100 mm (300 mm below finished ceiling)

3.9 Sealing of Wall and Floor Openings

.1 All conduit and cable entries through outside walls of buildings, through partition walls separating electrical rooms from other areas, through fire separations, and through floors above grade shall be sealed to prevent passage of moisture, dust, gasses, flame, or to maintain pressurization.

.2 Openings shall be sealed when all wiring entries shown on the drawings have been completed.

.3 Sealing material shall be fire resistant and shall not contain any compounds, which will chemically affect the wiring jacket or insulating material. Cable penetrations through fire separations to be sealed.

3.10 Ground Wiring

.1 Provide a separate green ground conductor for each conduit run.

END OF SECTION

1. GENERAL

1.1 Work Included

.1 Supply and install all hangers and supports for the installation shown on the drawings and specified herein, as necessary to fasten electrical equipment securely.

1.2 Related Work

.1 Material and Equipment - Fastenings and supports. Section 26 05 29

1.3 Waste Management and Disposal

.1 Refer to Section 26 05 00 11 – Electrical General Requirements.

2. PRODUCT

2.1 Concrete and Masonry Anchors

.1 Materials: Hardened steel inserts, zinc plated for corrosion resistance. All anchor bolts must be galvanized.

.2 Components: non-drilling anchors for use in predrilled holes, sized to safely support the applied load with a minimum safety factor of four.

2.2 Non-Metallic Anchors

.1 Material: Plastic anchors for sheet metal screws.

2.3 Conduit Supports

.1 General: Malleable iron one-hole conduit straps where exposed to weather. Stamped steel two-hole straps indoors.

.2 Masonry, concrete, stone, etc.: Anchors.

.3 Unistrut: Unistrut conduit clamps.

3. Execution

3.1 General

.1 Do not cut or drill beams, joists or structural steel unless written permission of the Consultants is obtained.

.2 Distance between conduit or cable supports not to exceed code requirements.

.3 Supports to be suitable for the real loads imposed by equipment.

.4 Supports to be securely fastened, free from vibration and excessive deflection or rotation. Maximum deflections are 4 mm over a 1 meter span and 8 mm over a 2 meter span.

.5 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

3.2 Installation

.1 Secure equipment to poured concrete with expandable inserts.

.2 Secure equipment to hollow masonry walls with toggle bolts.

.3 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.4 Fasten exposed conduit or cables to building construction or support system using straps.

.1 One-hole malleable iron or steel straps to secure surface conduits and cables 50 mm and smaller.

.2 Two-hole steel straps for conduits and cables larger than 50 mm.

.3 Beam clamps to secure conduit to exposed steel work.

.5 Suspended support systems.

.1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.6 Use plastic anchors for light loads only. Use metal anchors for all other loads.

.7 Shot driven pins may only be used with written approval of the structural engineer.

.8 Use round or pan head screws for fastening straps, boxes, etc.

.9 Do not support heavy loads from the bottom chord of open web steel joists.

.10 Support outlet boxes, junction boxes, panel tubs, etc., independent of conduits running to them. Support conduits within 600 mm of outlet boxes. Support surface mounted panel tubs with a minimum of four 6 mm fasteners.

.11 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.12 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.13 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.14 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of the Consultant.

END OF SECTION

1. GENERAL

1.1 Work Included

.1 Provide a complete system of boxes for the installation of wiring and equipment.

1.2 References

.1 CSA C22.1-Canadian Electrical Codes, Part 1.

1.3 Waste Management and Disposal

.1 Refer to Section 26 05 00 11 – Electrical General Requirements.

2. PRODUCTS

2.1 Outlet and Conduit Boxes General

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 Outlet Boxes for Metal Conduit

.1 Materials:

.1 Surface or recessed concealed type: Die formed steel, hot dip galvanized, 1.25 oz/sq. ft. minimum zinc coating.

.2 Surface mounting exposed: Cast ferrous for threaded conduit, with attached lugs, corrosion resistant two coats finish.

.2 Components:

.1 Ceiling outlets, surface mounting, concealed:

.1 101 mm square, depth 54 mm, Iberville 52171 series

.2 119 mm square, depth 54 mm, Iberville 72171 series

.2 Ceiling outlets, concealed mounting in concrete:

.1 101 mm octagonal concrete rings, depth from 38 mm to 152 mm Iberville 54521 series.

.2 Wall boxes, concealed in concrete or masonry: for one and two gang applications shall be 101 mm square, 54 mm deep, complete with suitable square cornered raised tile wall cover for proper device and wall surface application. Masonry boxes may be used for line voltage switching.

.3 Wall outlets, concealed non-masonry construction, with plaster finish: For one or two gangs used with switches, receptacles, etc., use 54 mm deep, with matching plaster covers, depth to suit. Alternately, use 119 mm square boxes, and covers as required. (For more than two gangs use solid boxes, or special boxes as required).

.4 Covers: Unless wiring devices and plates are mounted, provide blank, round canopy covers to match boxes.

.5 For 277V switches: Non-interchangeable with 120V switches through special tapped mounting ears, with top and bottom knockouts only.

2.3 Fittings - General

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

3. Execution

3.1 Installation

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

.5 Install all outlets flush and surface mounted as required for the installation.

.6 Surface mount above suspended ceilings, or in unfinished areas.

.7 Adjust position of outlets in finished masonry walls to suit course lines. Coordinate cutting of masonry walls to achieve neat openings for all boxes.

.8 Do not distort boxes during installation. If boxes are distorted, replace with new boxes.

.9 Use plaster rings to correct depth. Use 30 mm on concrete block.

.10 Do not use sectional boxes.

.11 Provide boxes sized as required by the Canadian Electrical Code.

.12 Install vapour barrier material to surround and seal all outlet boxes located on exterior walls of building. Maintain wall insulation.

.13 Outlets installed in party walls to be offset by a minimum of one stud space.

.14 Ceiling outlet boxes shall be provided for every surface mounted fixture or row of fixtures installed on suspended "hard" ceilings.

.15 Primary bushings in termination box for cable connection.

.16 Secondary bushings in termination box for bus duct connection.

.17 Control junction box.

.18 Stainless steel nameplate and connection diagram.

.19 Where outlet boxes penetrate throughout a fire or smoke separation, ensure that they are tightly fitted with non-combustible material to prevent passage of smoke or flame.

.20 No sectional or handy boxes to be installed.

4. Back boxes for all low voltage systems equipment to be provided in accordance with specific manufacturer’s recommendations and as specified in the low voltage sections of these specifications.

END OF SECTION

1. GENERAL

1.1 Work Included

.1 Provide a complete system of conduit and fittings for installation of wiring.

1.2 Waste Management and Disposal

.1 Refer to Section 26 05 00 11 – Electrical General Requirements.

2. PRODUCTS

2.1 E.M.T. Conduit

.1 Fittings in dry locations: Steel or zinc set screw connectors with insulated throat. Steel or zinc set screw couplings.

.2 Fittings in wet locations: steel rain tight connectors with insulated throat. Steel rain tight couplings.

.3 Minimum size to be 19 mm.

2.2 Liquid-Tight Flexible Conduit

.1 Conduit: flexible metal conduit with liquid-tight PVC jacket.

.2 Connectors: captive sealing jacket and ground cone insulated throat, steel.

.3 Minimum size to be 19 mm.

3. EXECUTION

3.1 E.M.T. Conduit

.1 Use as raceways for following applications:

.1 In surface and concealed areas or in poured concrete above ground level.

.2 It may not be used in damp locations, corrosive atmosphere, underground, outdoors, nor in areas exposed to mechanical damage.

3.2 Workmanship

.1 Install all conduit and wiring concealed, unless otherwise shown on the drawings. Do not recess conduit in columns, except as noted, without permission.

.2 Where conduit is run exposed, run parallel to building lines. Where conduits are grouped (two or more), space evenly, make bends concentric.

.3 Reuse existing concealed conduit in ceiling concrete slab as much as possible to avoid surface run conduit.

.4 Lay out conduit to avoid interference with other work. Maintain a minimum clearance of 150 mm from steam or hot water piping, vents, etc.

.5 Take extreme care in reaming ends of all conduit to ensure a smooth interior finish that will not damage the insulation of the wires.

.6 Use insulated non-metallic bushings on all conduit terminations.

.7 Ensure electrical continuity in all conduit systems.

.8 All conduits shown exposed in finished areas is to be free of unnecessary labels and trade marks.

.9 Install a 90 lb. test line in all conduits left empty by this contractor including those which others will pull cables, wires, etc.

.10 Conduits and ducts crossing building expansion joints shall have conduit expansion fittings to suit the type of conduit used, and shall be Crouse-Hinds, Sceptre, or equal quality fitting.

.11 Seal conduits with duct seal where conduits are run between heated and unheated areas. Where conduits, cables, or cable trays pierce fire separations, seal openings with Dow Corning 3-6548 sealant or approved equal.

.12 Where conduits pass through walls, they shall be grouped and installed through openings. After all conduits shown on the drawings are installed, wall openings shall be closed with material compatible with the wall construction. Review size and quantity of conduit sleeves with the Consultant.

.13 Where conduit finish is damaged, repair or replace.

.14 Where conduits pass through fire separations, seal with approved fire sealing compound.

.15 Maximum run of conduit shall not exceed 30 m. Provide pull boxes at a minimum of every 30 m.

.16 Allow no more than a maximum of two (2) 90 degree bends between pull boxes.

.17 All conduit bends shall be sweep type bends with the inside radius not less than six (6) times the diameter for conduits 50 m and smaller and ten (10) times the diameter for conduits 65 mm and larger.

4. Provide a separate ground conductor in each conduit.

END OF SECTION

1. GENERAL

1.1 Related Sections

.1	Fastenings and support:	Section 26 05 29 00.
.2	Outlet boxes, conduit boxes and fittings:	Section 26 05 32 00.
.3	Conduits, Conduit fastenings and conduit fittings:	Section 26 05 34 00.

1.2 Summary

.1 This Section covers fire alarm systems, including initiating devices, notification appliances, controls and supervisory devices and mechanical systems smoke removal.

.2 Work covered by this section includes the furnishing of labor, equipment and materials for installation of the fire alarm system as indicated in the drawings and specifications.

.3 The fire alarm system shall consist of all necessary hardware, equipment, and software programming to perform the following functions.

.1 Fire alarm and detections operations.

.2 Control and monitoring of elevators, smoke control equipment, door hold-open devices, fire suppression systems, emergency power systems, and other equipment as indicated in the drawings and specifications.

.3 The Fire Alarm/Life Safety system manufacturer shall supply a one (1) year warranty from date of verification for all control systems, field devices, and appliances.

.4 The contractor shall warranty the installed system to be free from defects of material and installation for a period of one (1) year from acceptance by the Engineer. Any deficiencies shall be immediately corrected at no additional cost to the Owner.

.5 The Fire Alarm Manufacturer's authorized service organization shall provide a separate maintenance contract for a period of one (1) year from the date of system commissioning. As part of the system's maintenance, the service company will provide printed reports which detail the sensitivity of each smoke detector in the system and the date of the report.

1.3 Not used

1.4 Not used

1.5 Product Options and Substitutions

.1 Refer to Division 01 for requirements pertaining to product options and substitutions.

1.6 Referenced Documents

.1 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems

.2 CAN/ULC-S526-02, Visual Signal Appliances for Fire Alarm Systems

.3 CAN/ULC-S528-05, Manual Pull Stations for Fire Alarm Systems

.4 CAN/ULC-S529-02, Smoke Detectors for Fire Alarm Systems

.5 CAN/ULC-S530-91, Heat Actuated Fire Detectors for Fire Alarm Systems

.6 CAN/ULC-S533-02, Egress Door Securing and Releasing Devices

.7 CAN/ULC-S537-13, Verification of Fire Alarm Systems

.8 ULC-S525-99, Audible Signal Devices for Fire Alarm Systems

.9 ULC-S527-99, Control Units for Fire Alarm Systems

.10 ULC-S553-02, Installation of Smoke Alarms

1.7 Description of System

.1 Single stage, hard wired, addressable component, class A loop, supervised, annunciated, fire alarm system consisting of the following major components:

.1 Control panel with integral annunciator
.2 Remote annunciator panels
.3 Manual fire alarm stations
.4 Thermal detectors
.5 Products-of-combustion detectors
.6 Duct detectors
.7 End-of-line resistors
.8 Audible and visual signal appliances
.9 External relay driven devices

.2 Function description (Any Alarm)

.1 Upon any alarm the zone in alarm is to be annunciated at the main control panel showing zone and description of device. The remaining zones throughout the facility are to remain in a normal state (no annunciation in these zones).
.2 The magnetic holders and locks will deactivate upon a first stage alarm in the affected zones
.3 All fans supplying the affected zone are to be shutdown.
.4 Signal to be sent to the fire alarm monitoring agency.
.5 All signals in common areas and in suites will sound at a temporal pattern.

1.8 Shop Drawings, Product Data, and Samples

.1 Provide shop drawing within 3 weeks of receipt of contract.

.2 Provide factory data sheets for the following:

.1 Annunciator panels: indicating materials, finishes, layouts, and proposed labeling.
.2 System devices: indicating typical wiring connection, installation instructions, control settings, and component limitations

.3 If requested by Owner, submit samples of following components:

.1 Products-of-combustion detector
.2 Thermal detector
.3 Manual alarm station.
.4 Graphic annunciator panel
.5 Special cables
.6 Audible and visual signaling devices

1.9 Operation and Maintenance Data

.1 Supply 1 training session of 2 hours to owner after system completion and supply operations maintenance manuals (2)
.2 As build drawings to be submitted to Stantec at completion of job.

1.10 Supplier Qualifications

.1 System supplier, that is, manufacturer or manufacturer's authorized agent, shall have an office in Alberta established for a minimum of one-year, with full in-house technical service and maintenance capabilities. Suppliers utilizing third party or subcontracted maintenance services are not acceptable.

1.11 Source of Supply

.1 Complete fire alarm system shall be supplied by a single manufacturer.

1.12 Coordination

.1 Coordinate installation of fire alarm system with:

.1 Elevators contractor.
.2 Mechanical equipment controls.
.3 Other related work.

.2 Coordinate with the above noted work as required to provide a complete, integrated, and functional system.

2. PRODUCTS

2.1 Product Manufacturers

.1 Acceptable fire alarm system manufacturers:

.1 Tyco
.2 Chubb
.3 Notifier

2.2 Control Panel

.1 Control Panel: to CAN/ULC-S527, sheet steel construction, surface mounted, hinged doors, integral remote battery compartment, and integral annunciator panel. Install in FACP room.

.2 Features:

.1 Multiplex system
.2 Software controlled
.3 Supervisory Control Wiring: Class A, with automatic device and panel addressing for addressable devices.
.4 Zoned Audio Amplifiers: as indicated in drawings conforming to applicable building and constru
.6 Audio and telephone paging master controls and external voice communication port for telephone paging connection.
.7 Trouble buzzer and "acknowledge" switch.
.8 Standby power supervision pilot LED light.
.9 All signal circuit modules shall accommodate products of combustion detectors.
.10 Auxiliary contacts for central station tie-in one set normally open.

.11 Alarm circuits zoned as indicated on drawings.
.12 Separate alarm and trouble indication for each signal zone, and initiating.
.13 Silence button for alert and alarm signals.
.14 Auxiliary relays for:

.1 Magnetic door holders
.2 Magnetic locks
.2 Elevators
.3 Mechanical equipment controls

.15 Bypass switches for:

.1 Fan shutdown

.16 Supports proprietary and local system operations.

.19 Operation of System Supervision:

.1 Fault on system or power failure condition shall cause:

.1 Trouble signal to operate.
.2 Trouble lamp to illuminate.
.3 Silence switch to de-activate trouble signal only.

.2 Trouble signal to reset automatically on system restoration.

.4 Integral dual line monitoring dialer to the ULC monitoring standards.

2.3 Remote Annunciator Panels, Generally

.1 Construction: Sheet steel, painted, flush mounted.

.2 Features:

.1 Window layout on hinged subplate.
.2 LED indicators for each suites and zones in barriered compartments.
.3 Framed painted steel glass door, lockable, totally concealed hinges and fasteners.
.4 LED test button with local transformer.
.5 Common system trouble indication with LED indicator, buzzer and acknowledge button.
.6 Number of zone windows.
.7 Lettering to suit.

2.4 Remote Passive Graphic Annunciator Panels

.1 Colour passive graphic display adjacent to the panels and remote annunciator(s) in public areas. Passive annunciator to indicate how the building is zoned and identify each device and description in the form of a legend, minimum of 6 colours mounted in a brushed aluminum frame. Minimum size 600 by 600 mm for main entrance annunciator. Minimum 300 by 600 mm for remote annunciators.

.2 LED indicator lights for each suite to indicate which suite is in alarm.

2.5 Manual Fire Alarm Stations

.1 Manual Fire Alarm Stations: to CAN/ULC-S528 and as follows.

.1 Type: intelligent analog device.
.2 Contacts: normally open.
.3 Construction: metal.
.4 Mounting: flush.
.5 Features: glass rod.
.6 Operation:

.1 First stage: manual lever.
.2 Second stage: key operated.

2.6 Thermal Detectors

.1 Thermal Detectors: to CAN/ULC-S530 and as follows.

.1 Type: intelligent analog device.
.2 Mounting: semi flush, trim ring.
.3 Contacts: rated at 3 A from 6 to 125 V AC, 1 A from 6 to 28 V DC.
.4 Auxiliary contracts for remote annunciation.
.5 Screw terminals: designed to accept No. 14 AWG conductors, separate terminal for each conductor.
.6 Operation:

.1 Projecting centre disk shall indicate when alarmed.
.2 Fixed Temperature Type: non reset shall operate at 88°C.
.3 Fixed Temperature and Rate of Rise Type:

.1 Rate of rise element: reset type.
.2 Fixed temperature element: 88°C non reset type.
.3 Rate of rise: 8°C per minute.

.4 Selection of heat detector type:

.1 Heat detectors shall be installed in areas based on manufacturer's recommendations.

2.7 Photoelectric Products-of-Combustion Duct Detectors

.1 Photoelectric Products-of-Combustion Detectors: to CAN/ULC-S529 and as follows.

.1 Features:

.1 Type: intelligent analog device
.2 Dual chamber
.3 Twist-lock plug-in base
.4 Overall tapered geometry
.5 Chamber accessible without special tools
.6 Chamber easy to clean
.7 Chamber port smoke entry 360°
.8 Chamber with anti-static protection
.9 Alarm indicator: local LED
.10 Voltage: 24 V

.12 Auxiliary contacts, SPDT rated at:

.1 2 A at 24 V DC
.2 5 A at 120 V AC

.2 Operation:

.1 Sensitivity field adjustable.
.2 Detection independent of requirement for presence of heat or smoke.
.3 Unaffected by changes in temperature, humidity, and pressure within following ranges:

.1 Temperature: 0°C to 38°C
.2 Air velocity: 0 to 1.52 m/s
.3 Humidity: 0 to 90%.

.3 Duct Detector Housing:

.1 Cast metal construction
.2 Surface mounting on duct
.3 Rigid sampling tube support

.4 Screw-on hinged access cover

.4 Sampling Tubes:

.1 12 mm metal tubing.
.2 Perforation number and size shall suit air velocity.
.3 Tube length shall suit duct size.

2.8 Photo-Electric Products-of-Combustion Detectors

.1 Photo-Electric Products-of-Combustion Detectors: to CAN/ULC S529 and as follows.

.1 Features:

.1 Twistlock plug-in base
.2 2-wire operation
.3 Supervisory lamp
.4 Alarm lamp
.5 Test button
.6 Provision for remote alarm

.2 Operation:

.1 Detect smoke obscuration of light by 1.5% within device chamber.
.2 Temperature Range: 0°C to 35°C.
.3 Voltage: 10 - 24 V DC.
.4 Supervisory current: 100 microamperes.
.5 Alarm current: 65 milliamp

2.9 Combination Thermal and Carbon Monoxide Detectors

.1 Same specifications as Thermal Detectors and as follows:

.1 Features:
.1 Carbon Monoxide detection: Includes field replaceable sensor for the detection of carbon monoxide.

2.10 Combination Photo-Electric Products-of-Combustion Detectors

.1 Same specifications Photo Electric Products of Combustion Detectors and as follows:

.1 Features:

.1 Carbon Monoxide detection: Includes field replaceable sensor for the detection of carbon monoxide.

2.11 Signal Appliances

.1 Audible signal appliances: to ULC-S525 and as follows.

.1 Voltage: 24 V DC.
.2 Mounting: flush, wall or ceiling mount.
.3 Speakers: Round housing, multi tap settings from ¼ W to 2 W, designed for use with specified amplifier. ULC rated for use in Canada. To come with appropriate back box and mounting hardware for flush mounting.
.4 Alarm Notification Appliances: Guestrooms, Suites, and Apartments: Provide audible alarm notification appliances (speakers for voice annunciation systems) in each guest room and other sleeping spaces within the guest room, guest suite, or apartment. Where the guest room or space is a suite with multiple sleeping rooms, an audible alarm notification appliance shall be provided in each sleeping room. Public Areas: Provide speakers and visual strobes. Back of House: Provide speakers and visual strobes. The only places in where horns and strobes may be used instead of, or as a supplement to a voice annunciation system are in areas with high noise where speakers may not be audible such as plant rooms, or nightclubs etc.

2.12 End-of-Line Resistor Assembly

.1 End-of-line Resistor Assembly: single gang steel plate, terminal strip on back, resistor, red enamel finish and lamicoid nametag on front identifying zone.

2.13 Signal Appliance Amplifiers

.1 Amplifiers: to ULC-S525 and as follows:

.1 Voltage: rating to match speaker installation.
.2 Mounting: surface in wiring cabinets.
.3 Separate battery back-up, power supply
.4 Boosters for speaker paging.

2.14 Relay Module

.1 Addressable relay module complete with form “C” dry relay contact rated at 0.5 amps at 120 VAC. Module to include a green polling LED and a red alarm LED.

2.15 Isolation Module

.1 Addressable line isolation module. Module is to isolate short circuits within floor areas exceeding 2,000 square meters and between floors, so that a fault wiring one floor area shall not affect another floor area. At least one isolator module shall be provided for each protected zone of the building.

2.16 Input Module

.1 Addressable input module complete with supervised Class "B" input circuit(s) to monitor non addressable contact devices. Module to include a red polling LED.

2.17 System Power Supply

.1 Power Supply: to ULC-S5275 and as follows.

.1 Rectifier and Battery Charger:

.1 Designed to automatically maintain battery bank fully charged.
.2 Sized to recharge batteries in 12 hours' minimum.
.3 Designed to operate system when batteries are disconnected.
.4 Temperature compensated.
.5 Provide battery connection supervision.

.2 Battery Bank: lead acid type or approved equivalent.
.3 Capacity: designed to operate system under supervisory load condition for 24 hours and then have sufficient power to operate system alarm devices for 20 minutes, without recharging.
.4 Mounting: integral with control panel.

2.18 Wire and Cable

.1 Remote Control and Signal Cable: as per manufacturer requirements

3. EXECUTION

3.1 Installation

.1 Install system in accordance with CAN/ULC-S524.

.2 Mount end-of-line resistors where indicated in accordance with Rule 32-008 of the Canadian Electrical Code.

.3 External AC Power Supply:

.1 Provide 120 V AC emergency supply, two circuits.
.2 Provide separate breaker(s) clearly marked "Fire Alarm System".
.3 Provide locking device on breaker(s).
.4 Provide power supply disconnect breaker location in control panel.

.4 Central Station Tie-In:

.1 Provide 19 mm conduit and 2 No. 14 conductors to telephone panel for central station tie-in.

.5 Wiring:

.1 Make conductor terminations in panel on terminal strips with separate terminal for each conductor.
.2 Neatly install wiring clamped with nylon cable straps or laced with jute cord.
.3 Number identify all strips as indicated on shop drawings.
.4 Attach wiring diagram to inside of panel door.

.6 Connect the following fire alarm system components as indicated on drawings:

.1 Manual fire alarm stations.
.2 Thermal detectors.
.3 Ionization products-of-combustion detectors.
.4 Duct detectors.
.5 Audible signal appliances.
.6 Visual signal appliances.

3.2 Testing and Verification

.1 Verify completed system in accordance with requirements of CAN/ULC-S537.

3.3 Demonstration and Instruction

.1 Provide any additional reprogramming to improve operation, from issues arising from demonstration.

3.4 Fire Alarm Verification

.1 If Stantec is used to be the fire alarm verification Engineer then the Electrical Contractor shall carry a Fire Alarm Verification fee of $3,000 for Stantec to participate and verify the system in its entirety.

.2 All other costs to be included in the fire alarm tender (e.i. Electrical Contractor, System

Supplier/programmer, Tools and Labour).

END OF SECTION