MAINWAY ARENA
Community Centre
Washroom Renovation
Contract No. CW-19-25

Spring 2019

Issued for Tender

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DIVISION 00-01 - GENERAL REQUIREMENTS

DIVISION 09 – FINISHES

DIVISION 10 – SPECIALTIES

DIVISION 22 – PLUMBING – BnZ Engineering.
(refer to Mechanical Drawings)

DIVISION 26 – ELECTRICAL – BnZ Engineering.
(refer to Electrical Drawings)

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ELECTRICAL ENGINEER

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1.1 General Requirements

1. Comply with requirements of General Conditions and Supplementary General Conditions.

2. Division 1 requirements apply to all Sections of Work.

3. In case of conflict between General Conditions and Division 1 requirements, General Conditions shall govern.

1.2 Examination

1. Examine the site and surrounding areas and be fully informed as to the conditions and limitations under which the Work has to be completed. Claims for additional costs will not be entertained with respect to conditions which could have been ascertained by an inspection prior to tender submission.

2. Make good, at no cost to the Owner, any damage to existing roadways and sidewalks, except that which was documented to have existed prior to start of construction.

3. Throughout the project, examine the work of all trades and promptly notify the Architect if any conditions do not or will not comply with the drawings and specifications.

1.3 Metric Project

1. This project is to be based on The International System of Units (SI). Measurements are expressed in metric (SI) units.

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

1.4 Protection

1. Conform to Ontario Building Code-2012, and The Construction Health and Safety Act, all as currently amended.

2. Provide spare safety helmets for and enforce their use by Owner, Architect, their representatives and any authorized visitors to site.

3. Ensure that no damage is caused to existing structures, buildings, foundations, pavement, fences, curbs, grounds, plants, property, utilities, services, and finishes during the progress of Work. Repair and make good any damage caused, at no extra cost to Owner and to the complete satisfaction of the respective property owners and

authorities having jurisdiction. Do not proceed with repairs or remedial work without written permission of the Consultant. Only trades specifically capable of performing the Work will be allowed to make remedial or repair work.

Provide temporary fences and steel posts, with chain link gates and locks, to enclose construction laydown area and other Contractor controlled areas outside the building, and pavement protection as required for protection of public, and of public and private property and as required by law and by authorities having jurisdiction Erect sturdy railings around shafts, stair wells and the like to protect workers and public from injury.

Equip foregoing protection with warning lights and signs. Alter, remove and relocate or replace hoardings, barriers, and entrances therein as required by authorities having jurisdiction and by the work.

Hazards requiring such protection shall be eliminated as soon as possible and protection devices removed. Maintain fences, gates until construction is complete. Keep free from unauthorized signs.

4. Keep surfaces to receive finished flooring dry and free from oil and grease. Stockpiling of damp or wet building materials and use of mixing boxes or water buckets without protecting floors from moisture gain by approved means, is prohibited.

5. Provide and maintain in working order, adequate, temporary Canadian Underwriters labelled, chemical solution (soda acid) Class A.1, fire extinguishers and locate in prominent positions to approval of authorities having jurisdiction.

6. Utilities and Services – before starting the work contact the Public Utilities for location of underground services.

7. Protect new work from damage with suitable protective coverings. Protect work during periods of suspension, regardless of reason for suspension.

1.5 Safety and Security

1. Be knowledgeable and comply with all pertinent safety requirements of all authorities having jurisdiction.

Work in cooperation with the safety associations operating under the authority of the Ontario Workers' Compensation Act and the

regulations of the Ontario Ministry of Labour and the Ontario Construction Safety Act.

2. Maintain security of all areas affected by work of this Contract until taken over by Owner.
Prevent entry to the Work by unauthorized persons and guard against theft, fire and damage by any cause.

3. Notify the Ontario Ministry of Labour of the intended work of this Contract and provide one copy of the Notice of Project to the Consultant. After filing Notice of Project Contractor shall become the Constructor as defined by the Ministry of Labour until Work is completed, occupancy has been granted by the Municipality *and* Contractor has demobilized fully from site.

4. When work at site has progressed as to become attractive for vandalism or theft, engage a recognized guard agency to provide security service at times when tradesmen are not present in substantial numbers. Continue service until after time of Substantial Performance.

5. Extent of security services shall be at the discretion of the Contractor. Note that the fit, finish and new appearance of the finished building will not be comprised. Materials, products, finishes, etc. damaged due to vandalism are to be restored and/or replaced to an as-new condition.

6. Take all precautions necessary to protect and safeguard workers from dangerous conditions including fumes; lead paints, etc.; asbestos; and silica hazardous to health.

7. Comply with requirements of Section 01 54 50 Safety Requirements.

1.6 Use of Site

1. Accept full responsibility for the construction site from the time of Contract award until final acceptance of the Work or occupancy by the Owner, whichever occurs the earliest.

2. Check means of access and egress, rights and interests which may be interfered with.
Do not block lanes, roadways, entrances or exits. Access to site may be limited; check with Municipality.

1.7 Services and Utility Systems

1. Consult with local utility companies and other jurisdictional authorities to determine the locations of existing services on or adjacent to site.

2. Information as to the location of existing services shown on the Drawings is not guaranteed and does not relieve the excavation subcontractor of his responsibility to determine the exact type, number and location of existing services.

3. Give proper notices for new services as may be required. Make arrangements with authorities and utilities for service connections required.

4. Pay any charges levied by utilities or authorities in connection with this Contract, unless specified otherwise.

5. Operate and maintain all utility systems affected by Work of this Contract, until the building or specific portions thereof have been accepted by the owner.

6. Report existing unknown services encountered to the Owner for instructions. Cut back and cap or plug unused services. Be responsible for the protection of all active services encountered and for repair of such services if damaged.

1.8 As-Built Drawings

1. Maintain as work progresses, accurate records of changes to the Drawings and concealed services. Accurate locations, depth, size, and type of underground utilities shall be included in these record drawings. As-built drawings will be reviewed at site meetings and must be properly maintained to receive Architect's approval before the monthly certificate draw will be approved.

2. Keep a daily record showing progress of the work and all factors affecting the work, i.e., weather, strikes, accidents, shipping delay, etc.

3. The General Contractor shall also supply as-built drawings on computer disks or USB memory stick in AutoCad 2007 and PDF by a professional drafting service, along with hard copies. Approval shall be obtained by the Architect for approval of the professional drafting service.

4. Completed as-built drawings shall be submitted prior to requesting substantial completion.

1.9 Field Office

1. Field Office: General Contractor to provide field office at site for Contractor's and Consultants' use. Provide janitor service for periodic dusting, cleaning, and removal of rubbish. Include construction and operating hardware, with security locks, as required. Locate office where directed by Owner. The temporary office is to accommodate administrative activities and site meetings, and is to be provided with light, heating and cooling equipment, ventilation, telephone, computer, email service, printer, table and chairs.

2. Storage Area: General Contractor to provide storage area at site for products and tools.
   Include construction and operating hardware, with security locks, as required. Separate storage for painter's materials and tools from other storage areas. Locate storage area where directed by Owner and provide security.

3. Location of contractor's field office and storage area may be required to be located remote from the Visitation Centre Building, within the cemetery grounds. Final location shall be approved at the sole discretion of Mount Pleasant Group.

1.10 Washroom Conveniences

1. General Contractor to provide washroom facilities as per the Construction Health and Safety Act for use of subcontractors and employees. Facilities shall be provided with a screen and contents shall be removed regularly during construction. Maintain it without offense to Owner and their customers. At completion of building, washroom facilities and contents shall be removed and the ground carefully levelled and cleared. Employees on work must avail themselves of this convenience. It shall be to the satisfaction of local Health Authority.

2. Use of permanent toilets is forbidden.

1.11 Temporary Drains

1. Excavations and building site shall be kept free from water at all times by means of trenches to sewers or pits from which it shall be pumped away and disposed from the site.

2. Conform to erosion and sedimentation control requirements of the

authorities having jurisdiction.

1.12 **Temporary Water Service**

1. The General Contractor shall provide and pay for all temporary water and connections for water used for construction operations until the building is complete and turned over to the Owner. The Contractor will pay for the supply cost from the local municipality. Water for compaction and watering of sod shall be trucked to the site and paid by for the General Contractor.

1.13 **Temporary Telephone And Internet**

1. The General Contractor shall provide and pay for a private telephone and internet connection until their work is complete.

1.14 **Temporary Electrical Service**

1. The General Contractor may utilize temporary light and power from the existing Visitation Centre Building necessary to the operations under this contract, provided this use does not impact ongoing operations of the facility. The Owner will pay for the cost of electrical power supply from the existing Visitation Centre Building only

2. Install and maintain temporary electrical systems in accordance with the Construction Safety Association's "Temporary Wiring Standards on Construction Sites" the Ontario Electrical Code and other authorities having jurisdiction.

1.15 **Temporary Heating**

1. Provide temporary heat, heating equipment, and shelter, to keep that work which requires protection from cold, adequately warm and sheltered from elements and to allow it to be done safely and well, maintaining minimum temperature of 16 degrees Celsius (60 degrees F.) when finishing is being done and when building is closed in, until completion of work. Provide heating for materials affected by cold, both in storage and during construction. Construction requiring heat shall be suitably enclosed.

2. Do not use salamanders. Use temporary heaters of forced warm air type, operated in well-ventilated location and vented to exterior, or radiant panel type. If used in areas of completed building, provide protection on floors and adjacent surfaces to prevent damage to floors and adjacent surfaces, particularly when re-fuelling.

3. Provide temporary heat for interior spaces to maintain a minimum temperature of 16 degrees Celsius (60 degrees F.) throughout the building at all times once the building is enclosed.

1.16 Temporary Use of Permanent Heating System

1. Permanent heating and ventilation system may be used for temporary heating and ventilation only if the Owner gives his approval to do so in writing, and when piping is complete, all units are connected, all pumps and valves are installed and operating properly, all strainers are installed and permanent or temporary filters are installed, and entire system has been tested and is safe operating condition, and when no further shut- down of system will be necessary for future conditions.

2. Do not use air distribution system until permanent or temporary filters are in place? Filter air distribution system to prevent dirt and dust from entering units via return air. Keep unused ducts sealed to prevent entry of air. Replace or clean filters frequently during construction to minimize entry of dirt. Clean (if cleanable) or replace filters before turning over system to Owner.

3. Put system in charge of fully trained and experienced operator at all times. Operators shall qualify as set out in Operating Engineers Act, if applicable.

4. Clean, maintain and repair heating and ventilation system as required throughout its use during construction. Notify manufacturer and Architect immediately before turning over new heating equipment to Owner so that heating items may be checked for possible damage during temporary heating period. Make good damage to heating and air distribution equipment. Replace all worn parts and turn over system to Owner in clean, new condition, operating with circulating water properly treated chemically.

5. Permission might be given by the Architect in writing only upon 100% operation completeness of the systems. Neither the Owner nor the Architect are under any obligation to grant permission to use permanent heating system during construction period.

1.17 Delivery and Storage Of Materials

1. Arrange for early deliveries necessary for execution of work

without delay and have materials on job well in advance of the time it is needed.

2. Deliver, store and handle materials to exclude foreign material and prevent damage, soiling or breakage.

3. Materials to be stored on site, which need to be protected from weather shall be so protected.

4. Packaged materials shall be delivered in packages with manufacturer's seals and all labels intact.

1.18 Ownership of Materials

1. All work or material delivered on the site or premises to form part of the works shall be considered the property of the Owner and shall not be removed without the consent of the Architect, but the Contractor shall have the right to and shall remove the surplus materials after he has completed the work. If so directed by the Architect, such surplus materials shall be removed at any time prior to the completion of the work.

2. All materials which are to be removed in the existing site and are not called for to be re- used or specifically called for in the specifications to be turned over to the Owner, shall become the property of the General Contractor and shall be removed from the site.

1.19 Details and Measurements

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

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

3. Check and verify dimensions referring to work and interfacing of services. Dimensions, when pertaining to work of other trades, shall be verified with trade concerned.

4. Do not scale directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant and await his instructions before proceeding. Be fully responsible for rectifying, altering or redoing any work resulting from disregarding this clause.

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

6. Should revised drawings be issued after work has commenced, Contractor shall immediately return to Architect previous drawings which refer to said work. The Contractor will be held responsible for work being carried out in accordance with said revised drawings.

1.20 Workmanship

1. Work shall be done in accordance with best standard practice. Only skilled mechanics shall be used where such are required to produce a first class job.

2. Use, install and handle manufactured materials, equipment and appliances in strict accordance with manufacturer's directions and instructions, unless specified otherwise.

3. Where specified requirements are in conflict with manufacturer’s written directions, follow manufacturer’s directions, but inform the Consultant in writing prior to proceeding with affected work. Where specified requirements are more stringent than manufacturer’s directions, comply with specified requirements.

1.21 Frost Protection

1. Provide proper frost protection, including heating for materials to ensure scheduling of work without delay.

2. Similar protection shall be given to work done.

3. Work or materials damaged by frost shall be replaced by Contractor.

4. Snow and ice shall not be allowed to remain on any part of structure, except finished roofs, and shall be removed by Contractor.

1.22 **Project Meetings**

1. Arrange regular meetings at two week intervals and notify the representatives of the Owner, Architect, Engineer and each subcontractor concerned with the current progress.

2 Contact all subcontractors concerned at least 24 hours in advance and request their presence at job meeting.

3. Review approved progress schedule for rapid and efficient completion of work according to Contract requirements, with suppliers of materials and

4. Post and forward copies of progress schedule for advice of interested

5. Record the minutes of each meeting and send copies to all attending and interested parties not later than two days after the meeting. In addition, send copies to the Architect, Consultants and Owner. Contractor to provide updated change order register and shop drawing register attached to each record of minutes to indicate exactly what has been issued and the status of approvals and/or distribution.

6. Keep Architect informed of progress, delays and of potential delays during all stages of work to avoid delays.

1.23 **Progress Schedule**

1. Carefully prepare and update full progress schedules of the work in conformance with
G.C.3.5 of the Supplementary General Conditions.

2. Prepare schedule immediately upon award of Contract and present copies to the Architect within a maximum of one week from Contract awarding date.

1.24 **Maintenance Manuals**

1. As soon as possible and in no event later than request for substantial completion check and assemble in three ring binders, all shop drawings, all warranties and guarantees submitted by manufacturers, suppliers and subcontractors and as called for throughout Specifications. Assemble three copies of recommended operation and maintenance procedures (such as flooring, equipment, and roofing). Present one set of binders to Architect for review and approval. Furnish a complete index in

each binder listing its contents in detail and stamp and sign the cover page of each and every manual. Also ensure that the manuals are stamped and signed on the cover page by subcontractor submitting them. Note: A $30,000.00 holdback will only be released when all documents approved by the Consultants have been turned over to the Owner.

2. When all documents have been approved by the Consultants scan or otherwise digitize all documents into PDF format and submit files to Owner on Compact Disk(s) or USB memory stick, along with two complete sets of the binders.

3. Recommended maintenance procedures shall contain warnings concerning the use of maintenance materials or practices which might injure the product covered by the recommended maintenance procedure. Should any product be injured or damaged by faulty maintenance or practices not warned against in the maintenance manual, then the Contractor shall rectify such damage or injury.

4. Complete maintenance manuals and PDF files shall be submitted prior to requesting release of Holdback.

1.25 **Sleeves, Supports and Fasteners**

1. Unless specified in other Sections, furnish, set and secure inserts, hangers, sleeves, fasteners, adhesives, anchors and other supports and fittings required for proper installation of work.

2. Use exposed metal fastenings and accessories of same texture, colour and finish as base metal on which they occur.

3. Select appropriate type of anchoring and fastening devices and in sufficient quantity and in such manner as to provide positive permanent anchorage of unit to be anchored in position. Keep exposed fasteners to a minimum, evenly spaced and neatly laid out.

4. Fasteners shall be of permanent type. Do not use wood plugs.

5. Fasteners which cause spalling or cracking of material to which anchorage is being made shall not be used.

1.26 **Concealment**

1. Conceal ductwork, piping, conduit and wiring located in finished areas, in ceiling spaces and furred construction unless specifically noted to be exposed.

2. If any doubt arises as to means of concealment, or intent of Contract Documents in this connection, request clarification from the Construction Manager before proceeding with portion of work in question.

1.27 Cutting and Patching

1. Do all cutting, patching and making good to leave in a finished condition and to make the parts of the work come together properly. Coordinate work to keep cutting and patching to a minimum.

2. Regardless of which Section of work is responsible for any portion of cutting and patching, in each case tradesmen qualified in work being cut and patched shall be employed to ensure that it is correctly done.

3. Do not endanger any work by cutting, digging or otherwise altering, and do not cut nor alter any load bearing element. Provide bracing, shoring and temporary supports as required to keep construction safely supported at all times.

4. Cut holes carefully and not larger than required after they are located by Sections requiring them, using suitable equipment and tools.

5. Patching and making good shall be done by trade specialists in material to be treated, and shall be made undetectable in finished work.

1.28 Check Floor Drains

1. Just before acceptance of building by Owner, check floor drains and see that they are clean, clear and functioning properly.

1.29 Fire Protection and Access to Equipment and Exits

1. Take necessary precautions to eliminate fire hazards and to prevent damage to work, equipment and other property both public and private having to do with the work. Inspect work of this contract at least once a week for this purpose.

2. Provide and maintain in working order suitable Underwriters' labelled fire extinguishers and locate in prominent positions, to approval of authorities.

3. When welding, brazing and performing any operation with an open flame, a portable fire extinguisher shall be kept within 10 feet (3000 mm) of the operator at all times.

4. Store and locate materials and equipment packed in cardboard cartons, wood crates and other combustible containers in orderly and accessible manner. Place approved types of firefighting equipment in vicinity of materials or equipment packed in this type of crate or carton until permanent fire protection and equipment are available.

5. Store all rags and waste containing oil, grease or other flammable materials in an approved metal container and remove from the site at the end of each working day.

6. Only fire resistant tarpaulins are permitted on site.

7. Locate temporary buildings and storage areas in relation to their hazards and probability of damage to existing buildings under construction. Unless constructed of noncombustible materials, wherever possible locate them at least 10 m away from buildings. If constructed of combustible materials separate these structures into small detached units.

8. Provide and maintain free access at all times from the street to fire hydrants and to outside connections for standpipes or other fire extinguishing equipment whether permanent or temporary. Do not place material or construction equipment within 3 m of hydrants or connection, nor between them and centre line of the street.

9. Maintain free access at all times to control valves and hose on fire lines within building and to all portable extinguishers.

10. Install fire doors and put into operating condition at the earliest possible time.

11. Provide and maintain temporary exits and means of egress where existing building exits are impacted by the construction. Temporary exits shall be in conformance with Ontario Building Code and Local Authorities having Jurisdiction.

12. Comply with requirements of 01545 Safety Requirements.

1.30 **Notes to General Contractor**

1. Ensure that the building is maintained weather tight and secure. The General Contractor shall furnish all temporary protection, enclosures, tarpaulins, etc., as may be required to weatherproof openings in the work.
2. The General Contractor shall carry out all removal and disposal of all resultant debris.

3. In case of damage to active services, notify Architect, Utilities and authorities immediately and make all required repairs under direction of appropriate utility. Carry out repairs during off hours if required. In absence of specific requirements or direction, plug or cap unused or abandoned utility lines at least 1000 mm outside of new building walls, or as required by utilities, codes and authorities.

4. Restore disturbed areas to original condition unless shown otherwise on drawings or stated in specifications.

1.31 Protective Fencing

1. The Contractor shall install and maintain temporary 1800 mm high chain link fence and gates to fence off construction access and construction areas as directed by the Architect and as required to conform to the authorities having jurisdiction. The installation of temporary fences shall be to provide the least disruption and to meet the approval of the Owner.

1.32 Construction Parking

1. Parking will be permitted on site as directed by the Owner, provided it does not disrupt the performance of Work.

1.33 Protection for Off-Site & Public Property

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

2. Be responsible for damage incurred.

1.34 Sign and Advertisements

1. Erect no signs, except those signs which are necessary to give direction or for safety or warning signs, without the Owner's permission.

2. Coordinate location of all signage with owner.

1.35 Protection Of Building Finishes & Equipment

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

2. Provide necessary screens, covers, hoardings as required.

3. Be responsible for damage incurred due to lack of or improper protection. Replace or repair finishes or equipment so damaged.

End of Section

1.1 General

.1 Thorough investigations of existing conditions through examination of the Project Site, areas which are affected by the Work, examination of documentation made available by the Owner for inspection, and requirements of authorities having jurisdiction for the Project Site and Work is the sole responsibility of the Contractor.

.2 Site Inspections may be arranged during Tender Period. To arrange a site inspection contact:

Jennifer Johnson, City of Burlington
- Facilities & Buildings
T: 905-335-7600 x 7358
E: Jennifer.johnson@burlington.ca

END OF SECTION

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Professional Engineers Ontario

Building Survey for the Presence of Asbestos-Containing Materials

Mainway Recreation Centre and Arena
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December 2010

OHE Project No.: 13216-074

Submitted by:

OHE Consultants
Occupational Hygiene & Environment
496 South Service Road
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EXECUTIVE SUMMARY

OHE Consultants (OHE) was retained by Mr. Ken Pirhonen, Coordinator, Asset Management, Corporate Strategic Initiatives, The Corporation of the City of Burlington (the client), to conduct a building survey for the presence of Asbestos-Containing Materials (ACMs) at the Mainway Recreation Centre and Arena, 4015 Mainway, Burlington, Ontario (subject location). The purpose of the survey is to provide a foundation for an Asbestos Management Program (AMP).

The site survey included the collection of forty-five (45) bulk samples of materials suspected of containing asbestos.

Asbestos was not detected in any of the forty-five (45) samples collected and analyzed.

Exterior finishes, roofing materials and fire doors were not sampled as part of the survey and are assumed to be asbestos-containing until proven otherwise through analytical testing.

As the survey was non-destructive in nature, asbestos may be present in areas not accessible for view and identification. In situations where the asbestos-containing materials extend into a non-accessible area, the materials were assumed to also be present in those areas and have been reported as such. Contractors and maintenance personnel should be warned of the possibility of undisclosed asbestos when breaking into enclosed areas. Friable and non-friable materials discovered in these areas should be treated as asbestos-containing until proven otherwise.

An Asbestos Management Program is not required for this building in accordance with the requirements of Ontario Regulation 278/05.

A copy of this report must be kept on the premises to reflect that ***asbestos-containing materials were not identified*** at the subject location.

This executive summary provides a brief overview of the survey findings. It is not intended to substitute for the complete survey report, nor does it discuss specific issues documented in the report. The executive summary should not be used as a substitute to reading the complete report.

1.0 INTRODUCTION

OHE Consultants (OHE) was retained by Mr. Ken Pirhonen, Coordinator, Asset Management, Corporate Strategic Initiatives, The Corporation of the City of Burlington (the client), to conduct a building survey for the presence of Asbestos-Containing Materials (ACMs) at the Mainway Recreation Centre and Arena, 4015 Mainway, Burlington, Ontario (subject location). The purpose of the survey is to provide a foundation for an Asbestos Management Program (AMP).

The site survey was conducted by Ryan Bayard of OHE on August 16, 2010.

The scope of work entailed:

- An inspection of accessible areas of the building to identify materials which could contain asbestos;
- Bulk sampling and analysis of representative materials suspected of containing asbestos; and
- An assessment of the condition of the asbestos-containing material with recommendations for appropriate corrective action if required.

1.1 Report Outline

The building survey is structured as follows:

- Section 2 - Background Information on Asbestos, provides a brief discussion of the properties, uses and hazards associated with asbestos exposure.
- Section 3 - Asbestos Regulations - Ontario, covers the applicable provincial regulations.
- Section 4 - Building Survey for Asbestos-Containing Materials, summarizes the building survey methodology, the bulk sample analysis methodology and the survey findings.
- Section 5 - Assessment of Asbestos-Containing Materials, covers the criteria used to

determine the condition of asbestos-containing material, the sample analysis results and the recommendations for corrective action.

- Section 6 - Discussion, covers the rationale for the methodology used in interpreting the data and the results obtained.

- Section 7 - Recommendations, summarizes the recommended course of action (if required).

2.0 BACKGROUND INFORMATION ON ASBESTOS

Asbestos is a term applied to a family of fibrous minerals divided into two geological groups, serpentines and amphiboles. These minerals are naturally occurring and are found in every mountain formation throughout the world. Only six forms of asbestos were used commercially. These are chrysotile, the only serpentine asbestos type, and amosite, crocidolite, anthophyllite, tremolite and actinolite which are amphibole asbestos forms.

There are over 3,000 separate uses of asbestos identified in existing literature. Each use is dependent upon the physical and chemical properties of a particular asbestos type. The desirable properties of asbestos fibres differ with each type of asbestos and include:

Fire retardance	Resistance to acids and alkalies	High tensile strength
Filter action	Thermal insulating qualities	Friction and wear resistance
Cohesion	Reinforcement	Filler

Asbestos is rarely found in pure form in a product and all products are divided into two broad categories based on hardness; "friable materials" and "non-friable materials or manufactured products". "Friable materials" are defined as materials that, when dry, can be crumbled, pulverized or powdered by hand pressure. This classification includes materials such as sprayed fireproofing, thermal insulation applications, acoustical texturized material and refractory or non-friable materials that have been made to become friable.

"Non-friable materials" are generally hard and do not readily release fibres. Most asbestos-containing material types are found in this category and are typically included in the following broad classes as cement products, felts, cloths, floor and roof coverings, friction products and ceiling tiles.

Asbestos fibres, when inhaled, may cause various respiratory diseases including primarily Asbestosis, Mesothelioma and Lung Cancer. All of these diseases can result in an early death. Due to this affliction, the use of asbestos has become regulated across Canada and some products are now prohibited. The location of asbestos-containing materials must be identified in report form so that work undertaken on these materials is conducted in a safe manner and debris is safely handled.

3.0 ASBESTOS REGULATIONS

Three regulations govern the control, handling, transport and disposal of asbestos in Ontario:

- Ontario Regulation 278/05 (formerly O. Reg. 838/90) The Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations (refer to Section 3.1);

- Ontario Regulation 347 (as amended) under the Environmental Protection Act (refer to Section 3.2); and

- The Regulations Respecting the Handling and Offering for Transport and Transporting of Dangerous Goods (refer to Section 3.3).

A copy of Regulation 278/05 is provided in Appendix D.

3.1 Ontario Regulation 278/05

Ontario Regulation 278/05 applies to buildings with regards to maintenance, renovations or demolition work where asbestos-containing materials are or may be disturbed.

The major requirements of the asbestos management program for the building owner include:

- Preparation and maintenance of a record of the location of asbestos-containing materials in the building;

- Notification of the building's tenants of the location of such material;

- Establishment of a training program for those employees of the owner who may work in close proximity to and disturb the material;

- Periodic inspection of the material to determine its condition;

- Remedial action on material that has deteriorated following the precautions and procedures prescribed by the regulation as Type 1, Type 2 and Type 3; and

- Removal of asbestos-containing materials to the extent practicable prior to demolition of a building or part thereof.

The regulation prescribes work to be conducted according to three procedure types. The procedure to be followed depends on the type of material and the regulation provides instruction on how the work must be performed.

The following is a summary of the three types of classification of asbestos work:

Classification of Asbestos Work in Ontario

The following are Type 1 operations:

1. Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area less than 7.5 square metres and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
2. Installing or removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
3. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,
    i. the material is wetted to control the spread of dust or fibres, and
    ii. the work is done only by means of non-powered hand-held tools.
4. Removing less than one square metre of drywall in which joint-filling compounds that are asbestos-containing material have been used.

The following are Type 2 operations:

1. Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.
2. The removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship.
3. Enclosing friable asbestos-containing material.
4. Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.
5. Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area of 7.5 square metres or more and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
6. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,
    i. the material is not wetted to control the spread of dust or fibres, and
    ii. the work is done only by means of non-powered hand-held tools.
7. Removing one square metre or more of drywall in which joint filling compounds that are asbestos-containing material have been used.
8. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
9. Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.
10. Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.
11. An operation that;
    i. is not mentioned in any of paragraphs 1 to 10,
    ii. may expose a worker to asbestos, and
    iii. is not classified as a Type 1 or Type 3 operation.

The following are Type 3 operations:

1. The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship,

locomotive, railway car or vehicle or any machinery or equipment.

2. The spray application of a sealant to friable asbestos-containing material.
3. Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.
4. Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are asbestos-containing materials.
5. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
6. Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1986.

3.2 Ontario Regulation 347

Ontario Regulation 347 (as amended) applies to the transport of asbestos waste from the location of generation to a landfill site. The regulation also prescribes procedures on how the asbestos waste is to be buried at the landfill site.

The major requirements to the building owner are to ensure that:

- The waste is appropriately packaged and labelled;
- The transport vehicle is appropriately placarded;
- The asbestos waste is transported on the same day as received by the landfill site; and
- The route of travel is the most direct.

The building owners are held responsible for their asbestos waste as prescribed in the regulation until it is accepted by the waste disposal site.

3.3 Transportation of Dangerous Goods Regulations

These regulations govern the packaging mode of transport labelling, placarding and documentation of asbestos waste while in transport. The labelling requirements differ from Ontario Regulation 347.

The major requirement to the building owner is to ensure the waste meets the packaging requirements and that a bill of lading accompanies the shipment.

4.0 BUILDING SURVEY FOR ASBESTOS-CONTAINING MATERIALS

This section of the report summarizes the building survey methodology, the bulk sample analysis methodology and the location of asbestos-containing materials in the building.

4.1 Survey Methodology

The survey consisted of an extensive examination of all accessible areas of the building to identify materials which could contain asbestos. The materials suspected of containing asbestos were assessed based on the surveyors' knowledge regarding the historical use of asbestos in building materials, through published data and through previous experiences. Accessible is defined as an area above a suspended ceiling tile, within an access hatch or behind a closed door, not impeded by any structure, article or thing. An area enclosed by cement block, plaster, solid lumber, etc., where minor demolition is required to gain entry is considered non-accessible. The walkthrough survey was augmented with layout drawings where available.

OHE's approach to the work followed accepted industry procedures, as well as our own in-house protocols as well as our own in-house protocols. The examination of materials was largely performed visually with some occasion where physical contact was necessary to assess the condition or examine for underlying layers. No destructive examinations were performed as part of this survey.

Bulk samples were collected for subsequent analysis during the building survey. A small volume of material (approximately one teaspoon full) was removed either from a damaged section of suspect material or cut out of intact material and then repaired by sealing with an appropriate surfacing compound, tape, paint or plaster to prevent fibre release. The collected samples were placed in plastic bags and sealed until they were opened by an independent laboratory. Section 4.2 provides a brief description of the methods employed by the laboratory for the identification of asbestos.

4.2 Bulk Sample Analysis Methodology

The bulk samples of suspect asbestos-containing materials were analyzed in accordance with a US EPA method for the determination of asbestos content in bulk materials, EPA Method 600/R-93/116. The EPA Method requires that the samples be analyzed using the Polarized Light Microscopy (PLM) technique. The percentage of asbestos in the sample is measured as perceived by the analyst in comparison to standard area projections and is greatly influenced by the analyst's experience. The method is useful for the qualitative identification of asbestos (type) and the semi-quantitative (% estimates) determination of asbestos content in bulk samples.

The asbestos bulk samples were analyzed by EMSL Analytical Incorporated, an independent and NVLAP accredited laboratory. To ensure quality results, the independent laboratory chosen must successfully participate in an "Asbestos Proficiency Analytical Testing Program" and as such, this laboratory is responsible for their findings.

4.3 Site Description

The subject location is a two-storey arena and recreational centre consisting primarily of two ice surfaces with associated office / administration, mechanical and electrical facilities. The site covers an area of approximately 79,437 ft^2 and was reported by the client to have been constructed in 1986. A breakdown of the facility is as follows:

1) Ice Surfaces
2) Dressing Rooms
3) First Aid Room
4) Ice Machine Room
5) Office / Administration
6) Storage
7) Mechanical / Electrical Room / Sprinkler Rooms
8) Concessions
9) Auditorium
10) Classroom / Meeting Rooms
11) Environmental Services Closets

12) Washrooms

13) Press Boxes

4.4 Survey Findings

Locations where the samples were collected are shown on Drawings 1.1 and 1.2 presented in Appendix A. A summary of the bulk sample analysis results are presented in Table A presented in Appendix B. The laboratory analysis report is presented in Appendix C. Selected photographs taken during the survey are presented in Appendix E.

Asbestos was not detected in any of the forty-five (45) samples collected and analyzed. It should be noted that O. Reg. 278/05 s.3 sets out the minimum number of bulk material samples to be collected from an area of homogeneous material.

No samples were taken of glass fibre applications as this material can be positively identified visually and does not contain asbestos.

The following is a brief discussion of the suspect asbestos-containing materials identified and sampled.

4.4.1 Sprayed Fireproofing Material

Sprayed fireproofing material was not observed at the subject location.

4.4.2 Mechanical Systems Insulation

Mechanical Systems Insulation (MSI), other fiberglass applications, was not observed at the subject location.

4.4.3 Suspended Ceiling Tiles

Various styles of Suspended Ceiling Tiles (SCTs) were observed throughout the subject location.

A total of three (3) sample sets, consisting of nine (9) samples (OHE samples 13216-074-3A, 13216-074-3B, 13216-074-3C, 13216-074-4A, 13216-074-4B, 13216-074-4C, 13216-074-10A, 13216-074-10B and 13216-074-10C) of SCTs observed at the subject location were collected as part of the survey. Asbestos was not detected in any of the nine (9) samples collected and analyzed.

4.4.4 Texture Coat Material

Texture coat material was not observed at the subject location.

4.4.5 Plaster

Plaster was not observed at the subject location.

4.4.6 Drywall Joint Compound

Drywall Joint Compound (DJC) was observed on walls and ceilings throughout the subject location.

A total of one (1) sample set, consisting of six (6) samples (OHE samples 13216-074-6A, 13216-074-6B, 13216-074-6C, 13216-074-6D, 13216-074-6E and 13216-074-6F) of DJC observed at the subject location was collected as part of the survey. Asbestos was not detected in any of the six (6) samples collected and analyzed.

In cases of demolition and/or renovation, all DJC shall be assumed asbestos-containing until proven otherwise by bulk sampling and analysis.

4.4.7 Vinyl Floor Tiles and Vinyl Sheet Flooring

Various styles of Vinyl Floor Tiles (VFTs) were observed throughout the subject location.

A total of six (6) sample sets, consisting of eighteen (18) samples (OHE samples 13216-074-1A, 13216-074-1B, 13216-074-1C, 13216-074-2A, 13216-074-2B, 13216-074-2C, 13216-074-7A, 13216-074-7B, 13216-074-7C, 13216-074-8A, 13216-074-8B, 13216-074-8C, 13216-074-11A, 13216-074-11B, 13216-074-11C, 13216-074-13A, 13216-074-13B and 13216-074-13C) of VFTs

observed at the subject location were collected as part of the survey. Asbestos was not detected in any of the eighteen (18) samples collected and analyzed.

Vinyl Sheet Flooring (VSF) was not observed at the subject location.

In cases of demolition and/or renovation, all VFTs, VSF and underlying mastics other than the materials sampled and, including VFTs, VSF and mastics which may be concealed beneath carpeting, shall be assumed asbestos-containing until proven otherwise by bulk sampling and analysis.

4.4.8 Asbestos Cement Products

Asbestos cement products were not observed at the subject location.

4.4.1 Exterior Finishes

No samples of the exterior finishes and associated materials and equipment were collected during the survey to avoid damaging the finishes and associated materials and equipment. Any such materials and equipment shall be considered asbestos-containing until proven otherwise by bulk sampling and analysis.

4.4.9 Roofing Tar and Felts

Historically, asbestos is known to be present in roofing felts and tar material. Before conducting any roof related work, we recommend that a detailed sampling program of the roof felts and tar be carried out to determine if the felts and tar contain asbestos.

No samples of the roofing materials and associated materials and equipment were collected during the survey in order to avoid damaging roofing membranes and associated materials and equipment. Any such materials and equipment shall be assumed asbestos-containing until bulk sampling and analysis proves otherwise.

4.4.10 Other ACMs

Black Mastic

Black mastic, used as an adhesive for VFTs was observed on the floor of the 1st floor workshop at the subject location.

A total of one (1) sample set, consisting of three (3) samples (OHE samples 13216-074-5A, 13216-074-5B and 13216-074-5C) of black mastic observed at the subject location was collected as part of the survey. Asbestos was not detected in any of the three (3) samples collected and analyzed.

Beige Caulking

Beige caulking, used as a sealant, was observed on the wall of the 1st floor environmental services closet at the subject location.

A total of one (1) sample set, consisting of three (3) samples (OHE samples 13216-074-9A, 13216-074-9B and 13216-074-9C) of beige caulking observed at the subject location was collected as part of the survey. Asbestos was not detected in any of the three (3) samples collected and analyzed.

Brown Mastic

Brown mastic, used as a sealant, was observed on the joints of ducts throughout the subject location.

A total of one (1) sample set, consisting of three (3) samples (OHE samples 13216-074-12A, 13216-074-12B and 13216-074-12C) of brown mastic observed at the subject location was collected as part of the survey. Asbestos was not detected in any of the three (3) samples collected and analyzed.

Grey Caulking

Grey caulking, used as a sealant, was observed around the exterior window frames of the subject location.

A total of one (1) sample set, consisting of three (3) samples (OHE samples 13216-074-14A, 13216-

074-14B and 13216-074-14C of grey caulking observed at the subject location was collected as part of the survey. Asbestos was not detected in any of the three (3) samples collected and analyzed.

Flexible Duct Joint Material

Flexible joint material was observed on the heating, ventilation and air-conditioning systems and associated components throughout the subject location. Samples of this material were not collected in order to avoid damaging the seals around the air-handling equipment. All flexible duct joint material in all parts of the subject location should be treated as asbestos-containing until proven otherwise by Material Safety Data Sheet review or by bulk sampling and analysis.

5.0 ASSESSMENT OF ASBESTOS-CONTAINING MATERIALS

This section covers the assessment of the condition of asbestos-containing materials including the criteria used, the assessment results and the recommendations for corrective actions.

5.1 Assessment of Asbestos-Containing Materials Methodology

The assessment of asbestos-containing materials involves the evaluation of a number of factors by the surveyor including:

- Asbestos content
- Condition of the material
- Accessibility
- Water damage
- Activity and vibration
- Presence in air plenum/direct air stream

Where asbestos-containing material is found to be in good condition, firmly bound and not likely to deteriorate or fall, the recommended procedure is to evaluate the condition of the material on a periodic basis (which should be at least once a year unless specified more frequently) in order to detect gradual deterioration. This process is referred to as an "Operation and Maintenance Program".

Damaged material is identified by surface crumbling, blistering, water stains, gouges, marring or being otherwise abraded. The accumulation of powder dust or debris similar in appearance to the suspect material can be used as confirmatory evidence.

In situations where the asbestos-containing materials are found to have deteriorated or likely to fall,

the following are the four abatement options that may be specified in this report:

1. **Cleaning**. The cleaning of asbestos-containing debris may be performed using a High Efficiency Particulate Air (HEPA) filter vacuum cleaner or by damp wiping techniques. All fallen asbestos material must be cleaned upon discovery. In situations where the material will continue to fall due to deterioration, damage or abrasion, additional corrective work is required, i.e., the material must be repaired, permanently enclosed or removed.

2. **Repairs**. This option is usually selected in situations where damage to the asbestos-containing material is of a minor nature and is not likely to reoccur due to accessibility or activity. This method of repair is chosen in situations where performing the repair activities will not cause significant disturbance to the underlying material. Typical repairs include the repair of thermal insulation by the application of mastic (paint adhesive) to lagging (canvas cloth). The repair of sprayed fireproofing or acoustical texturized material can involve the application of an encapsulant to limited areas of abraded or damaged material. If this option is followed, the sprayed material must be capable of supporting the additional weight of the encapsulant.

3. **Enclosure**. An enclosure consists of the construction of a physical barrier, typically constructed from drywall or metal sheeting. This option is applicable in situations where the removal of materials with asbestos is not practicable, is of a high financial cost, or where damage is likely to occur without a protective barrier. Where the installation of the barrier is likely to disturb the asbestos-containing materials, the work must be performed in isolation from the building's normal environment.

4. **Removal**. This option is recommended in situations where the asbestos-containing material is damaged beyond repair and the material is highly likely to be damaged due to nearby activities, by renovation or during demolition. The precautions employed may vary depending on the volume of the material to be removed and whether the material is friable or not. Typical programs can include the use of glove bags for limited amounts of thermal pipe insulation or minor amounts of fireproofing may be removed within a small polyethylene lined enclosure. For larger amounts of asbestos, more stringent protocols are used and consist of attached shower facilities, the establishment of a negative pressure differential, a

filtration system for the air and monitoring for exposure to asbestos fibres.

5.2 Assessment Results and Recommendations

Asbestos-containing materials were not identified at the subject location, therefore, no corrective actions are required.

6.0 DISCUSSION

No asbestos-containing materials have been identified at the subject location. As such, an asbestos management program is not required.

This report presumes that materials from a common construction time and addition that have a high degree of similarity (i.e. in appearance, colour and texture) have a similar asbestos content. This presumption is based on normal construction practice.

Asbestos is assumed to be present in roofing felts, tar, exterior finishes and associated materials and equipment and flexible duct joint material. Samples of these materials were not collected to avoid leaks and damage to surface finishes or were excluded from the scope of work provided by The Corporation of the City of Burlington prior to the start of the survey for asbestos.

Exterior finishes, roofing materials and fire doors were not sampled as part of the survey and are assumed to be asbestos-containing until proven otherwise through analytical testing.

As the survey was non-destructive in nature, asbestos may be present in areas not accessible for view and identification. In situations where the asbestos-containing materials extend into a non-accessible area, the materials were assumed to also be present in those areas and have been reported as such. Contractors and maintenance personnel should be warned of the possibility of undisclosed asbestos when breaking into enclosed areas. Friable and non-friable materials discovered in these areas should be treated as asbestos-containing until proven otherwise.

7.0 RECOMENDATIONS

An Asbestos Management Program is not required for this building in accordance with the requirements of Ontario Regulation 278/05.

A copy of this report must be kept on the premises to reflect that ***asbestos-containing materials were not identified*** at the subject location.

8.0 LIMITATIONS OF THE SURVEY

In the performance of the Asbestos Survey, OHE has exercised a degree of thoroughness and competence that is consistent with the profession. OHE believes the information presented in this report to be factual at the time of the assessment survey for the building sections that were accessible to the surveyor.

Due to the nature of building construction, especially in a building that has been renovated and developed extensively, some limitations exist as to the identification of pockets of asbestos-containing materials. Professional judgment has been exercised in gathering and analyzing the information obtained. We cannot warrant or guarantee that the conclusions we reach are absolutely complete or accurate however, we commit ourselves to care and competence in reaching those conclusions.

The information provided by this report is intended for the sole use of The Corporation of the City of Burlington. OHE reserves the right to review and comment on any interpretation of the data or conclusions derived by The Corporation of the City of Burlington. No other warranty or representation, either expressed or implied, is included in this report.

Dated December 2010

OHE Consultants
Occupational Hygiene & Environment

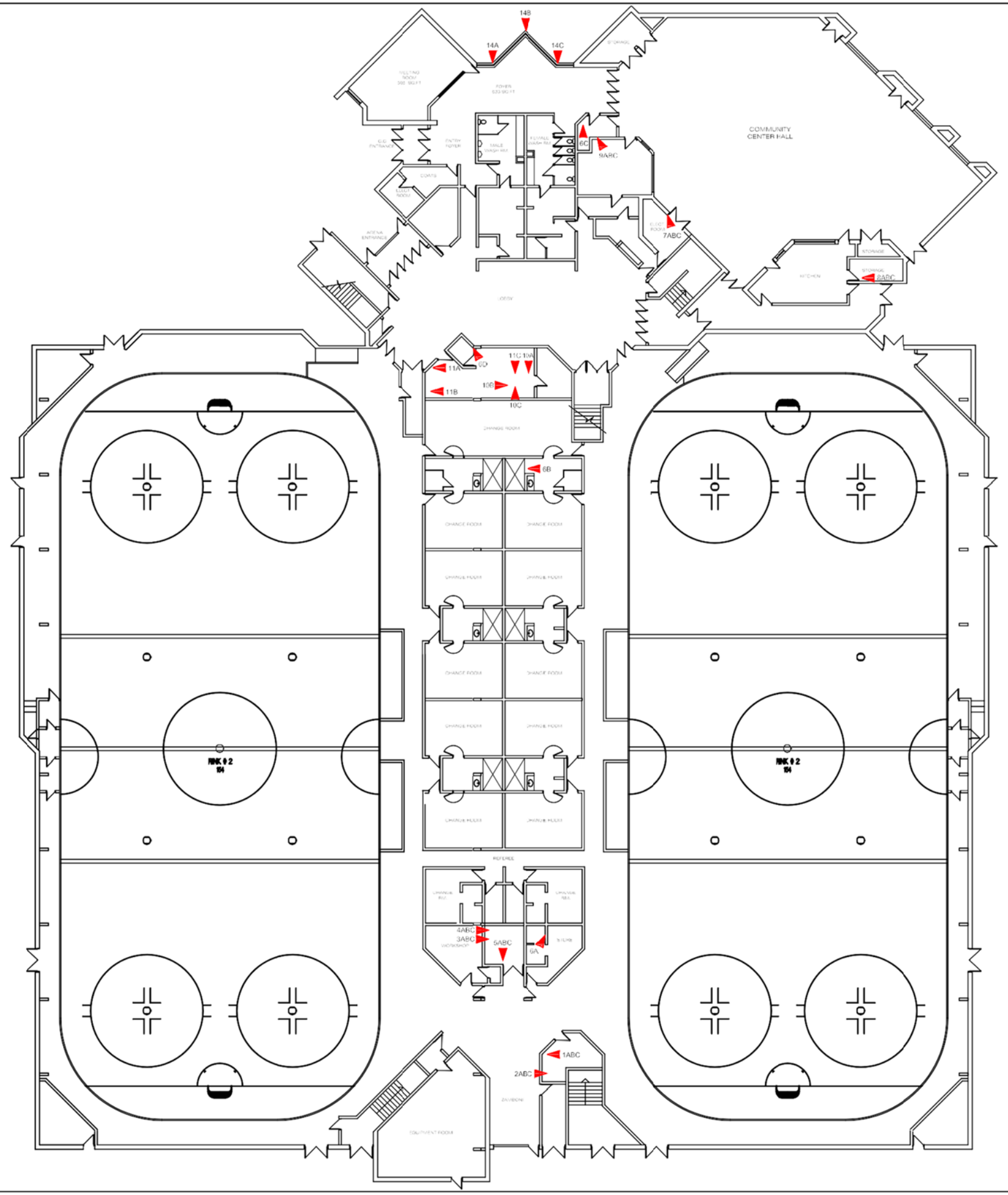
Original Signed By:

Prepared by:
Ryan Bayard, B.E.S.
Project Consultant

Original Signed By:

Reviewed by:
Fred Atrash, M.H.Sc., ROH, CIH
Director/Senior Consultant

Drawings



LEGEND

XX Bulk Sample Location

Notes: Locations of site features are approximate and may vary from that shown

Client:
The Corporation of the
City of Burlington
426 Brant St.
P.O. Box 5013
Burlington, ON

Project Location:
Mainway Recreation
Centre-Arena
First Floor
4015 Mainway
Burlington, ON

Drawing Showing
Bulk Sample Locations

Reviewed By	FA
Drawn By	CS
Project N°	13216-074
Date	Dec 2010
Scale	NTS
DWG N°	1.1

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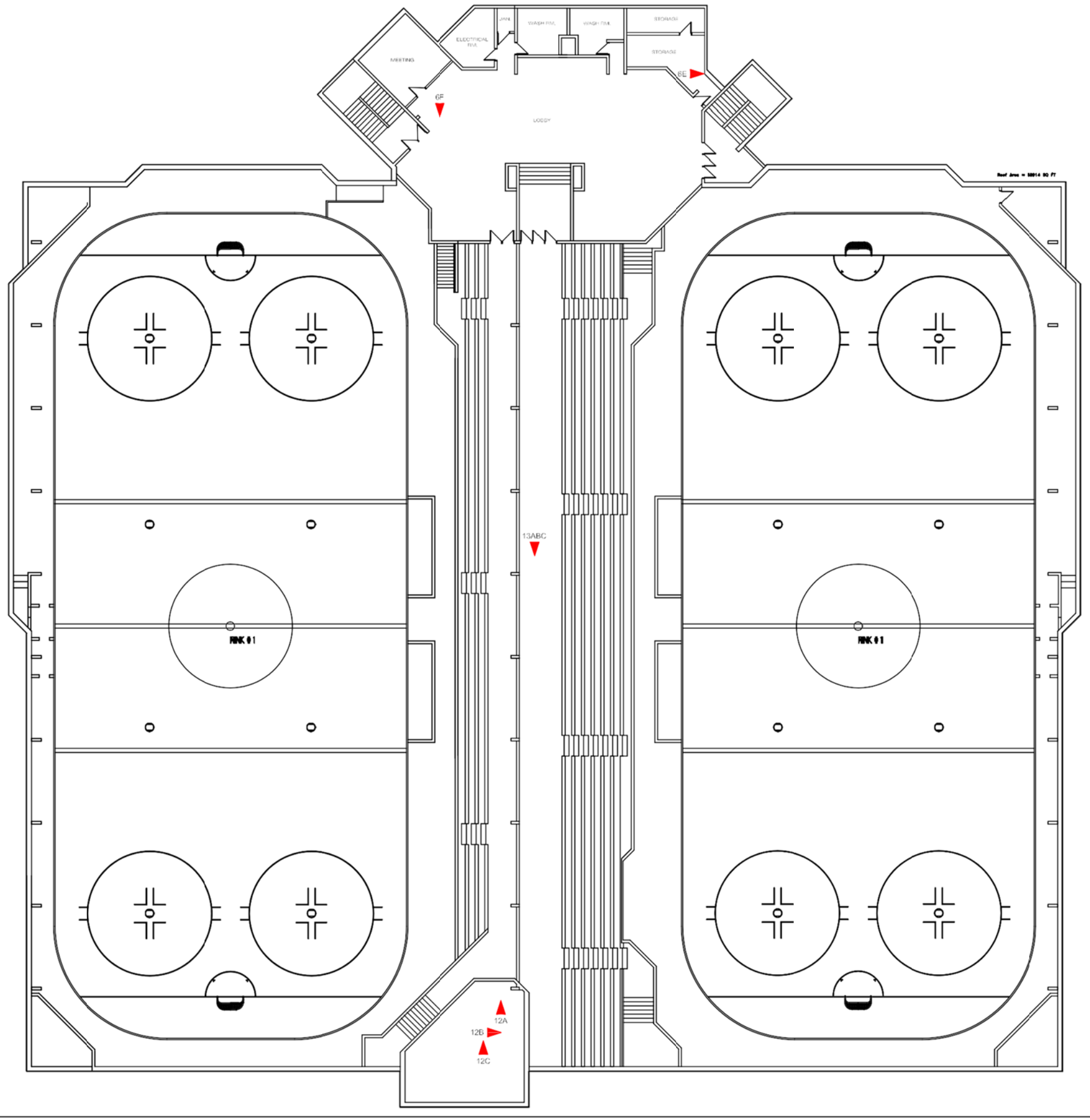
Occupational Hygiene & Environment



LEGEND

XX Bulk Sample Location

Notes: Locations of site features are approximate and may vary from that shown

Client:
The Corporation of the
City of Burlington
426 Brant St.
P.O. Box 5013
Burlington, ON

Project Location:
Mainway Recreation
Centre-Arena
Second Floor
4015 Mainway
Burlington, ON

Drawing Showing
Bulk Sample Locations

Reviewed By: FA	N
Drawn By: CS	
Project N°: 13216-074	
Date: Dec 2010	DWG N°: 1.2
Scale: NTS	

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Occupational Hygiene & Environment

Results of Analysis of Bulk Samples for the Presence of Asbestos

Table A
Summary of Analysis of Bulk Samples
by Polarized Light Microscopy (PLM) with Dispersion Staining

Project No.: 13216-074

Collected August 16, 2010

Bulk Sample Number	Sample Description	Sample Location	Percent and Type of Asbestos
13216-074-1A	Vinyl floor tile – 12”x12” beige with brown and white splatter	Floor of the 1st floor break room	None Detected
13216-074-1B	Vinyl floor tile – 12”x12” beige with brown and white splatter	Floor of the 1st floor break room	None Detected
13216-074-1C	Vinyl floor tile – 12”x12” beige with brown and white splatter	Floor of the 1st floor break room	None Detected
13216-074-2A	Vinyl floor tile – 12”x12” white with beige and grey splatter	Floor of the 1st floor break room	None Detected
13216-074-2B	Vinyl floor tile – 12”x12” white with beige and grey splatter	Floor of the 1st floor break room	None Detected
13216-074-2C	Vinyl floor tile – 12”x12” white with beige and grey splatter	Floor of the 1st floor break room	None Detected
13216-074-3A	Suspended ceiling tile – 2’x2’ beige with pinholes and long / large fissures	Ceiling of the work shop	None Detected
13216-074-3B	Suspended ceiling tile – 2’x2’ beige with pinholes and long / large fissures	Ceiling of the work shop	None Detected
13216-074-3C	Suspended ceiling tile – 2’x2’ beige with pinholes and long / large fissures	Ceiling of the work shop	None Detected
13216-074-4A	Suspended ceiling tile – 2’x2’ with pinholes and small fissures	Ceiling of the work shop	None Detected
13216-074-4B	Suspended ceiling tile – 2’x2’ with pinholes and small fissures	Ceiling of the work shop	None Detected
13216-074-4C	Suspended ceiling tile – 2’x2’ with pinholes and small fissures	Ceiling of the work shop	None Detected
13216-074-5A	Black mastic	Floor of the work shop	None Detected
13216-074-5B	Black mastic	Floor of the work shop	None Detected
13216-074-5C	Black mastic	Floor of the work shop	None Detected
13216-074-6A	Drywall joint compound	Ceiling of locker room	None Detected
13216-074-6B	Drywall joint compound	Ceiling of dressing room	None Detected
13216-074-6C	Drywall joint compound	Ceiling of the 1st floor janitors closet	None Detected
13216-074-6D	Drywall joint compound	Wall of the office area	None Detected
13216-074-6E	Drywall joint compound	Ceiling of the 2nd floor concession	None Detected
13216-074-6F	Drywall joint compound	Wall of 2nd floor foyer	None Detected
13216-074-7A	Vinyl floor tile – 12”x12” light green, dark green and white	Floor of the electrical room	None Detected
13216-074-7B	Vinyl floor tile – 12”x12” light green, dark green and white	Floor of the electrical room	None Detected
13216-074-7C	Vinyl floor tile – 12”x12” light green, dark green and white	Floor of the electrical room	None Detected
13216-074-8A	Vinyl floor tile – 12”x12” beige, brown and white	Floor of the 1st floor concession area	None Detected
13216-074-8B	Vinyl floor tile – 12”x12” beige, brown and white	Floor of the 1st floor concession area	None Detected
13216-074-8C	Vinyl floor tile – 12”x12” beige, brown and white	Floor of the 1st floor concession area	None Detected

Table A (Continued)
Summary of Analysis of Bulk Samples
by Polarized Light Microscopy (PLM) with Dispersion Staining

Project No.: 13216-074

Collected August 16, 2010

Bulk Sample Number	Sample Description	Sample Location	Percent and Type of Asbestos
13216-074-9A	Beige caulking	Wall of the 1st floor janitors closet	None Detected
13216-074-9B	Beige caulking	Wall of the 1st floor janitors closet	None Detected
13216-074-9C	Beige caulking	Wall of the 1st floor janitors closet	None Detected
13216-074-10A	Suspended ceiling tile – 2'x2' with pinholes and very small fissures	Ceiling of the office area	None Detected
13216-074-10B	Suspended ceiling tile – 2'x2' with pinholes and very small fissures	Ceiling of the office area	None Detected
13216-074-10C	Suspended ceiling tile – 2'x2' with pinholes and very small fissures	Ceiling of the office area	None Detected
13216-074-11A	Vinyl floor tile – 18" x18" beige – marble pattern	Floor of the office area	None Detected
13216-074-11B	Vinyl floor tile – 18" x18" beige – marble pattern	Floor of the office area	None Detected
13216-074-11C	Vinyl floor tile – 18" x18" beige – marble pattern	Floor of the office area	None Detected
13216-074-12A	Brown mastic	Duct joint in 2nd floor electrical room	None Detected
13216-074-12B	Brown mastic	Duct joint in 2nd floor electrical room	None Detected
13216-074-12C	Brown mastic	Duct joint in 2nd floor electrical room	None Detected
13216-074-13A	Vinyl floor tile - 12"x12" black	Floor of press box	None Detected
13216-074-13B	Vinyl floor tile - 12"x12" black	Floor of press box	None Detected
13216-074-13C	Vinyl floor tile - 12"x12" black	Floor of press box	None Detected
13216-074-14A	Grey caulking	Exterior window frame	None Detected
13216-074-14B	Grey caulking	Exterior window frame	None Detected
13216-074-14C	Grey caulking	Exterior window frame	None Detected

Laboratory Analysis Report

EMSL Analytical, Inc.
490 Rowley Road, Depew, NY 14043
Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **Fred Atrash**
OHE Consultants
496 South Service Road
Mississauga, Ontario, CN L5G 2S5

Fax: (905) 278-0090 Phone: (905) 278-7000
Project: **13216-074**

Customer ID: OHEI93
Customer PO:
Received: 09/08/10 10:00 AM
EMSL Order: 141004947

EMSL Proj:
Analysis Date: 9/21/2010

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**	**% Type**
13216-074-1A *141004947-0001*	floor of the 1st fl break room	Gray Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-1B *141004947-0002*	floor of the 1st fl break room	Gray Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-1C *141004947-0003*	floor of the 1st fl break room	Gray Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-2A *141004947-0004*	floor of the 1st fl break room	White Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-2B *141004947-0005*	floor of the 1st fl break room	White Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-2C *141004947-0006*	floor of the 1st fl break room	White Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-3A *141004947-0007*	ceiling of the work shop	Gray Fibrous Homogeneous	40% 40%	Cellulose Min. Wool	20% Non-fibrous (other)	**None Detected**

Initial report from 09/21/2010 11:51:19

Analyst(s)

Tom Hanes (45)

Rhonda McGee, Laboratory Manager
or other approved signatory

EMSL Analytical, Inc.
490 Rowley Road, Depew, NY 14043
Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **Fred Atrash**
OHE Consultants
496 South Service Road
Mississauga, Ontario, CN L5G 2S5

Fax: (905) 278-0090 Phone: (905) 278-7000
Project: **13216-074**

Customer ID: OHEI93
Customer PO:
Received: 09/08/10 10:00 AM
EMSL Order: 141004947

EMSL Proj:
Analysis Date: 9/21/2010

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**% Non-Fibrous**	**% Type**
13216-074-3B *141004947-0008*	ceiling of the work shop	Gray Fibrous Homogeneous	40% 40%	Cellulose Min. Wool	20% Non-fibrous (other)	**None Detected**
13216-074-3C *141004947-0009*	ceiling of the work shop	Gray Fibrous Homogeneous	40% 40%	Cellulose Min. Wool	20% Non-fibrous (other)	**None Detected**
13216-074-4A *141004947-0010*	ceiling of the work shop	Gray Fibrous Homogeneous	30% 50%	Cellulose Min. Wool	20% Non-fibrous (other)	**None Detected**
13216-074-4B *141004947-0011*	ceiling of the work shop	Gray Fibrous Homogeneous	30% 50%	Cellulose Min. Wool	20% Non-fibrous (other)	**None Detected**
13216-074-4C *141004947-0012*	ceiling of the work shop	Gray Fibrous Homogeneous	30% 50%	Cellulose Min. Wool	20% Non-fibrous (other)	**None Detected**
13216-074-5A *141004947-0013*	floor of the work shop	Black Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-5B *141004947-0014*	floor of the work shop	Black Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**

Initial report from 09/21/2010 11:51:19

Analyst(s)

Tom Hanes (45)

Rhonda McGee

Rhonda McGee, Laboratory Manager
or other approved signatory

EMSL Analytical, Inc.
490 Rowley Road, Depew, NY 14043
Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **Fred Atrash**
OHE Consultants
496 South Service Road
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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
13216-074-5C *141004947-0015*	floor of the work shop	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-6A *141004947-0016*	ceiling of the locker room	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-6B *141004947-0017*	ceiling of the dressing room	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-6C *141004947-0018*	ceiling of the 1st fl janitors closet	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-6D *141004947-0019*	wall of the office area	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-6E *141004947-0020*	ceiling of the 2nd fl concession	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-6F *141004947-0021*	wall of 2nd fl foyer	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
13216-074-7A *141004947-0022*	floor of the electrical room	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-7B *141004947-0023*	floor of the electrical room	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-7C *141004947-0024*	floor of the electrical room	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-8A *141004947-0025*	floor of the 1st fl concession area	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-8B *141004947-0026*	floor of the 1st fl concession area	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-8C *141004947-0027*	floor of the 1st fl concession area	Tan Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-9A *141004947-0028*	wall fo the 1st fl janitors closet	Cream Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**%**	**Fibrous**	**% Non-Fibrous**	**% Type**
13216-074-9B *141004947-0029*	wall fo the 1st fl janitors closet	Cream Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-9C *141004947-0030*	wall fo the 1st fl janitors closet	Cream Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-10A *141004947-0031*	ceiling of the office area	Gray Fibrous Homogeneous	40% 30%	Cellulose Min. Wool	30% Non-fibrous (other)	**None Detected**
13216-074-10B *141004947-0032*	ceiling of the office area	Gray Fibrous Homogeneous	40% 30%	Cellulose Min. Wool	30% Non-fibrous (other)	**None Detected**
13216-074-10C *141004947-0033*	ceiling of the office area	Gray Fibrous Homogeneous	40% 30%	Cellulose Min. Wool	30% Non-fibrous (other)	**None Detected**
13216-074-11A *141004947-0034*	floor of the office area	Beige Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**
13216-074-11B *141004947-0035*	floor of the office area	Beige Non-Fibrous Homogeneous			100% Non-fibrous (other)	**None Detected**

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
13216-074-11C *141004947-0036*	floor of the office area	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-12A *141004947-0037*	duct joint in 2nd fl electrical room	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-12B *141004947-0038*	duct joint in 2nd fl electrical room	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-12C *141004947-0039*	duct joint in 2nd fl electrical room	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-13A *141004947-0040*	floor of press box	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-13B *141004947-0041*	floor of press box	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-13C *141004947-0042*	floor of press box	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
13216-074-14A *141004947-0043*	exterior window frame	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-14B *141004947-0044*	exterior window frame	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**
13216-074-14C *141004947-0045*	exterior window frame	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	**None Detected**

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THIS IS THE LAST PAGE OF THE REPORT.

Copy of Ontario Regulation 278/05

Occupational Health and Safety Act
Loi sur la santé et la sécurité au travail

ONTARIO REGULATION 278/05

No Amendments

DESIGNATED SUBSTANCE — ASBESTOS ON CONSTRUCTION PROJECTS AND IN BUILDINGS AND REPAIR OPERATIONS

This Regulation is made in English only.

CONTENTS

Definitions

1. (1) In this Regulation,

"asbestos" means any of the fibrous silicates listed in subsection (2);

"asbestos-containing material" means material that contains 0.5 per cent or more asbestos by dry weight;

"building" means any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel;

"competent worker", in relation to specific work, means a worker who,

(a) is qualified because of knowledge, training and experience to perform the work,

(b) is familiar with the Act and with the provisions of the regulations that apply to the work, and

(c) has knowledge of all potential or actual danger to health or safety in the work;

"demolition" includes dismantling and breaking up;

"examine", when used with reference to material, means to carry out procedures in accordance with section 3 to establish its asbestos content and to establish the type of asbestos, and "examination" has a corresponding meaning;

"friable material" means material that,

(a) when dry, can be crumbled, pulverized or powdered by hand pressure, or

(b) is crumbled, pulverized or powdered;

"HEPA filter" means a high efficiency particulate aerosol filter that is at least 99.97 per cent efficient in collecting a 0.3 micrometre aerosol;

"homogeneous material" means material that is uniform in colour and texture;

"joint health and safety committee" means,

(a) a joint health and safety committee established under section 9 of the Act,

(b) a similar committee described in subsection 9 (4) of the Act, or

(c) the workers or their representatives who participate in an arrangement, program or system described in subsection 9 (4) of the Act;

"occupier" has the same meaning as in the *Occupiers' Liability Act*;

"Type 1 operation" means an operation described in subsection 12 (2);

"Type 2 operation" means an operation described in subsection 12 (3);

"Type 3 operation" means an operation described in subsection 12 (4). O. Reg. 278/05, s. 1 (1).

(2) The fibrous silicates referred to in the definition of "asbestos" in subsection (1) are:

1. Actinolite.
2. Amosite.
3. Anthophyllite.
4. Chrysotile.
5. Crocidolite.
6. Tremolite. O. Reg. 278/05, s. 1 (2).

Application

2. (1) This Regulation applies to,

(a) every project, its owner, and every constructor, employer and worker engaged in or on the project;

(b) the repair, alteration or maintenance of a building, the owner of the building, and every employer and worker engaged in the repair, alteration or maintenance;

(c) every building in which material that may be asbestos-containing material has been used, and the owner of the building;

(d) the demolition of machinery, equipment, aircraft, ships, locomotives, railway cars and vehicles, and every employer and worker engaged in the demolition; and

(e) subject to subsection (3),

(i) work described in subsection (2) in which asbestos-containing material is likely to be handled, dealt with, disturbed or removed, and

(ii) every employer and worker engaged in the work. O. Reg. 278/05, s. 2 (1).

(2) Clause (1) (e) applies to,

(a) the repair, alteration or maintenance of machinery, equipment, aircraft, ships, locomotives, railway cars and vehicles; and

(b) work on a building that is necessarily incidental to the repair, alteration or maintenance of machinery or equipment. O. Reg. 278/05, s. 2 (2).

(3) This Regulation does not apply to an employer to whom Regulation 837 of the Revised Regulations of Ontario, 1990 (Designated Substance — Asbestos) applies in respect of those workers employed by the employer and engaged in the activities described in clause (1) (e) if the employer has on or before December 16, 1985 put into effect and maintained measures and procedures

to control the exposure of workers to asbestos and has incorporated the same in an asbestos control program in accordance with Regulation 837 of the Revised Regulations of Ontario, 1990. O. Reg. 278/05, s. 2 (3).

(4) This Regulation does not apply to an owner of a private residence occupied by the owner or the owner's family or to an owner of a residential building that contains not more than four dwelling units, one of which is occupied by the registered owner or family of the registered owner. O. Reg. 278/05, s. 2 (4).

Adoption of standard

3. (1) For the purposes of this Regulation, the method and procedures for establishing whether material is asbestos-containing material and for establishing its asbestos content and the type of asbestos shall be in accordance with the following standard:

1. U.S. Environmental Protection Agency. Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993. O. Reg. 278/05, s. 3 (1).

(2) The procedures required by subsection (1) shall be carried out on bulk material samples that are randomly collected by a competent worker and are representative of each area of homogeneous material. O. Reg. 278/05, s. 3 (2).

(3) The minimum number of bulk material samples to be collected from an area of homogeneous material is set out in Table 1. O. Reg. 278/05, s. 3 (3).

(4) If analysis establishes that a bulk material sample contains 0.5 per cent or more asbestos by dry weight,

(a) it is not necessary to analyze other bulk material samples taken from the same area of homogeneous material; and

(b) the entire area of homogeneous material from which the bulk material sample was taken is deemed to be asbestos-containing material. O. Reg. 278/05, s. 3 (4).

Restrictions re sprayed material, insulation, sealants

4. (1) No person shall apply or install or cause to be applied or installed, by spraying, material containing 0.1 per cent or more asbestos by dry weight that can become friable. O. Reg. 278/05, s. 4 (1).

(2) No person shall apply or install or cause to be applied or installed, as thermal insulation, material containing 0.1 per cent or more asbestos by dry weight that can become friable. O. Reg. 278/05, s. 4 (2).

(3) A liquid sealant shall not be applied to friable asbestos-containing material if,

(a) the material has visibly deteriorated; or

(b) the material's strength and its adhesion to the underlying materials and surfaces are insufficient to support its weight and the weight of the sealant. O. Reg. 278/05, s. 4 (3).

Information for workers

5. (1) This section applies whenever a worker is to do work that,

(a) involves material that,

(i) is asbestos-containing material,

(ii) is being treated as if it were asbestos-containing material,

(iii) is the subject of advice under section 9 or a notice under subsection 10 (8); or

(b) is to be carried on in close proximity to material described in clause (a) and may disturb it. O. Reg. 278/05, s. 5 (1).

(2) The constructor or employer shall advise the worker and provide him or her with the following information:

1. The location of all material described in clause (1) (a).
2. For each location, whether the material is friable or non-friable.
3. In the case of sprayed-on friable material, for each location,

i. if the material is known to be asbestos-containing material, the type of asbestos, if known, or

ii. in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 5 (2).

Demolition

6. (1) The demolition of all or part of machinery, equipment, a building, aircraft, locomotive, railway car, vehicle or ship shall be carried out or continued only when any asbestos-containing material that may be disturbed during the work has been removed to the extent practicable. O. Reg. 278/05, s. 6 (1).

(2) Subsection (1) does not apply so as to prevent work necessary to gain access to the asbestos-containing material that is to be removed, if the workers doing the work are protected from the hazard. O. Reg. 278/05, s. 6 (2).

Ongoing asbestos management in buildings, two-year transitional period

7. (1) This section does not apply on or after November 1, 2007. O. Reg. 278/05, s. 7 (1).

(2) Subsection (3) applies if,

(a) the owner of a building treats friable material that has been used in the building for any purpose related to it, including insulation and fireproofing, as if it were asbestos-containing material;

(b) the owner of a building has been advised under section 9 of the discovery of friable material that may be asbestos-containing material;

(c) the owner of a building knows or ought reasonably to know that friable asbestos-containing material has been used in a building for any purpose related to the building, including insulation, and fireproofing;

(d) an examination under subsection (8) or section 10 establishes, or would have established if carried out as required, that friable asbestos-containing material has been used in a building for any purpose related to the building, including insulation and fireproofing; or

(e) a constructor or employer notifies the owner of a building, in accordance with subsection 10 (8), of the discovery of friable material that may be asbestos-containing material and that was not referred to in a report prepared under subsection 10 (4). O. Reg. 278/05, s. 7 (2).

(3) If this subsection applies, the owner shall,

(a) prepare and keep on the premises a record containing the information set out in subsection (4);

(b) give any other person who is an occupier of the building written notice of any information in the record that relates to the area occupied by the person;

(c) give any employer with whom the owner arranges or contracts for work that is not described in clause 10 (1) (a) written notice of the information in the record, if the work,

(i) may involve material mentioned in the record, or

(ii) may be carried on in close proximity to such material and may disturb it;

(d) advise the workers employed by the owner who work in the building of the information in the record, if the workers may do work that,

(i) involves material mentioned in the record, or

(ii) is to be carried on in close proximity to such material and may disturb it;

(e) establish and maintain, for the training and instruction of every worker employed by the owner who works in the building and may do work described in clause (d), a program dealing with,

(i) the hazards of asbestos exposure,

(ii) the use, care and disposal of protective equipment and clothing to be used and worn when doing the work,

(iii) personal hygiene to be observed when doing the work, and

(iv) the measures and procedures prescribed by this Regulation; and

(f) inspect the material mentioned in the record at reasonable intervals in order to determine its condition. O. Reg. 278/05, s. 7(3).

(4) The record shall contain the following information:

1. The location of all material described in clauses (2) (a), (b), (c), (d) and (e).

2. In the case of sprayed-on material, for each location,

i. if the material is known to be asbestos-containing material, the type of asbestos, if known, or

ii. in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 7 (4).

(5) The owner shall update the record described in clause (3) (a),

(a) at least once in each 12-month period; and

(b) whenever the owner becomes aware of new information relating to the matters the record deals with. O. Reg. 278/05, s. 7 (5).

(6) If updating under subsection (5) results in any change to the record, clauses (3) (b), (c) and (d) apply with necessary modifications. O. Reg. 278/05, s. 7 (6).

(7) An occupier who receives a notice under clause (3) (b) is responsible for performing the duties set out in clauses (3) (d) and (e) with respect to the occupier's own workers. O. Reg. 278/05, s. 7 (7).

(8) If it is readily apparent that friable material used in a building as fireproofing or acoustical or thermal insulation has fallen and is being disturbed so that exposure to the material is likely to occur,

(a) the owner shall cause the material to be examined to establish whether it is asbestos-containing material; and

(b) until it has been established whether the material is asbestos-containing material, no further work involving the material shall be done. O. Reg. 278/05, s. 7 (8).

(9) Subsection (8) does not apply if the work is carried out in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 7 (9).

(10) If the examination mentioned in subsection (8) establishes that the material is asbestos-containing material, or if the material is treated as though it were asbestos-containing material as described in subsection (9),

(a) the owner shall cause the fallen material to be cleaned up and removed; and

(b) if it is readily apparent that material will continue to fall because of the deterioration of the fireproofing or insulation, the owner shall repair, seal, remove or permanently enclose the fireproofing or insulation. O. Reg. 278/05, s. 7 (10).

(11) Subsection (10) does not apply if the fallen material is confined to an area that is,

(a) above a closed false ceiling; and

(b) not part of a return air plenum. O. Reg. 278/05, s. 7 (11).

Ongoing asbestos management in buildings after transitional period

8. (1) This section applies on and after November 1, 2007. O. Reg. 278/05, s. 8 (1).

(2) Subsection (3) applies if,

(a) the owner of a building treats material that has been used in the building for any purpose related to it, including insulation, fireproofing and ceiling tiles, as if it were asbestos-containing material;

(b) the owner of a building has been advised under section 9 of the discovery of material that may be asbestos-containing material;

(c) the owner of a building knows or ought reasonably to know that asbestos-containing material has been used in a building for any purpose related to the building, including insulation, fireproofing and ceiling tiles;

(d) an examination under subsection (8) or section 10 establishes, or would have established if carried out as required, that asbestos-containing material has been used in a building for any purpose related to the building, including insulation, fireproofing and ceiling tiles; or

(e) a constructor or employer advises the owner of a building, in accordance with subsection 10 (8), of the discovery of material that may be asbestos-containing material and that was not referred to in a report prepared under subsection 10 (4). O. Reg. 278/05, s. 8 (2).

(3) If this subsection applies, the owner shall,

(a) prepare and keep on the premises a record containing the information set out in subsection (4);

(b) give any other person who is an occupier of the building written notice of any information in the record that relates to the area occupied by the person;

(c) give any employer with whom the owner arranges or contracts for work that is not described in clause 10 (1) (a) written notice of the information in the record, if the work,

(i) may involve material mentioned in the record, or

(ii) may be carried on in close proximity to such material and may disturb it;

(d) advise the workers employed by the owner who work in the building of the information in the record, if the workers may do work that,

(i) involves material mentioned in the record, or

(ii) is to be carried on in close proximity to such material and may disturb it;

(e) establish and maintain, for the training and instruction of every worker employed by the owner who works in the building and may do work described in clause (d), a program dealing with,

(i) the hazards of asbestos exposure,

(ii) the use, care and disposal of protective equipment and clothing to be used and worn when doing the work,

(iii) personal hygiene to be observed when doing the work, and

(iv) the measures and procedures prescribed by this Regulation; and

(f) inspect the material mentioned in the record at reasonable intervals in order to determine its condition. O. Reg. 278/05, s. 8(3).

(4) The record shall contain the following information:

1. The location of all material described in clauses (2) (a), (b), (c), (d) and (e).

2. For each location, whether the material is friable or non-friable.

3. In the case of friable sprayed-on material, for each location,

i. if the material is known to be asbestos-containing material, the type of asbestos, if known, or

ii. in any other case, a statement that the material will be treated as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 8 (4).

(5) The owner shall update the record described in clause (3) (a),

(a) at least once in each 12-month period; and

(b) whenever the owner becomes aware of new information relating to the matters the record deals with. O. Reg. 278/05, s. 8 (5).

(6) If updating under subsection (5) results in any change to the record, clauses (3) (b), (c) and (d) apply with necessary modifications. O. Reg. 278/05, s. 8 (6).

(7) An occupier who receives a notice under clause (3) (b) is responsible for performing the duties set out in clauses (3) (d) and (e) with respect to the occupier's own workers. O. Reg. 278/05, s. 8 (7).

(8) If it is readily apparent that friable material used in a building as fireproofing or acoustical or thermal insulation has fallen and is being disturbed so that exposure to the material is likely to occur,

(a) the owner shall cause the material to be examined to establish whether it is asbestos-containing material; and

(b) until it has been established whether the material is asbestos-containing material, no further work involving the material shall be done. O. Reg. 278/05, s. 8 (8).

(9) Subsection (8) does not apply if the work is carried out in accordance with this Regulation as though the material were asbestos-containing material and, in the case of friable sprayed-on material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 8 (9).

(10) If the examination mentioned in subsection (8) establishes that the material is asbestos-containing material, or if the material is treated as though it were asbestos-containing material as described in subsection (9),

(a) the owner shall cause the fallen material to be cleaned up and removed; and

(b) if it is readily apparent that material will continue to fall because of the deterioration of the fireproofing or insulation, the owner shall repair, seal, remove or permanently enclose the fireproofing or insulation. O. Reg. 278/05, s. 8 (10).

(11) Subsection (10) does not apply if the fallen material is confined to an area that is,

(a) above a closed false ceiling; and

(b) not part of a return air plenum. O. Reg. 278/05, s. 8 (11).

Responsibility of employer other than owner

9. An employer whose workers work in a building of which the employer is not the owner shall advise the owner if the workers discover material that may be asbestos-containing material in the building. O. Reg. 278/05, s. 9.

Owner's responsibilities before requesting tender or arranging work

10. (1) An owner shall comply with subsections (2), (3), (4), (5) and (6) before,

(a) requesting tenders for the demolition, alteration or repair of all or part of machinery, equipment, or a building, aircraft, locomotive, railway car, vehicle or ship; or

(b) arranging or contracting for any work described in clause (a), if no tenders are requested. O. Reg. 278/05, s. 10 (1).

(2) Unless clause (3) (a) or (b) applies, the owner shall have an examination carried out in accordance with section 3 to establish whether any material that is likely to be handled, dealt with, disturbed or removed, whether friable or non-friable, is asbestos-containing material. O. Reg. 278/05, s. 10 (2).

(3) An examination under subsection (2) is not required if,

(a) the owner,

(i) already knows that the material is not asbestos-containing material, or

(ii) already knows that the material is asbestos-containing material and, in the case of sprayed-on friable material, knows the type of asbestos; or

(b) the work is being arranged or contracted for in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 10 (3).

(4) Whether an examination is required under subsection (2) or not, the owner shall have a report prepared,

(a) stating whether,

(i) the material is or is not asbestos-containing material, or

(ii) the work is to be performed in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than chrysotile;

(b) describing the condition of the material and stating whether it is friable or non-friable; and

(c) containing drawings, plans and specifications, as appropriate, to show the location of the material identified under clause (a). O. Reg. 278/05, s. 10 (4).

(5) An owner shall give any prospective constructor a copy of the complete report prepared under subsection (4). O. Reg. 278/05, s. 10 (5).

(6) Subsection (5) applies, with necessary modifications, with respect to,

(a) a constructor and a prospective contractor; and

(b) a contractor and a prospective subcontractor. O. Reg. 278/05, s. 10 (6).

(7) Subsections (8), (9) and (10) apply if, during work described in clause (1) (a), material is discovered that,

(a) was not referred to in the report prepared under subsection (4); and

(b) may be asbestos-containing material. O. Reg. 278/05, s. 10 (7).

(8) The constructor or employer shall immediately notify, orally and in writing,

(a) an inspector at the office of the Ministry of Labour nearest the workplace;

(b) the owner;

(c) the contractor; and

(d) the joint health and safety committee or the health and safety representative, if any, for the workplace. O. Reg. 278/05, s. 10 (8).

(9) The written notice referred to in subsection (8) shall include the information referred to in clauses 11 (3) (a) to (f). O. Reg. 278/05, s. 10 (9).

(10) No work that is likely to involve handling, dealing with, disturbing or removing the material referred to in subsection (7) shall be done unless,

(a) it has been determined under section 3 whether the material is asbestos-containing material; or

(b) the work is performed in accordance with this Regulation as though the material were asbestos-containing material and, in the case of sprayed-on friable material, as though it contained a type of asbestos other than chrysotile. O. Reg. 278/05, s. 10 (10).

(11) Subsection (10) does not prohibit handling, dealing with, disturbing or removing material for the sole purpose of determining whether it is asbestos-containing material. O. Reg. 278/05, s. 10 (11).

Advance notice re Type 3 operations and certain Type 2 operations

11. (1) Before commencing a Type 3 operation, the constructor, in the case of a project, and the employer, in any other case, shall notify, orally and in writing, an inspector at the office of the Ministry of Labour nearest the workplace of the operation. O. Reg. 278/05, s. 11 (1).

(2) Subsection (1) also applies with respect to a Type 2 operation described in paragraph 9 of subsection 12 (3) in which one square metre or more of insulation is to be removed. O. Reg. 278/05, s. 11 (2).

(3) The written notice required by subsection (1) shall set out,

(a) the name and address of the person giving the notice;

(b) the name and address of the owner of the place where the work will be carried out;

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

(d) a description of the work that will be carried out;

(e) the starting date and expected duration of the work; and

(f) the name and address of the supervisor in charge of the work. O. Reg. 278/05, s. 11 (3).

Type 1, Type 2 and Type 3 operations

12. (1) For the purposes of this Regulation, operations that may expose a worker to asbestos are classified as Type 1, Type 2 and Type 3 operations. O. Reg. 278/05, s. 12 (1).

(2) The following are Type 1 operations:

1. Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area less than 7.5 square metres and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.

2. Installing or removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.

3. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,

i. the material is wetted to control the spread of dust or fibres, and

ii. the work is done only by means of non-powered hand-held tools.

4. Removing less than one square metre of drywall in which joint-filling compounds that are asbestos-containing material have been used. O. Reg. 278/05, s. 12 (2).

(3) The following are Type 2 operations:

1. Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.

2. The removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship.

3. Enclosing friable asbestos-containing material.

4. Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.

5. Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area of 7.5 square metres or more and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.

6. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,

i. the material is not wetted to control the spread of dust or fibres, and

ii. the work is done only by means of non-powered hand-held tools.

7. Removing one square metre or more of drywall in which joint filling compounds that are asbestos-containing material have been used.

8. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.

9. Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.

10. Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.

11. An operation that,

i. is not mentioned in any of paragraphs 1 to 10,

ii. may expose a worker to asbestos, and

iii. is not classified as a Type 1 or Type 3 operation. O. Reg. 278/05, s. 12 (3).

(4) The following are Type 3 operations:

1. The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship, locomotive, railway car or vehicle or any machinery or equipment.

2. The spray application of a sealant to friable asbestos-containing material.

3. Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.

4. Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are asbestos-containing materials.

5. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.

6. Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1986. O. Reg. 278/05, s. 12 (4).

(5) Work on ceiling tiles, drywall or friable asbestos-containing material is classified according to the total area on which work is done consecutively in a room or enclosed area, even if the work is divided into smaller jobs. O. Reg. 278/05, s. 12 (5).

(6) The following provisions apply if a dispute arises as to the classification of an operation under this section:

1. A party to the dispute may notify an inspector at the office of the Ministry of Labour nearest the workplace of the dispute.

2. The party who notifies the inspector shall promptly inform the other parties that the inspector has been notified.

3. Work on the operation shall cease until the inspector has given a decision under paragraph 4.

4. The inspector shall, as soon as possible, investigate the matter and give the parties a decision in writing. O. Reg. 278/05, s. 12 (6).

(7) Nothing in subsection (6) affects an inspector's power to issue an order for a contravention of this Regulation. O. Reg. 278/05, s. 12 (7).

Respirators

13. (1) A respirator provided by an employer and used by a worker in a Type 1, Type 2 or Type 3 operation,

(a) shall be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet;

(b) shall be assigned to a worker for his or her exclusive use, if practicable;

(c) shall be used and maintained in accordance with written procedures that are established by the employer and are consistent with the manufacturer's specifications;

(d) shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker;

(e) shall have damaged or deteriorated parts replaced prior to being used by a worker; and

(f) when not in use, shall be stored in a convenient, clean and sanitary location. O. Reg. 278/05, s. 13 (1).

(2) The following additional requirements apply to a respirator of the supplied air type:

1. The compressed air used for breathing shall meet the standards set out in Table 1 of CSA Standard Z180.1-00, Compressed Breathing Air and Systems (March, 2000).

2. If an oil-lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor equipped with an alarm shall be provided.

3. If an ambient breathing air system is used, the air intake shall be located in accordance with Appendix B of the standard referred to in paragraph 1. O. Reg. 278/05, s. 13 (2).

(3) If respirators are used in the workplace,

(a) the employer shall establish written procedures regarding the selection, use and care of respirators; and

(b) a copy of the procedures shall be provided to and reviewed with each worker who is required to wear a respirator. O. Reg. 278/05, s. 13 (3).

(4) A worker shall not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator. O. Reg. 278/05, s. 13 (4).

Measures and procedures, Type 1 operations

14. The following measures and procedures apply to Type 1 operations:

1. Before beginning work, visible dust shall be removed with a damp cloth or a vacuum equipped with a HEPA filter from any surface in the work area, including the thing to be worked on, if the dust on that surface is likely to be disturbed.

2. The spread of dust from the work area shall be controlled by measures appropriate to the work to be done including the use of drop sheets of polyethylene or other suitable material that is impervious to asbestos.

3. In the case of an operation mentioned in paragraph 4 of subsection 12 (2), the material shall be wetted before and kept wet during the work to control the spread of dust or fibres, unless wetting would create a hazard or cause damage.

4. A wetting agent shall be added to water that is to be used to control the spread of dust and fibres.

5. Frequently and at regular intervals during the doing of the work and immediately on completion of the work,

i. dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a container as described in paragraph 5 of section 15, and

ii. drop sheets shall be wetted and placed in a container as described in paragraph 5 of section 15, as soon as practicable after subparagraph i has been complied with.

6. Drop sheets shall not be reused.

7. After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a container as described in paragraph 5 of section 15 as soon as practicable after paragraph 5 of this section has been complied with.

8. After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping, as soon as practicable after paragraphs 5 and 7 have been complied with.

9. Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.

10. Compressed air shall not be used to clean up and remove dust from any surface.

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

12. If a worker requests that the employer provide a respirator to be used by the worker, the employer shall provide the worker with a NIOSH approved respirator in accordance with Table 2, and the worker shall wear and use the respirator.

13. If a worker requests that the employer provide protective clothing to be used by the worker, the employer shall provide the worker with protective clothing as described in paragraph 12 of section 15, and the worker shall wear the protective clothing.

14. A worker who is provided with protective clothing shall, before leaving the work area,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15.

15. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area. O. Reg. 278/05, s. 14.

Measures and procedures, Type 2 and Type 3 operations

15. The following measures and procedures apply to Type 2 operations and to Type 3 operations:

1. The work area shall be identified by clearly visible signs warning of an asbestos dust hazard.

2. Signs required by paragraph 1 shall be posted in sufficient numbers to warn of the hazard and shall state in large clearly visible letters that,

i. there is an asbestos dust hazard, and

ii. access to the work area is restricted to persons wearing protective clothing and equipment.

3. A wetting agent shall be added to water that is to be used to control the spread of dust and fibres.

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

5. Containers for dust and waste shall be,

i. dust tight,

ii. suitable for the type of waste,

iii. impervious to asbestos,

iv. identified as asbestos waste,

v. cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before being removed from the work area, and

vi. removed from the workplace frequently and at regular intervals.

6. Frequently and at regular intervals during the doing of the work and immediately on completion of the work,

i. dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a container as described in paragraph 5, and

ii. drop sheets shall be wetted and placed in a container as described in paragraph 5, as soon as practicable after subparagraph i has been complied with.

7. Drop sheets shall not be reused.

8. After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a container as described in paragraph 5 as soon as practicable after paragraph 6 has been complied with.

9. After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping, as soon as practicable after paragraphs 6 and 8 have been complied with.

10. Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.

11. The employer shall provide every worker who will enter the work area with a NIOSH approved respirator in accordance with Table 2 and the worker shall wear and use the respirator.

12. Protective clothing shall be provided by the employer and worn by every worker who enters the work area, and the protective clothing,

i. shall be made of a material that does not readily retain nor permit penetration of asbestos fibres,

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

iii. shall include suitable footwear, and

iv. shall be repaired or replaced if torn.

13. Compressed air shall not be used to clean up and remove dust from any surface.

14. Only persons wearing protective clothing and equipment shall enter a work area where there is an asbestos dust hazard. O. Reg. 278/05, s. 15.

Additional measures and procedures, Type 2 operations

16. In addition to the measures and procedures prescribed by section 15, the following measures and procedures apply to Type 2 operations:

1. If the operation is one mentioned in paragraph 1 of subsection 12 (3), the friable material that is likely to be disturbed shall be cleaned up and removed by using a vacuum equipped with a HEPA filter when access to the work area is obtained.

2. Before commencing work that is likely to disturb friable asbestos-containing material that is crumbled, pulverized or powdered and that is lying on any surface, the friable material shall be cleaned up and removed by damp wiping or by using a vacuum equipped with a HEPA filter.

3. Friable asbestos-containing material that is not crumbled, pulverized or powdered and that may be disturbed or removed during the work shall be thoroughly wetted before the work and kept wet during the work, unless wetting would create a hazard or cause damage.

4. Subject to paragraph 5, the spread of dust from a work area shall be controlled by measures appropriate to the work to be done, including the use of drop sheets of polyethylene or other suitable material that is impervious to asbestos.

5. If the operation is one mentioned in paragraph 1 or 2 of subsection 12 (3) and is carried on indoors, the spread of dust from the work area shall be prevented, if practicable, by,

i. using an enclosure of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls,

ii. disabling the mechanical ventilation system serving the work area, and

iii. sealing the ventilation ducts to and from the work area.

6. Before leaving the work area, a worker shall,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, and

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15.

7. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area. O. Reg. 278/05, s. 16.

Additional measures and procedures, glove bag operations

17. In addition to the measures and procedures prescribed by sections 15 and 16, the following measures and procedures apply to Type 2 operations referred to in paragraph 9 of subsection 12 (3):

1. The work area shall be separated from the rest of the workplace by walls, barricades, fencing or other suitable means.

2. The spread of asbestos-containing material from the work area shall be prevented by disabling the mechanical ventilation system serving the work area and sealing all openings or voids, including ventilation ducts to and from the working area.

3. Surfaces below the work area shall be covered with drop sheets of polyethylene or other suitable material that is impervious to asbestos.

4. The glove bag shall be made of material that is impervious to asbestos and sufficiently strong to support the weight of material the bag will hold.

5. The glove bag shall be equipped with,

i. sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period,

ii. valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure,

iii. a tool pouch with a drain,

iv. a seamless bottom and a means of sealing off the lower portion of the bag, and

v. a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

6. A glove bag shall not be used to remove insulation from a pipe, duct or similar structure if,

i. it may not be possible to maintain a proper seal for any reason including, without limitation,

A. the condition of the insulation, or

B. the temperature of the pipe, duct or similar structure, or

ii. the bag could become damaged for any reason including, without limitation,

A. the type of jacketing, or

B. the temperature of the pipe, duct or similar structure.

7. Immediately before the glove bag is attached, the insulation jacketing or coating shall be inspected for damage or defects, and if any damage or defect is present, it shall be repaired.

8. The glove bag shall be inspected for damage or defects,

i. immediately before it is attached to the pipe, duct or other similar structure, and

ii. at regular intervals during its use.

9. If damage or defects are observed when the glove bag is inspected under subparagraph 8 i, the glove bag shall not be used and shall be disposed of.

10. If damage or defects are observed when the glove bag is inspected under subparagraph 8 ii or at any other time,

i. the use of the glove bag shall be discontinued,

ii. the inner surface of the glove bag and the contents, if any, shall be thoroughly wetted,

iii. the glove bag and the contents, if any, shall be removed and placed in a container as described in paragraph 5 of section 15, and

iv. the work area shall be cleaned by vacuuming with a vacuum equipped with a HEPA filter before removal work is resumed.

11. When the removal work is completed,

i. the inner surface of the glove bag and the waste inside shall be thoroughly wetted and the air inside the bag shall be removed through an elasticized valve, by means of a vacuum equipped with a HEPA filter,

ii. the pipe, duct or similar structure shall be wiped down and sealed with a suitable encapsulant,

iii. the glove bag, with the waste inside, shall be placed in a container as described in paragraph 5 of section 15, and

iv. the work area shall be cleaned by damp wiping or by cleaning with a vacuum equipped with a HEPA filter. O. Reg. 278/05, s. 17.

Additional measures and procedures, Type 3 operations

18. (1) In addition to the measures and procedures prescribed by section 15, the following measures and procedures apply to Type 3 operations:

1. The work area shall be separated from the rest of the workplace by walls, the placing of barricades or fencing or other suitable means.

2. Subsection (2) applies to an operation mentioned in paragraph 5 of subsection 12 (4).

3. Subsection (3) applies to an operation mentioned in paragraph 1, 2, 3 or 4 of subsection 12 (4) that is carried on outdoors.

4. Subsection (4) applies to an operation mentioned in paragraph 1, 2, 3, 4 or 6 of subsection 12 (4) that is carried on indoors. O. Reg. 278/05, s. 18 (1).

(2) In the case of an operation mentioned in paragraph 5 of subsection 12 (4), the following measures and procedures also apply:

1. The spread of dust from the work area shall be prevented by,

i. using enclosures of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure material is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls, and

ii. using curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted on each side of each entrance or exit from the work area.

2. Unless the operation is carried on outdoors, or inside a building that is to be demolished and will not be entered by any person except the workers involved in the operation and the workers involved in the demolition, the spread of dust from the work area shall also be prevented by,

i. creating and maintaining within the enclosed area, by installing a ventilation system equipped with a HEPA filtered exhaust unit, a negative air pressure of 0.02 inches of water, relative to the area outside the enclosed area,

ii. ensuring that replacement air is taken from outside the enclosed area and is free from contamination with any hazardous dust, vapour, smoke, fume, mist or gas, and

iii. using a device, at regular intervals, to measure the difference in air pressure between the enclosed area and the area outside it.

3. The ventilation system referred to in subparagraph 2 i shall be inspected and maintained by a competent worker before each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it shall be replaced before the ventilation system is used.

4. Before leaving the work area, a worker shall,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, and

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15.

5. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area. O. Reg. 278/05, s. 18 (2).

(3) In the case of an operation mentioned in paragraph 1, 2, 3 or 4 of subsection 12 (4) that is carried on outdoors, the following measures and procedures also apply:

1. If practicable, any asbestos-containing material to be removed shall be thoroughly wetted before and during removal, unless wetting would create a hazard or cause damage.

2. Dust and waste shall not be permitted to fall freely from one work level to another.

3. If practicable, the work area shall be washed down with water after completion of the clean-up and removal described in paragraph 6 of section 15.

4. Temporary electrical power distribution systems for tools and equipment involved in wet removal operations shall be equipped with ground fault circuit interrupters.

5. A decontamination facility shall be located as close as practicable to the work area and shall consist of,

i. a room suitable for changing into protective clothing and for storing contaminated protective clothing and equipment,

ii. a shower room as described in paragraph 7 of subsection (4), and

iii. a room suitable for changing into street clothes and for storing clean clothing and equipment.

6. The rooms described in subparagraphs 5 i, ii and iii shall be arranged in sequence and constructed so that any person entering or leaving the work area must pass through each room.

7. When leaving the work area, a worker shall enter the decontamination facility and shall, in the following order,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15,

iii. shower, and

iv. remove and clean the respirator. O. Reg. 278/05, s. 18 (3).

(4) In the case of an operation mentioned in paragraph 1, 2, 3, 4 or 6 of subsection 12 (4) that is carried on indoors, the following measures and procedures also apply:

1. Friable asbestos-containing material that is crumbled, pulverized or powdered and that is lying on any surface in the work area shall be cleaned up and removed using a vacuum equipped with a HEPA filter or by damp wiping and everything shall be removed from the work area or covered with polyethylene sheeting or other suitable material that is impervious to asbestos.

2. The spread of dust from the work area shall be prevented by an enclosure of polyethylene or other suitable material that is impervious to asbestos, if the work area is not enclosed by walls, and by a decontamination facility consisting of a series of interconnecting rooms including,

i. a room suitable for changing into protective clothing and for storing contaminated protective clothing and equipment,

ii. a shower room as described in paragraph 7,

iii. a room suitable for changing into street clothes and for storing clean clothing and equipment, and

iv. curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted to each side of the entrance or exit to each room.

3. The rooms described in subparagraphs 2 i, ii and iii shall be arranged in sequence and constructed so that any person entering or leaving the work area must pass through each room.

4. The mechanical ventilation system serving the work area shall be disabled and all openings or voids, including ventilation ducts to or from the work area, shall be sealed by tape or other appropriate means.

5. Unless the operation is carried on inside a building that is to be demolished and will not be entered by any person except the workers involved in the operation and the workers involved in the demolition, the spread of dust from the work area shall also be prevented by,

i. creating and maintaining within the enclosed area, by installing a ventilation system equipped with a HEPA filtered exhaust unit, a negative air pressure of 0.02 inches of water, relative to the area outside the enclosed area,

ii. ensuring that replacement air is taken from outside the enclosed area and is free from contamination with any hazardous dust, vapour, smoke, fume, mist or gas, and

iii. using a device, at regular intervals, to measure the difference in air pressure between the enclosed area and the area outside it.

6. The ventilation system referred to in subparagraph 5 i shall be inspected and maintained by a competent worker before each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it shall be replaced before the ventilation system is used.

7. The shower room in the decontamination facility shall,

i. be provided with hot and cold water or water of a constant temperature that is not less than 40° Celsius or more than 50° Celsius,

ii. have individual controls inside the room to regulate water flow and, if there is hot and cold water, individual controls inside the room to regulate temperature,

iii. be capable of providing adequate supplies of hot water to maintain a water temperature of at least 40° Celsius, and

iv. be provided with clean towels.

8. When leaving the work area, a worker shall enter the decontamination facility and shall, in the following order,

i. decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,

ii. if the protective clothing will not be reused, place it in a container as described in paragraph 5 of section 15,

iii. shower, and

iv. remove and clean the respirator.

9. If practicable, existing electrical power distribution systems that are not water-tight shall be de-energized and locked out where wet removal operations are to be carried out.

10. Temporary electrical power distribution systems for tools and equipment involved in wet removal operations shall be equipped with ground fault circuit interrupters.

11. Friable asbestos-containing material shall be thoroughly wetted before and during removal, unless wetting would create a hazard or cause damage.

12. The work area shall be inspected by a competent worker for defects in the enclosure, barriers and decontamination facility,

i. at the beginning of each shift,

ii. at the end of a shift if there is no shift that begins immediately after the first-named shift, and

iii. at least once each day on days when there are no shifts.

13. Defects observed during an inspection under paragraph 12 shall be repaired immediately and no other work shall be carried out in the work area until the repair work is completed.

14. If practicable, dust and waste shall be kept wet.

15. On completion of the work,

i. negative air pressure shall be maintained if required by subparagraph 5 i,

ii. the inner surface of the enclosure and the work area inside the enclosure shall be cleaned by a thorough washing or by vacuuming with a vacuum equipped with a HEPA filter,

iii. equipment, tools and other items used in the work shall be cleaned with a damp cloth or by vacuuming with a vacuum equipped with a HEPA filter or they shall be placed in a container as described in paragraph 5 of section 15 before being removed from the enclosure, and

iv. a visual inspection shall be conducted by a competent worker to ensure that the enclosure and the work area inside the enclosure are free from visible dust, debris or residue that may contain asbestos.

16. Once the work area inside the enclosure is dry after the steps set out in subparagraphs 15 ii, iii and iv have been completed, clearance air testing shall be conducted by a competent worker in accordance with subsection (5), unless the operation is carried on inside a building that is to be demolished and will not be entered by any person except the workers involved in the operation and the workers involved in the demolition.

17. The barriers, enclosure and decontamination facility shall not be removed or dismantled until,

i. cleaning has been done as described in paragraph 15, and

ii. if clearance air testing is required, it has been completed and the work area inside the enclosure has passed the clearance air test. O. Reg. 278/05, s. 18 (4).

(5) The following rules apply to clearance air testing:

1. Sample collection and analysis shall be done,

i. using the phase contrast microscopy method, in accordance with subsection (6), or

ii. using the transmission electron microscopy method, in accordance with subsection (7).

2. If the work area inside the enclosure fails the clearance air test, the steps set out in subparagraphs 15 ii, iii and iv of subsection (4) shall be repeated and the work area shall be allowed to dry before a further test is carried out, unless paragraph 6 of subsection (6) applies. O. Reg. 278/05, s. 18 (5).

(6) Clearance air testing using the phase contrast microscopy method shall be carried out in accordance with U.S. National Institute of Occupational Safety and Health Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules, and shall comply with the following requirements:

1. Testing shall be based on samples taken inside the enclosure.

2. Forced air shall be used, both before and during the sampling process, to ensure that fibres are dislodged from all surfaces inside the enclosure before sampling begins and are kept airborne throughout the sampling process.

3. At least 2,400 litres of air shall be drawn through each sample filter, even though the standard mentioned above provides for a different amount.

4. The number of air samples to be collected shall be in accordance with Table 3.

5. The work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of fibres that does not exceed 0.01 fibres per cubic centimetres of air.

6. If the work area inside the enclosure fails a first test that is done using the phase contrast microscopy method, the samples may be subjected to a second analysis using transmission electron microscopy in accordance with the standard mentioned in subsection (7).

7. When a second analysis is done as described in paragraph 6, the work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of asbestos fibres that does not exceed 0.01 fibres per cubic centimetre of air. O. Reg. 278/05, s. 18 (6).

(7) Clearance air testing using the transmission electron microscopy method shall be carried out in accordance with U.S. National Institute of Occupational Safety and Health Manual of Analytical Methods, Method 7402, Issue 2: Asbestos by TEM (August 15, 1994), and shall comply with the following requirements:

1. Testing shall be based on samples taken inside the enclosure and samples taken outside the enclosure but inside the building.

2. Forced air shall be used inside the enclosure, both before and during the sampling process, to ensure that fibres are dislodged from all surfaces before sampling begins and are kept airborne throughout the sampling process.

3. At least 2,400 litres of air shall be drawn through each sample filter, even though the standard mentioned above provides for a different amount.

4. At least five air samples shall be taken inside each enclosure and at least five air samples shall be taken outside the enclosure but inside the building.

5. Sampling inside and outside the enclosure shall be conducted concurrently.

6. The work area inside the enclosure passes the clearance air test if the average concentration of asbestos fibres in the samples collected inside the enclosure is statistically less than the average concentration of asbestos fibres in the samples collected outside the enclosure, or if there is no statistical difference between the two average concentrations. O. Reg. 278/05, s. 18 (7).

(8) Within 24 hours after the clearance air testing results are received,

(a) the owner and the employer shall post a copy of the results in a conspicuous place or places,

(i) at the workplace, and

(ii) if the building contains other workplaces, in a common area of the building; and

(b) a copy shall be provided to the joint health and safety committee or the health and safety representative, if any, for the workplace and for the building. O. Reg. 278/05, s. 18 (8).

(9) The owner of the building shall keep a copy of the clearance air testing results for at least one year after receiving them. O. Reg. 278/05, s. 18 (9).

Instruction and training

19. (1) The employer shall ensure that instruction and training in the following subjects are provided by a competent person to every worker working in a Type 1, Type 2 or Type 3 operation:

1. The hazards of asbestos exposure.

2. Personal hygiene and work practices.

3. The use, cleaning and disposal of respirators and protective clothing. O. Reg. 278/05, s. 19 (1).

(2) The joint health and safety committee or the health and safety representative, if any, for the workplace shall be advised of the time and place

where the instruction and training prescribed by subsection (1) are to be carried out. O. Reg. 278/05, s. 19 (2).

(3) Without restricting the generality of paragraph 3 of subsection (1), the instruction and training related to respirators shall include instruction and training related to,

(a) the limitations of the equipment;

(b) inspection and maintenance of the equipment;

(c) proper fitting of a respirator; and

(d) respirator cleaning and disinfection. O. Reg. 278/05, s. 19 (3).

Note: Section 20 comes into force on November 1, 2007. See: O. Reg. 278/05, s. 26 (2).

Asbestos abatement training programs

20. (1) The employer shall ensure that,

(a) every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities; and

(b) every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities. O. Reg. 278/05, s. 20 (1).

(2) The employer shall ensure that every worker and supervisor successfully completes the appropriate program required under subsection (1) before performing or supervising the work to which the program relates. O. Reg. 278/05, s. 20 (2).

(3) A document issued by the Ministry of Training, Colleges and Universities, showing that a worker has successfully completed a program mentioned in subsection (1), is conclusive proof, for the purposes of this section, of his or her successful completion of the program. O. Reg. 278/05, s. 20 (3).

(4) In accordance with the *Agreement on Internal Trade, 1995* and the *Protocols of Amendment*, a worker shall be deemed to hold a document showing successful completion referred to in subsection (3) if he or she has successfully completed equivalent training in another province or territory of Canada, as determined by the Director. O. Reg. 278/05, s. 20 (4).

Asbestos work report

21. (1) The employer of a worker working in a Type 2 operation or a Type 3 operation shall complete an asbestos work report in a form obtained from the Ministry for each such worker,

(a) at least once in each 12-month period; and

(b) immediately on the termination of the employment of the worker. O. Reg. 278/05, s. 21 (1).

(2) As soon as the asbestos work report is completed, the employer shall,

(a) forward it to the Provincial Physician, Ministry of Labour, and

(b) give a copy to the worker. O. Reg. 278/05, s. 21 (2).

(3) For the purposes of clause (2) (a), the employer may deliver the report to the Provincial Physician in person or send it by ordinary mail, by courier or by fax. O. Reg. 278/05, s. 21 (3).

Asbestos Workers Register

22. (1) The Provincial Physician, Ministry of Labour, shall establish and maintain an Asbestos Workers Register listing the name of each worker for whom an employer submits an asbestos work report under section 21. O. Reg. 278/05, s. 22 (1).

(2) On the recommendation of the Provincial Physician, a worker who is listed in the Register may volunteer to undergo the prescribed medical examination described in paragraph 1 of subsection (4). O. Reg. 278/05, s. 22 (2).

(3) A worker who has undergone the prescribed medical examination described in paragraph 1 of subsection (4) may volunteer to undergo subsequent examinations of the same type if they are recommended by his or her physician. O. Reg. 278/05, s. 22 (3).

(4) The following medical examinations are prescribed for the purposes of subsection 26 (3) of the Act:

1. An examination consisting of a medical questionnaire, chest x-rays and pulmonary function tests.

2. A subsequent examination that consists of the components described in paragraph 1, is recommended by the worker's physician and takes place at least two years after the most recent examination. O. Reg. 278/05, s. 22 (4).

(5) A worker who is removed from exposure to asbestos because an examination discloses that he or she may have or has a condition resulting from exposure to asbestos and suffers a loss of earnings as a result of the removal from exposure to asbestos is entitled to compensation for the loss in the manner and to

the extent provided by the *Workplace Safety and Insurance Act, 1997*. O. Reg. 278/05, s. 22 (5).

Use of equivalent measure or procedure

23. A constructor, in the case of a project, or the employer, in any other case, may vary a measure or procedure required by this Regulation if the following conditions are satisfied:

1. The measure or procedure, as varied, affords protection for the health and safety of workers that is at least equal to the protection that would be provided by complying with this Regulation.

2. The constructor or employer gives written notice of the varied measure or procedure, in advance, to the joint health and safety committee or the health and safety representative, if any, for the workplace. O. Reg. 278/05, s. 23.

Notice to inspector

24. (1) When this Regulation requires written notice to an inspector at an office of the Ministry of Labour, the notice shall be given,

(a) by delivering it to the office in person;

(b) by sending it by ordinary mail, by courier or by fax, or

(c) by sending the notice to the inspector by electronic means that are acceptable to the Ministry. O. Reg. 278/05, s. 24 (1).

(2) When this Regulation requires oral notice to an inspector at an office of the Ministry of Labour, the notice shall be given,

(a) in person;

(b) by telephoning the inspector; or

(c) by sending the notice to the inspector by electronic means that are acceptable to the Ministry. O. Reg. 278/05, s. 24 (2).

25. Omitted (revokes other Regulations). O. Reg. 278/05, s. 25.

26. Omitted (provides for coming into force of provisions of this Regulation). O. Reg. 278/05, s. 26.

TABLE 1
BULK MATERIAL SAMPLES

Subsection 3 (3)

Item	Type of material	Size of area of homogeneous material	Minimum number of bulk material samples to be collected
1.	Surfacing material, including without limitation material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings and fireproofing materials on structural members	Less than 90 square metres	3
		90 or more square metres, but less than 450 square metres	5
		450 or more square metres	7
2.	Thermal insulation, except as described in item 3	any size	3
3.	Thermal insulation patch	Less than 2 linear metres or 0.5 square metres	1
4.	Other material	Any size	3

O. Reg. 278/05, Table 1.

TABLE 2
RESPIRATORS

Paragraph 12 of section 14 and paragraph 11 of section 15

Column 1		Column 2
Work Category		**Required respirator**
Type 1 Operations		
Worker requests that the employer provide a respirator to be used by the worker, as described in paragraph 12 of section 14		Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter
Type 2 Operations		
Work described in paragraph 1 of subsection 12 (3)		One of the following: - Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter - Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter - Negative pressure (demand) supplied air respirator equipped with a full-facepiece - Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
Work described in paragraphs 2 to 7 and 9 to 11 of subsection 12 (3)		Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter
Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable material containing asbestos by means of power tools, if the tool is attached to a dust collecting device equipped with a HEPA filter as described in paragraph 8 of subsection 12 (3)	Material is not wetted	One of the following: - Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter - Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter - Negative pressure (demand) supplied air respirator equipped with a full-facepiece

		- Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
	Material is wetted to control spread of fibre	Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter
Type 3 Operations		
Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable material containing asbestos by means of power tools, if the tool is not attached to a dust collecting device equipped with a HEPA filter as described in paragraph 5 of subsection 12 (4)	Material is not wetted	Pressure demand supplied air respirator equipped with a half mask
	Material is wetted to control spread of fibre	One of the following: - Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter - Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter - Negative pressure (demand) supplied air respirator equipped with a full-facepiece - Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
Work with friable material containing asbestos, as described in paragraphs 1 to 4 and 6 of subsection 12 (4)	Material is not wetted	Pressure demand supplied air respirator equipped with a full facepiece
Work with friable material, as described in paragraphs 1 to 4 and 6 of subsection 12 (4), that contains a type of asbestos other than chrysotile	Material was applied or installed by spraying, and is wetted to control spread of fibre	Pressure demand supplied air respirator equipped with a half mask
Work with friable material, as described in paragraphs 1 to 4 and 6 of subsection 12 (4), that contains only chrysotile asbestos		One of the following: - Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter - Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter - Negative pressure (demand) supplied air respirator equipped with a full-facepiece - Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)
Work with friable material containing asbestos, as described in paragraphs 1 to 4 and 6 of subsection 12 (4)	Material was not applied or installed by spraying, and is wetted to control spread of fibre	One of the following: - Air purifying full-facepiece respirator with N-100, R-100 or P-100 particulate filter - Powered air purifying respirator equipped with a tight-fitting facepiece (half or full-facepiece) and a high efficiency filter or N-100, P-100 or R-100 particulate filter - Negative pressure (demand) supplied air respirator equipped with a full-facepiece - Continuous flow supplied air respirator equipped with a tight fitting facepiece (half or full-facepiece)

O. Reg. 278/05, Table 2.

TABLE 3
AIR SAMPLES

Paragraph 4 of subsection 18 (6)

Minimum number of air samples to be taken from each enclosure	Area of enclosure
2	10 square metres or less
3	More than 10 but less than 500 square metres
5	500 square metres or more

O. Reg. 278/05, Table 3.

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Site Photographs

Photograph 1: View of the subject location at 4015 Mainway, Burlington Ontario.

Photograph 2: View of flexible duct joint material that could not be sampled without damaging the seals on the unit.

1. Requirements Included

.1 Requirements and limitations for cutting and patching the Work.

2. Related Requirements

.1 DIVISION 00-01 – GENERAL REQUIREMENTS.

3. Submittals

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

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

4. General

.1 Execute cutting, fitting, and patching including excavation and fill, to complete the Work.

.2 Fit the several parts together, to integrate with other work.

.3 Uncover work to install ill-timed work.

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

.5 Remove samples of installed work for testing.

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

5. Inspection

.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.

6. Preparation

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

.2 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

7. Performance

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

.2 Use material to match existing.

. 3 For a change in material submit request for substitution under provisions of Section 01 23 00 Alternatives.

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

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

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

.7 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

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

.9 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008, Stipulated Price Contract. As amended by Owner.

1.02 CASH ALLOWANCES

.1 Refer to Contract.

.2 Include in Contract Price specified cash allowances.

.3 Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage [installation] and other authorized expenses incurred in performing Work.

.4 Contract Price, and not cash allowance, includes Contractor's overhead and profit in connection with such cash allowance.

.5 Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.

.6 Where the total costs for all the cash allowances exceed amount of the allowances, Contractor will be compensated for the excess costs incurred and substantiated plus allowance for overhead and profit as set out in Contract Documents. Refer to SC -51.

.7 Include progress payments on accounts of work authorized under cash allowances in Consultant's monthly certificate for payment.

.8 Prepare schedule jointly with Consultant and Owner to show when items called for under cash allowances must be authorized by Consultant for ordering purposes so that progress of Work will not be delayed.

.9 Amount of each allowance, for Work specified is as follows:
  .a testing & inspections $1000.00

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE

.1 Submit to Consultant(s) 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 Consultant. 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 Consultant, 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 Consultant's review of submittals.

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

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

1.02 SHOP DRAWINGS AND PRODUCT DATA

.1 Refer to contract.

.2 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.

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

.4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been

co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.5 Allow 5 days for Consultant's review of each submission.

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

.7 Make changes in shop drawings as Consultant may require, consistent with Contract Documents and the Ontario Building Code. When resubmitting, notify Consultant in writing of revisions other than those requested.

.8 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.

.9 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.

.10 After Consultant's review, distribute copies.

.11 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

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

.13 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.
.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.

.14 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.
.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.

.15 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant.
.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.

.16 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.

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

.18 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant.

.19 Delete information not applicable to project.

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

.21 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, electronic 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.

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 site office.

.3 Notify Consultant 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 Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.6 Make changes in samples which Consultant 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 and as directed by Consultant.

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

.3 Number of viewpoints: 2 locations.
.1 Viewpoints and their location as determined by Consultant.

.4 Frequency of photographic documentation: monthly as directed by Departmental Consultant.
.1 Upon completion of: excavation, foundation, framing and services before concealment, of Work, and as directed by Consultant.

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.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2 – 2008 - Stipulated Price Contract. As amended by Owner.

1.02 INSPECTION

.1 Refer to contract.

.2 Allow Consultant's access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.

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

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

1.03 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Owner for purpose of inspecting and/or testing portions of Work.

.2 Allocated costs: By Owner.

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

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

.5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to the Client. Pay costs for retesting and re inspection.

1.04 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.

1.05 PROCEDURES

.1 Notify appropriate agency and Consultant 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.

1.06 REJECTED WORK

.1 Refer to contract.

.2 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 Independent Inspection and Testing Agency as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

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

.4 If in opinion of Consultant 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 Consultant.

1.07 REPORTS

.1 Submit 2 copies of inspection and test reports to Consultant.

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

1.08 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 Consultant and may be authorized as recoverable.

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations acceptable to Consultant as specified in specific Section.

.3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Consultant will assist in preparing schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Consultant.

.7 Mock-ups may remain as part of Work.

.8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.10 MILL TESTS

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

1.11 EQUIPMENT AND SYSTEMS

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

.2 Refer to Division 5, for definitive requirements.

END OF SECTION

1 GENERAL

1.01 ACTION AND INFORMATIONAL SUBMITTALS

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

1.02 INSTALLATION AND REMOVAL

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

.2 Remove from site all such work after use.

1.03 DEWATERING

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

1.04 WATER SUPPLY

.1 Client will provide access to a continuous supply of potable water for construction use.

.2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.

1.05 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.5 Ventilating:
- .1 Prevent accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, may be used when available but is subject to owner's approval. The Contractor is responsible for damage to heating system if use is permitted.

.7 On completion of Work for which permanent heating system is used, replace all filters.

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

.9 Contractor will Pay costs for maintaining temporary heat, when using permanent heating system.

.10 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.

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

1.06 TEMPORARY POWER AND LIGHT

.1 Owner will cover costs for regular power during construction used for for temporary lighting and operating of power tools.

.2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

.3 Temporary power for electric cranes and other large equipment requiring in excess of above is responsibility of Contractor.

.4 Provide and maintain temporary lighting throughout project.

.5 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected. 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 Owner will cover costs of related connections associated with the temporary office facilities and the permanent Bell line connections..

1.8 FIRE PROTECTION

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

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

2 EXECUTION

2.01 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2-2008, Stipulated Price Contract. As amended by Owner.

.2 Within text of each specifications section, reference may be made to reference standards.

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

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

1.02 QUALITY

.1 Refer to CCDC 2.

.2 Refer to DOC 14 DOC 15.

.3 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.

.4 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.

.5 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.

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

.7 Unless otherwise indicated in specifications, maintain uniformity of

manufacture for any particular or like item throughout building.

.8 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 Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

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

1.04 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 Consultant.

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

1.05 TRANSPORTATION

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

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 Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant or Consultant 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 Construction Manager if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Consultant 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 Consultant, 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 Consultant if there is interference. Install as directed by Consultant. Failure to notify Consultant of interference prior to installation, if not acceptable by Consultant work to be rectified at no cost to client.

1.10 REMEDIAL WORK

.1 Refer to CCDC 2, DOC 14, DOC 15, and Section 01 73 00 - Execution.

.2 Refer to DOC 14, DOC 15.

.3 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.

.4 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 Consultant 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. 316 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 Consultant.

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.

.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.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2–2008, Stipulated Price Contract. As amended by Owner.

1.02 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.

.3 Clear snow and ice from access to building, pile snow in designated areas only.

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

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

.6 Dispose of waste materials and debris off site.

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

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

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

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

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

.12 Clean Niche areas regularly, or at the owner’s discretion.

1.03 FINAL CLEANING

.1 Refer to Contract.

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

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

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

.5 Remove waste products and debris including that caused by Owner or other Contractors.

.6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.

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

.8 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.

.9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls.

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

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

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

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

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

.15 Remove dirt and other disfiguration from exterior surfaces.

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

.17 Sweep and wash clean paved areas.

.18 Clean equipment and fixtures to sanitary condition; clean or replace filters

of mechanical equipment.

.19 Clean roofs, downspouts, and drainage systems.

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

.21 Remove snow and ice from access to building.

END OF SECTION

1 GENERAL

1.01 WASTE MANAGEMENT

.1 Trade Contractors shall provide waste containers for the disposal for the disposal of all waste materials resulting from performance of their work.

.2 No hazardous or contaminated waste materials shall be placed in owner's or Contractor's waste containers and Trade contractors shall make their own arrangements for the disposal off site of any material resulting from performance of their work.

.3 Trade Contractors shall remove all regular waste materials and debris from their work areas and deposit in the waste containers at the end of each working day. Any clean up work not performed as requested will be carried out by the Contractor with all costs being charged to the trade.

1.02 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Consultant.

.2 Unless specified otherwise, materials for removal 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 Support affected structures. If safety of building is endangered, cease operations and immediately notify Consultant.

.6 Protect surface drainage, mechanical and electrical from damage and blockage.

.7 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Provide waybills for separated materials.

1.03 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

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

1.04 USE OF SITE AND FACILITIES

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

1.05 SCHEDULING

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

3 EXECUTION

3.02 APPLICATION

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

3.03 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 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008 - Stipulated Price Contract. As amended by Owner.

1.02 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:
  .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    .1 Notify Consultant in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    .2 Request Consultant's inspection.
  .2 Consultant's Inspection:
    .1 Consultant, Owner 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 and balanced and fully operational.
    .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies: submitted.
    .5 Operation of systems: demonstrated to Owner's personnel.
    .6 Work: complete and ready for final inspection.
  .4 Final Inspection:
    .1 When completion tasks are done, request final inspection of Work by Consultant, and Contractor.
    .2 When Work incomplete according to Owner, Consultant, complete outstanding items and request re-inspection.
  .5 Declaration of Substantial Performance: when Consultant 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 Consultant considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.2 Refer to Contract when Work deemed incomplete by Consultant, complete outstanding items and request re-inspection.

.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.

1.03 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: in accordance with Section 01 74 21 – Garbage Disposal and Clean Up.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:
- .1 Convene meeting one week prior to contract completion with Consultant, in accordance with Section 01 31 19 - Project Meetings to:
  - .1 Verify Project requirements.
  - .2 Review manufacturer's installation instructions and warranty requirements.
- .2 Consultant 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 Consultant, one final copy of operating and maintenance manuals in English for review. Once format and information provided is approved, submit second binder along with CD of PDF version with all documentation to the owner.

.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 Submit all materials in hard copy and PDF format.

.2 Organize data as instructional manual.

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

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

.1 Identify contents of each binder on spine.

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

.1 Arrange content by systems, process flow, under Section numbers and sequence of Table of Contents.

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

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

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

.8 Provide scaled CAD files in dwg format, and PDF format, on CD.

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 Consultant and Owner 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 Consultant.

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 Contractor.

.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 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.08 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.

1.09 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.

1.10 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 site; place and store.
  .4 Receive and catalogue items.
    .1 Submit inventory listing to Consultant.
  .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 site; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Consultant.
  - .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 site; place and store.
- .4 Receive and catalogue items.
  - .1 Submit inventory listing to Consultant.
  - .2 Include approved listings in Maintenance Manual.

1.11 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 Consultant.

1.12 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 Consultant approval.

.3 Warranty management plan to include required actions and documents to assure

that Consultant 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 Consultant 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 Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct a joint 9 month warranty inspection, measured from time of acceptance, by Consultant.

.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, and commissioned systems such as fire protection, alarm systems, sprinkler systems, lightning protection systems.

.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 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 Owner and or Consultant to proceed with action against Contractor.

1.13 WARRANTY TAGS

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

.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.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 02 41 16.01 – Structural Demolition.

1.02 REFERENCES

.1 CSA International
  .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures and 01 74 21 – Garbage Disposal and Clean-up.

.2 Submit demolition drawings:
  .1 Submit for review and approval by Consultant shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario, Canada, showing proposed method.

1.04 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Consultant immediately.
  .1 Proceed only after receipt of written instructions have been received from Consultant.

.3 Notify Consultant and Owner before disrupting building access or services.

3 EXECUTION

3.01 EXAMINATION

.1 Inspect building, site with relevant Consultant’s and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Consultant and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Consultant should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.02 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work..

.2 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.3 Demolition/Removal:

.1 Remove items as indicated.
.2 Removal of Pavements, Curbs and Gutters:
.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Construction Manager.
.2 Protect adjacent joints and load transfer devices.
.3 Protect underlying and adjacent granular materials where indicated.
.3 Remove parts of existing building to permit new construction.

3.03 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Refer to demolition drawings and specifications for items to be salvaged for reuse.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 04 22 00 Concrete Unit Masonry.

1.02 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.
- .3 CAN/CSA A371-04, Masonry Construction for Buildings.
- .4 CAN/CSA-A3000-03, Cementitious Materials Compendium; CAN/CSA-A3002-03, Masonry and Mortar Cement.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.

.2 Samples:
- .1 Samples: provide unit samples in accordance with Section 04 05 00 - Common Work Results for Masonry, supplemented as follows:
  - .1 Provide two samples of coloured mortar.
  - .2 Provide confirmation of source or product data sheet, prior to mixing or preparation of mortars, to Consultant of:
    - .1 Aggregate.
    - .2 Cement.
    - .3 Lime.
    - .4 Colour pigment samples.

.3 Manufacturer's Instructions:
- .1 Provide manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

.1 Submit laboratory test reports in accordance with Section 01 45 00 – Quality Control.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.4 Mock-ups:
- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
- .1 Construct mock-up sample panel of pointing.
- .2 Sample panel: 3000 mm x 3000 mm using proposed procedures, colours, texture, finish and workmanship.

1.05 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handles masonry mortar and grout materials in accordance with Section 00 01 00 Specified Products supplemented as follows:
- .1 Deliver prepackaged, dry-blended mortar mix to project site in labelled plastic-lined bags each bearing name and address of manufacturer, production codes or batch numbers, and colour or formula numbers.
- .2 Maintain mortar, grout and packaged materials clean, dry, and protected against dampness, freezing, traffic and contamination by foreign materials.

.2 Packaging Waste Management: in accordance with Section 01 74 21 - Garbage Disposal and Cleanup.

1.06 SITE CONDITIONS

.1 Ambient Conditions: maintain materials and surrounding air temperature to:

.1 Minimum 10 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Maximum 32 degrees C prior to, during, and 48 hours after completion

of masonry work.

.2 Weather Requirements: CAN/CSA A371 International Masonry Industry All-Weather Council (IMIAC) - Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction].

2 PRODUCTS

2.01 MATERIALS

.1 Use same brands of materials and source of aggregate for entire project.

.2 Cement:
- .1 Portland Cement: to CAN/CSA-A3000, Type GU - General use hydraulic cement
- .2 Masonry Cement above grade: to CAN/CSA-A3002 and CAN/CSA A179,
  - a) Load Bearing Type S
  - b) Non Load Bearing Type N.
- .3 Mortar Cement at or below grade: to CAN/CSA-A3002 and CAN/CSA A179, integral water repellents.
  - a) Load Bearing Type S
  - b) Non Load Bearing Type N

.3 Aggregate: supplied by one supplier.
- .1 Fine Aggregate: to CAN/CSA A179, natural sand
- .2 Course Aggregate: to CAN/CSA A179.

.4 Water: clean and potable.

.5 Bonding Agent: epoxy type.

.6 Polymer Latex: organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.

2.02 MORTAR MIXES

.1 Mortar for exterior masonry above grade:
- .1 Loadbearing: type S based on proportion specifications.
- .2 Non-Loadbearing: N based on proportion specifications.

.2 Mortar for interior masonry:
- .1 Loadbearing: type S based on proportion specifications.
- .2 Non-Loadbearing: N based on proportion specifications.

.3 Pointing Mortar: CAN/CSA A179, Type S and N using property

specification with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

.4 Stain Resistant Pointing Mortar: one part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate to 2 percent of Portland cement by weight.

.5 Parging mortar: type N to CAN/CSA A179.

.6 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type M based on proportion specifications, CAN/CSA A179.

.7 Following applies regardless of mortar types and uses specified above:

.1 Mortar for calcium silicate brick and concrete brick: type O based on proportion specifications.

.2 Mortar for stonework: type N based on proportion specifications.

.3 Mortar for grouted reinforced masonry: type S based on proportion specifications.

2.03 MORTAR MIXING

.1 Use pre-blended, pre-coloured mortar prepackaged under controlled factory conditions. Ingredients batching limitations to be within 1% accuracy.

.2 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.

.3 Maintain sand uniformly damp immediately before mixing process.

.4 Add mortar colour in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

.5 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.

.6 Do not add air entraining admixture to mortar mix.

.7 Use a batch type mixer in accordance with CAN/CSA A179.

.8 Pointing mortar: pre hydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball.

Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

.9 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.

.10 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

2.04 GROUT MIXES

.1 Bond Beams: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; premixed type in accordance with CAN/CSA-A23.1

.2 Lintels: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; premixed type in accordance with CAN/CSA-A23.1

.3 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA A179.

2.05 GROUT MIXING

.1 Mix batched and delivered grout in accordance with CAN/CSA-A23.1 transit mixed

.2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179 fine grout.

.3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.

.4 Do not use calcium chloride or chloride based admixtures.

2.06 MIX TESTS

.1 Testing Mortar Mix:

.1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for mortar based on proportion specification. Test during construction for:

.1 Compressive strength.
.2 Consistency.
.3 Mortar aggregate ratio.
.4 Sand/cement ratio.
.5 Water content and water/cement ratio.
.6 Air content.

.7 Splitting tensile strength.

.2 Testing Grout Mix:

.1 Test grout to requirements of Section 00 45 00 - Quality Control, and in accordance with CAN/CSA A179, for grout based proportion specification. Test during construction for:

.1 Compressive strength.
.2 Sand/cement ratio.
.3 Water content and water/cement ratio.
.4 Slump.

3 EXECUTION

3.01 EXAMINATION

.1 Request inspection of spaces to be grouted.

3.02 PREPARATION

.1 Apply bonding agent to existing concrete surfaces.

.2 Plug clean-out holes with brick masonry units. Brace masonry for wet grout pressure.

3.03 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.04 CONSTRUCTION

.1 Do masonry mortar and grout work in accordance with CAN/CSA A179 except where specified otherwise.

.2 Apply parging in uniform coating not less than 10 mm thick.

3.05 MIXING

.1 All pointing mortar can be mixed using a regular paddle mixer.

.2 Clean all mixing boards and mechanical mixing machine between batches.

.3 Mortar must be weaker than the units it is binding.

.4 Contractor to appoint one individual to mix mortar, for duration of project. In the event that this individual must be changed, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

3.06 MORTAR PLACEMENT

.1 Install mortar to manufacturer's instructions.

.2 Install mortar to requirements of CAN/CSA A179.

.3 Install mortar and grout to requirements of Section 04 05 12.

.4 Remove excess mortar from grout spaces.

3.07 GROUT PLACEMENT

.1 Install grout in accordance with manufacturer's instructions.

.2 Install grout in accordance with CAN/CSA A179.

.3 Work grout into masonry cores and cavities to eliminate voids.

.4 Do not install grout in lifts greater than 400 mm, without consolidating grout by rodding.

.5 Do not displace reinforcement while placing grout.

3.08 FIELD QUALITY CONTROL

.1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:

.1 Test and evaluate mortar during construction in accordance with CAN/CSA A179.

.2 Test and evaluate grout during construction to CAN/CSA A179; test in conjunction with masonry unit sections specified.

.2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.09 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

.2 Remove droppings and splashings using clean sponge and water.

.3 Clean masonry with low pressure clean water and soft natural bristle brush.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 00 01 00 – Garbage Disposal and Cleanup.

3.10 PROTECTION OF COMPLETED WORK

.1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

.1 Mortar:

.1 Brick Masonry.

.2 Stone Veneer.

.3 Concrete Masonry Units.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 04 05 12 Masonry and Grout.

1.02 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA-A165 Series-2004, CSA Standards on Concrete Masonry Units covers: A165.1, A165.2, A165.3.
- .2 CAN/CSA A371-04, Masonry Construction for Buildings.

.5 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Product Data: provide product data, including manufacturer's printed data sheets and catalog pages illustrating products to be incorporated into project for specified products.

.3 Samples:
- .1 Provide unit samples in accordance with Section 04 05 00 - Common Work Results for Masonry.

.4 Manufacturer's Written Instructions: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.

1.04 QUALITY ASSURANCE SUBMITTALS

.1 Certificates: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Test and Evaluation Reports: provide certified test reports in accordance with Section 04 05 00 - Common Work Results for Masonry.

.3 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 00 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's

warranty requirements.

.4 Mock-ups:
.1 Construct mock-ups in accordance with Section 01 33 00 – Submittal Procedures, Section 01 45 00 Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
.1 Construct mock-up panel of exterior and interior concrete unit masonry construction 1200 x 1800 mm.

1.05 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Packaging Waste Management:
.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Garbage Disposal and Clean Up.

2 PRODUCTS

2.01 MATERIALS

.1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1) .
.2 Dimensions - Nominal: as indicated on drawings.

2.02 FLASHING

.1 Flashing: in accordance with Section 04 05 23 - Masonry Accessories.

2.03 MORTAR MIXES

.1 Mortar and mortar mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.

2.04 GROUT MIXES

.1 Grout and grout mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.

2.05 CLEANING COMPOUNDS

.1 Compatible with substrate and acceptable to masonry manufacturer for use on products.

.2 Cleaning compounds compatible with concrete unit masonry and in accordance with manufacturer's written recommendations and instructions.

2.06 TOLERANCES

.1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA A165.1, supplemented as follows:
- .1 Maximum variation between units within specific job lot not to exceed 2 mm.
- .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
- .3 Out of square tolerance not to exceed 2 mm.

.2 Tolerances for architectural concrete masonry units in accordance with CAN/CSA A165.1, supplemented as follows:
- .1 Maximum variation in length or height between units within specific job lot for specified dimension not to exceed 2 mm.
- .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
- .3 Out of square tolerance not to exceed 2 mm.
- .4 Maximum variation in width between units within specific job lot for specified dimension not to exceed 2 mm.

3 EXECUTION

3.01 EXAMINATION

.1 Verify surfaces and conditions are ready to accept work of this Section.

.2 Commencing installation means acceptance of existing substrates.

3.02 PREPARATION

.1 Protect adjacent finished materials from damage due to masonry work.

3.03 INSTALLATION

.1 Concrete block units:
- .1 Bond: running stack.
- .2 Coursing height: 200mm for one block and one joint.
- .3 Jointing: concave where exposed or where paint or other finish coating is

specified.

3.04 REINFORCEMENT

.1 Install reinforcing in accordance with Division 03 – Concrete and Division 05 - Metals.

3.05 FLASHING

.1 Install flashings: in accordance with Section 04 05 23 - Masonry Accessories.

3.06 MORTAR PLACEMENT

.1 Place mortar in accordance with Section 04 05 12 - Masonry Mortar and Grout.

3.08 GROUT PLACEMENT

.1 Place grout in accordance with Section 04 05 12 - Masonry Mortar and Grout.

3.09 CONSTRUCTION

.1 Cull out masonry units, in accordance with CAN/CSA A165 and approved range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.

.2 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.

.3 Construct masonry walls using running stack bond unless otherwise noted.

.4 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.

.5 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.

.6 Install movement joints and keep free of mortar where indicated.

.7 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints,

equivalent to shell thickness. Avoid excess mortar.

.8 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.

.9 Ensure compacted head joints. Use full or face-shell joint as indicated.

.10 Tamp units firmly into place.

.11 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.

.12 Tool exposed joints concave; strike concealed joints flush.

.13 After mortar has achieved initial set up, tool joints.

.14 Do not interrupt bond below or above openings.

3.10 REPAIR/RESTORATION

.1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

3.11 FIELD QUALITY CONTROL

.1 Site Tests, Inspection: in accordance with Section 01 45 00 - Quality Control and Section 04 05 00 - Common Work Results for Masonry.

.2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.12 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning supplemented as follows.

.1 Progress Cleaning:

.1 Standard Concrete Unit Masonry:

.1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Garbage Disposal and Clean Up.

3.13 PROTECTION

.1 Brace and protect concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Division 09 - Finishes

1.02 REFERENCES

.1 ASTM International
- .1 ASTM A 53/A 53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A 269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 CSA International
- .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA S16-09, Design of Steel Structures.
- .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

.3 Environmental Choice Program
- .1 CCD-047-98(R2005), Architectural Surface Coatings.
- .2 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.

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

.5 The Master Painters Institute (MPI)
- .1 Architectural Painting Specification Manual - current edition.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product

characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.04 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.05 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

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

2 PRODUCTS

2.01 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.

.2 Steel pipe: to ASTM A 53/A 53M, Grade A or B, standard weight, Schedule 40 (unless otherwise indicated), seamless black.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A 307.

.6 Sheet Steel: Grade C or higher yield strength.

.7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.02 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.03 FINISHES

.1 Galvanizing: hot dipped galvanized to CAN/CSA-G164-M.

.3 Zinc primer: Zinc Chromate Alkyd, ready mix to MPI-INT, EXT 5.2C in accordance with chemical component limits and restrictions requirements and VOC limits of CCD-047a, CCD-048, GS-11.

2.04 SHOP PAINTING

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.3 Clean surfaces to be field welded; do not paint.

2.06 ANGLE LINTELS

.1 Steel angles: galvanized, prime painted, sizes indicated for openings. Provide 150 mm minimum bearing at ends.

.2 Weld or bolt back-to-back angles to profiles as indicated.

2.07 PIPE RAILINGS

.1 Steel pipe: refer to Architectural drawings for diameter, formed to shapes and

sizes as indicated.

.2 Galvanize exterior pipe railings after fabrication. Shop coat prime interior railings after fabrication.

2.09 ACCESS LADDERS

.1 Refer to Drawings for locations and dimensions.

2.10 BOLLARDS

.1 Refer to Drawings for locations and dimensions.

3 EXECUTION

3.01 EXAMINATION

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

3.02 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CSA S16 or Weld field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.03 PIPE RAILINGS

.1 Install pipe railings to stairs as indicated.

.2 Set railing standards in concrete. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.

3.04 ACCESS LADDERS

.1 Install access ladders in locations as indicated.

.2 Erect ladders 200 mm clear of wall on bracket supports.

3.05 CHANNEL FRAMES

.1 Install steel channel frames to openings as indicated.

3.08 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.09 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Division 05 – Metal Fabrications.

.2 Section 06 20 00 – Finish Carpentry.

.3 Section 06 47 00 – Plastic Laminate Finishing.

.4 Division 07 – Joint Sealants.

.5 Division 09 – Finishes.

1.02 REFERENCES

.1 American National Standards Institute/National Particleboard Association (ANSI/NPA)
- .1 ANSI/NPA A208.1-2009, Particleboard.

.2 ASTM International
- .1 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A 653/A 653M-1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
- .3 ASTM C 578-11a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .4 ASTM C 1289-11, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .5 ASTM C 1396/C 1396M-11, Standard Specification for Gypsum Board.
- .6 ASTM D 1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
- .7 ASTM D 5055-11, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .8 ASTM D 5456-11, Standard Specification for Evaluation of Structural Composite Lumber Products.

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-11.3-M87, Hardboard.
- .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .3 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.

.4 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.5 CSA International
- .1 CAN/CSA-A123.2-03(R2008), Asphalt Coated Roofing Sheets.
- .2 CAN/CSA-A247-M86(R1996), Insulating Fiberboard.
- .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
- .5 CSA O121-08, Douglas Fir Plywood.
- .6 CAN/CSA O122-06(R2011), Structural Glued-Laminated Timber.
- .7 CSA O141-05(R2009), Softwood Lumber.
- .8 CSA O151-09, Canadian Softwood Plywood.
- .9 CSA O153-M1980(R2008), Poplar Plywood.
- .10 CSA O325-07, Construction Sheathing.
- .11 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.
- .12 CAN/CSA-Z809-08, Sustainable Forest Management.

.7 National Lumber Grades Authority (NLGA)
- .1 Standard Grading Rules for Canadian Lumber 2010.

.8 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

.4 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

.5 Low-Emitting Materials:
- .1 Submit listing of adhesives and sealants and paints and coatings

used in building, showing compliance with VOC and chemical component limits or restriction requirements.

.2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, and laminate adhesives used in building, stating that they contain no urea-formaldehyde.

1.04 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

.3 Sustainable Standards Certification:

.1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions].

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wood from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 FRAMING STRUCTURAL AND PANEL MATERIALS

.1 Description:

.1 Sustainability Characteristics:

.1 Lumber, Finger Jointed Lumber, Glulam, I-Joists, Trusses, SCL, CAN/CSA-Z809 or FSC or SFI certified.

.2 Plywood, Particleboard, OSB urea-formaldehyde free, CAN/CSA-Z809 or FSC or SFI certified.

.2 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
- .1 CSA O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.

.3 Glued end-jointed (finger-jointed) lumber [NLGA Special Products Standard] SPS, are acceptable.

.4 Glulam in accordance with Structural Glued-Laminated Timber CAN/CSA-O122.

.5 Structural Composite Lumber (SCL) in accordance with ASTM D 5456.

.6 Framing and board lumber: in accordance with NBC, except as follows:

.7 Furring, blocking, nailing strips, grounds, rough bucks, [cants,] curbs, fascia backing and sleepers:
- .1 Board sizes: "Standard" or better grade.
- .2 Dimension sizes: "Standard" light framing or better grade.
- .3 Post and timbers sizes: "Standard" or better grade.

.8 Plywood, OSB and wood based composite panels: to CSA O325.

.9 Douglas fir plywood (DFP): to CSA O121, standard construction.

.10 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.11 Poplar plywood (PP): to CSA O153, standard construction.

.12 Insulating fiberboard sheathing: to [CAN/CSA-A247] [CAN/ULC-S706].

.13 Glass fibre board sheathing: non-structural, rigid, faced, fiberglass, insulating exterior sheathing board.

.14 Expanded polystyrene sheathing: to ASTM C 578.

.15 Gypsum sheathing: to ASTM C 1396/C 1396M.

2.02 ACCESSORIES

.1 Exterior wall sheathing paper: to CAN/CGSB-51.32 single ply type as indicated.

.2 Polyethylene film: to CAN/CGSB-51.34, Type1, 0.15 mm thick.

.3 Roll roofing: to CAN/CSA A123.2, Type S.

.4 Air seal: closed cell polyurethane or polyethylene.

.5 Sealants: in accordance with Section 07 92 00 - Joint Sealants.

.6 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.

.7 General purpose adhesive: to CSA O112.9.

.8 Nails, spikes and staples: to CSA B111.

.9 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.10 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

.11 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation.

.12 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal formed to prevent dishing. Bell or cup shapes not acceptable.

.13 Fastener Finishes:
.1 Use galvanized fasteners for exterior work, interior highly humid areas.

.15 Wood Preservative:
.1 Preservative, Coating: in accordance with manufacturer's recommendations for surface conditions:

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Consultant.
.2 Inform Consultant of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied after receipt of written approval to proceed from Consultant.

3.02 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.4 Treat material as indicated as follows:
.1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
.2 Wood furring for exterior masonry and concrete walls.
.3 Wood sleepers supporting wood sub flooring over concrete slabs in contact with ground.

3.03 INSTALLATION

.1 Install members true to line, levels and elevations, square and plumb.

.2 Construct continuous members from pieces of longest practical length.

.3 Install spanning members with "crown-edge" up.

.4 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.5 Install sub flooring and combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.
.1 In addition to mechanical fasteners, floor panels secure floor sub flooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.

.6 Install wall sheathing in accordance with manufacturer's printed instructions.

.7 Install roof sheathing in accordance with requirements of NBC.

.8 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, electrical equipment mounting boards, and other work as required.

.9 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
.1 Align and plumb faces of furring and blocking to tolerance of [1:600].

.10 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.11 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.

.12 Install sleepers as indicated.

.13 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.

.14 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.15 Countersink bolts where necessary to provide clearance for other work.

.16 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.04 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning and Section 01 74 21 – Garbage Disposal and Clean Up.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.06 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 10 00 – Rough Carpentry.

.2 Division 09 – Finishes.

1.02 REFERENCES

.1 American National Standards Institute (ANSI)
- .1 ANSI A208.1-09, Particleboard.
- .2 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.
- .3 ANSI/HPVA HP-1-10, American National Standard for Hardwood and Decorative Plywood.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
- .1 Architectural Woodwork Quality Standards, 1st edition, 2009.

.3 ASTM International
- .1 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.5 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-11.3-M87, Hardboard.

.6 CSA International
- .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
- .2 CSA O121-08, Douglas Fir Plywood.
- .3 CSA O141-05(R2009), Softwood Lumber.
- .4 CSA O151-09, Canadian Softwood Plywood.
- .5 CSA O153-M1980(R2008), Poplar Plywood.

.8 National Lumber Grades Authority (NLGA)
- .1 Standard Grading Rules for Canadian Lumber 2010.

.11 Underwriters Laboratories of Canada (ULC)
- .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
- .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, particleboard, OSB, MDF and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate details of construction, profiles, jointing, fastening and other related details.
.3 Indicate materials, thicknesses, finishes and hardware.

.4 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.
.3 Submit duplicate 300 x 300 mm samples as requested by Owner and or Architect.

.5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

.6 Test and Evaluation Reports: submit certified test reports for composite wood from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

1.04 QUALITY ASSURANCE

.1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).

.2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.

.3 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada to CAN/ULC-S104 and CAN/ULC-S105.

1.05 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect wood products from nicks, scratches, and blemishes.

.4 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

.1 Softwood lumber: S4S, moisture content 19% or less in accordance with following standards:
- .1 CSA O141.
- .2 CAN/CSA-Z809 or FSC or SFI certified.
- .3 NLGA Standard Grading Rules for Canadian Lumber.
- .4 AWMAC [custom] [premium] grade, moisture content as specified.
- .5 Machine stress-rated lumber is acceptable.
- .6 Hardwood lumber: moisture content in accordance:
  - .1 CAN/CSA-Z809 or FSC or SFI certified.

.2 Panel Material: urea-formaldehyde free
.3 Douglas fir plywood (DFP): to CSA O121, standard construction.
.4 Canadian softwood plywood (CSP): to CSA O151, standard construction.
.5 Hardwood plywood: to ANSI/HPVA HP-1.
.6 Poplar plywood (PP): to CSA O153, standard construction.
.7 Particleboard: to ANSI A208.1.
.8 Hardboard: to CAN/CGSB-11.3.
.9 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/mü.
.10 Low density fibreboard: to CSA-A247M.
.11 Decorative overlaid composite panels.(Wood Veneers)
- .1 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.
- .2 Edge finishing: matching melamine and polyester overlay edge strip with self-adhesive, saw kerfed to take plastic "T" moulding in width and colour to match melamine finish.

2.02 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to ASTM A 123/A 123M for exterior work, interior humid areas and for treated lumber; stainless steel finish elsewhere.

.2 Wood screws: stainless steel, type and size to suit application.

.3 Splines: metal.

.4 Adhesive and Sealants: in accordance with Section 07 92 00 - Joint Sealants.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Construction Manager and Consultant.
- .2 Inform Construction Manager of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Construction Manager.

3.02 INSTALLATION

.1 Do finish carpentry to Quality Standards of (AWMAC).

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to conceal shrinkage.

3.03 CONSTRUCTION

.1 Fastening:

- .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
- .2 Design and select fasteners to suit size and nature of components

being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Standing and running trim:

.1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

.2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.

.3 Make joints in baseboard, where necessary using a 45 degrees scarf type joint.

.4 Install door and window trim in single lengths without splicing.

.3 Interior and exterior frames:

.1 Set frames with plumb sides and level heads and sills and secure.

.4 Panelling:

.1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.

.2 Secure panelling and perimeter trim using concealed fasteners.

.3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

.5 Stairs:

.1 Install stairs to location and details as indicated.

.6 Handrails, wall rails and bumper rails.

.1 Install handrails, wall rails and bumper rails in locations indicated.

.2 Make joints hair line, dowelled and glued.

.3 Install backing plates as indicated.

.4 Install metal backing plates between studs at bracket locations to ensure proper support for brackets and bolts or self-tapping screws.

.5 Secure using counter sunk screws plugged with matching wood plugs.

.7 Shelving:

.1 Install shelving as indicated.

3.04 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning and

Section 01 74 21 – Garbage Disposal and Clean Up.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.10 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by finish carpentry installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 06 20 00 – Finish Carpentry.

.2 Section 06 40 00 – Architectural Woodwork

1.02 REFERENCES

.4 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.5 CSA International
- .1 CSA O112.10-08, Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).
- .2 CSA O121-08, Douglas Fir Plywood.
- .3 CSA O151-09, Canadian Softwood Plywood.
- .4 CSA O153-M1980(R2008), Poplar Plywood.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for laminate, adhesive, and core materials and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
- .1 Submit for review and acceptance of each unit.
- .2 Samples will be returned for inclusion into work.
- .3 Submit duplicate samples of joints, edging, cutouts and postformed profiles.

.4 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.04 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for laminate work for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.05 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Sustainable Standards Certification:
- .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809.

- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.06 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect laminate, adhesive, and core materials from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

2 PRODUCTS

2.01 MATERIALS

2.1 General:

.1 Products manufactured by one of the following companies are suggested for use on this project.
- .1 Arborite
- .2 Nevamar
- .3 Panolam

.2 Final Selection of Plastic Laminate surface characteristics including colour, texture and pattern is to be made by Interior Designer. Refer to Drawings.

2.2 Materials

.1 Laminated plastic for flatwork: to CAN3-A172, Grade GP, Type SD, 1.25mm (0.050") thick; based on solid colour range with velour finish. Acceptable products: refer to drawings

.2 Laminated plastic for postformed work: to CAN3-A172, Grade PF, Type S, 1.07mm (0.042") thick, based on solid colour range with velour finish. Acceptable products: refer to Drawings

.3 Laminated plastic backing sheet: supplied by same manufacturer as facing sheet; not less than 0.508 mm (0.02") thick and same colour as face laminate. Sanded one side. Acceptable products:
.1 Formica Laminate Grade 20.

.4 Laminated plastic cabinet liner sheet material or for MCP Board or Cladboard material: supplied by same manufacturer as facing sheet, not less than 0.760 mm (0.028") thick, white colour. Acceptable products: refer to Drawings

.5 Plywood core: Douglas Fir Plywood to CSA-O121 or Canadian Softwood Plywood to CSA-O151 solid two sides, 19 mm (¾") thick.

.6 Particleboard core: to CAN3-O188.1, Grade R, sanded faces, of thickness indicated.

.7 Adhesive for laminated plastic: to be CSA approved and one of the following types as selected by the laminate manufacturer as being suitable for the application:
.1 Urea resin adhesive to CSA O112 Series.
.2 Contact adhesive to CAN/CGSB-71.20.
.3 Resorcinol resin adhesive to CSA O112.
.4 Polyvinyl adhesive to CSA O112.
.5 Two component epoxy thermosetting adhesive.

.8 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.

.9 Sealant: of a type recommended by the laminate manufacturer and in accordance with Section 07 92 00 - Joint Sealants; colour to be selected by the Consultant.

.10 Draw bolts and splines: as recommended by fabricator.

.11 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.12 Apply laminated plastic liner sheet to interior of cabinetry, including all exposed surfaces such as gable ends, doors and drawers, and where otherwise indicated.

2.02 FABRICATION

.1 Comply with NEMA LD3, Annex A.

.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.

.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.6 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.7 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.8 Apply laminated plastic liner sheet where indicated.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for

laminate, adhesive, and core materials installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.02 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.03 INSTALLATION

.1 Install work plumb, true and square, neatly scribed to adjoining surfaces.

.2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.

.3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.

.4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.

.5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.

.6 Site apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated.

.7 For site application, offset joints in plastic laminate facing from joints in core.

3.04 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
.1 Clean to NEMA LD3, Annex B.
.2 Remove traces of primer, caulking, epoxy and filler materials and clean doors and frames.

3.05 PROTECTION

.1 Cover finished laminated plastic veneered surfaces with heavy kraft paper or put in cartons during shipment.

.2 Protect installed laminated surfaces in accordance with manufacturer's written recommendations.
.1 Remove protection only immediately before final inspection.

.3 Protect installed products and components from damage during construction.

.4 Repair damage to adjacent materials caused by laminate, adhesive, and core materials installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Division 04 – Masonry

.2 Section 09 21 16 - Gypsum Board Assemblies

.3 Section 09 30 13 – ceramic Tile and Stone Finishes

.4 Section 09 91 23 – Interior Painting

1.02 REFERENCES

.1 ASTM International
- .1 ASTM C 834, Specification for Latex Sealants.
- .2 ASTM C920, Specification for Elastomeric Joint Sealants.
- .3 ASTM C1330, Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for [joint sealants] and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Manufacturer's product to describe:
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Samples:
- .1 Submit 2 samples of each type of material and colour. Colors to be selected by Consultant.
- .2 Cured samples of exposed sealants for each colour where required to match adjacent material.

.4 Manufacturer's Instructions:
- .1 Submit instructions to include installation instructions for each product used.

1.04 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.05 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect joint sealants from exterior elements.
- .3 Replace defective or damaged materials with new.

1.06 SITE CONDITIONS

.1 Ambient Conditions:
- .1 Proceed with installation of joint sealants only when:
  - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 deg. C.
  - .2 Joint substrates are dry.
  - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions:
- .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:
- .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

2 PRODUCTS

2.01 MATERIALS

.1 General:
- .1 All materials under Work of this Section, including but not limited to, primers and sealants are to have low VOC content limits.
- .2 Use materials as received from manufacturers, without additives or adulterations. Use one manufacturer's product for each kind of product specified.

.2 Sealant **Type A:** ASTM C920, Type M, Grade NS, Class 25; Two-part, Polyurethane non-sag type, in standard colours selected.
- .1 Sikaflex 2C-NS by Sika Canada Inc.
- .2 Dymeric 240 by Tremco Ltd.

.3 Sealant **Type B:** ASTM C920, Type S, Grade NS; One-part mildew-resistant silicone, in standard colours selected.
- .1 786 Mildew Resistant Silicone Sealant by Dow Corning Inc.
- .2 Tremsil 200 Silicone Sealant by Tremco Ltd.

.4 Sealant **Type C:** ASTM C834; Pure acrylic siliconized sealant; in standard white colour(paintable).
- .1 Tremflex 834 Silicone Sealant by Tremco Ltd.

.5 Grout Sealer: Clear solvent based impregnator/sealer:
- .1 HD Grout Sealer by DuPont Stonetech.
- .2 Tile Ultimate by Master Blend.

2.04 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

3 EXECUTION

3.01 EXAMINATION

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

3.02 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.03 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.04 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.05 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.06 APPLICATION

.1 Sealant:
- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .4 Apply sealant using gun with proper size nozzle.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

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

.9 Curing:
- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

3.07 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Clean adjacent surfaces immediately.
- .3 Remove excess and droppings, using recommended cleaners as work progresses.
- .4 Remove masking tape after initial set of sealant.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.08 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 10 00 – Rough Carpentry.

1.02 REFERENCES

.2 ASTM International

.1 ASTM C 475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.2 ASTM C 514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.

.3 ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.

.4 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.

.5 ASTM C 954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.6 ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.7 ASTM C 1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.8 ASTM C 1280-99, Standard Specification for Application of Gypsum Sheathing.

.9 ASTM C 1177/C 1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.10 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.11 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.

.12 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.13 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.14 Underwriters' Laboratories of Canada (ULC)

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

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

1.04 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store gypsum board assemblies materials level off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.

.3 Protect from weather, elements and damage from construction operations.

.4 Handle gypsum boards to prevent damage to edges, ends or surfaces.

.5 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

.6 Replace defective or damaged materials with new.

1.05 AMBIENT CONDITIONS

.1 Maintain temperature 10 degrees C minimum, 21 degrees C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

2 PRODUCTS

2.01 MATERIALS

.1 Gypsum Board

.1 Plain: to CSA A82.27-M91 standard or thickness as indicated, 1220mm(48") wide x maximum practical length, ends square cut, edges tapered.

.2 Cement Board board to thickness as indicated, 1220mm(48") wide x maximum practical length.

.3 Firerated: to CSA A82.27-M91 standard or thickness as indicated, 1220mm (48") wide x maximum practical length, ends square cut, edges tapered.

.2 Metal Furring and Suspension Systems

.1 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M1980, galvanized.

.2 Drywall furring channels: 0.5mm core thickness galvanized steel channels for screw attachment of gypsum board.

.3 Resilient clips 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.3 Fastenings and Adhesives:

.1 Nails, screws and staples: to CSA A82.31- M1980.

.2 Stud adhesive: to CGSB 71-GP-25M.

.3 Laminating compound: to CSA A82.31-M1980, asbestos-free.

.4 Accessories:

.1 Casing beads, corner beads fill type: 0.5 mm base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525-M90, perforated flanges; one piece length per location.

.2 Acoustic sealant: to CGSB 19-GP-21M.

.3 Polyethylene: to CAN 2-51.33-M89, Type 2.

.4 Joint compound: to CSA A82.31-M1980, asbestos- free.

.5 Finish:

.1 Smooth finish: asbestos-free standard white primer-sealer, recommended by gypsum board manufacturer.

2.02 FINISHES

.1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions.

.2 Inspect substrate conditions and Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.02 EXECUTION

.1 Suspended and Furred Ceilings

.1 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with CSA A82.31-M1980 except where specified otherwise.

.2 Support light fixtures by providing additional ceiling suspension hangers within 150mm(6”) of each corner and at maximum 620mm(24”) around perimeter of fixture.

.3 Install work level to tolerance of 1:1200.

.4 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, etc.

.5 Install 18mm(3/4”) x 62mm(2 1/2”) furring channels parallel to, and at exact locations of steel stud partition header track.

.6 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

.7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.8 Install suspension hangers for suspended and furred ceilings at 1240mm(48”).

.2 Wall Furring

.1 Install wall furring for gypsum board wall finishes in accordance with CSA A82.31-M1980, except where specified otherwise.

.2 Furr openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

.3 Gypsum Board Application:

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.2 Apply single or double layer gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 620mm(12”) oc.

.3 Apply type X gypsum board where indicated, to obtain: Rating listed on drawings.

.4 Apply water resistant gypsum board in all wet areas, where wall tiles to be applied and adjacent to slop sinks, washroom walls and janitors closets. Apply water- resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.5 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, etc., in partitions where perimeter sealed with acoustical sealant.

.6 Provide a 87mm(3 1/2”) solid stud mounted as required for all wall mounted fittings, fixtures, equipment and accessories. Extend reinforcement full length of wall mounted items and extend beyond to nearest vertical stud or furring member.

.4 Accessories:

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned

and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 6" o/c for full length.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.4 Install insulating strips continuously at edges of gypsum board or casing beads abutting metal window or exterior door frames, to provide thermal break.

.5 Control Joints:

.1 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.2 Provide continuous polyethylene dust barrier behind and across control joints.

.3 Locate control joints where indicated.

.4 Install control joints straight and true.

.6 Access Doors:

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems.

.7 Taping and Filling:

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.03 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.04 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by gypsum board assemblies installation.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 07 92 00 – Joint Sealants.

1.02 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM C 144-04, Specification for Aggregate for Masonry Mortar.
- .2 ASTM C 207-06, Specification for Hydrated Lime for Masonry Purposes.
- .3 ASTM C 847-06, Specification for Metal Lath.
- .4 ASTM C 979-05, Specification for Pigments for Integrally Coloured Concrete.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
- .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
- .4 CAN/CGSB-25.20-95, Surface Sealer for Floors.

.3 Terrazzo Tile and Marble Association of Canada (TTMAC)
- .1 Tile Specification Guide 09 30 00 2006/2007, Tile Installation Manual.
- .2 Tile Maintenance Guide 2000.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .1 Include manufacturer's information on:
  - .1 Ceramic/Porcelain tile, marked to show each type, size, and shape required.
  - .2 Chemical resistant mortar and grout (Epoxy and Furan).
  - .3 Cementitious backer unit.
  - .4 Dry-set cement mortar and grout.
  - .5 Divider strip.
  - .6 Elastomeric membrane and bond coat.
  - .7 Reinforcing tape.
  - .8 Levelling compound.
  - .9 Latex cement mortar and grout.

.10 Commercial cement grout.
.11 Organic adhesive.
.12 Slip resistant tile.
.13 Waterproofing isolation membrane.
.14 Fasteners.

.3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
.1 Base tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
.2 Floor tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
.3 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
.4 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.04 QUALITY ASSURANCE

.1 Quality Assurance Submittals:
.1 Manufacturer's Instructions: manufacturer's installation instructions.

.2 Manufacturer's Field Reports: manufacturer's field reports specified.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.06 MAINTENANCE

.1 Extra Materials:
.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
.2 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.
.3 Maintenance material same production run as installed material.

2 PRODUCTS

2.01 FLOOR TILE

.1 Refer to Drawings and Specifications.

2.02 WALL AND CEILING TILE

.1 Refer to Drawings and Specifications.

2.03 BASE TILE

.1 Refer to Drawings and Specifications.

2.04 METAL INLAY

.1 Refer to Drawings and Specifications.

2.05 TRIM SHAPES

.1 Conform to applicable requirements of adjoining floor and wall tile.

.2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.

.3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

.4 Internal and External Corners: provide trim shapes as follows where indicated.
- .1 Bullnose shapes for external corners including edges.
- .2 Coved shapes for internal corners.
- .3 Special shapes for:
  - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
  - .2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
  - .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.
  - .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.

.5 Provide cove and bullnose shapes for countertops, and where indicated and required to complete tile work.

2.06 MORTAR AND ADHESIVE MATERIALS

.1 Cement: to CSA-A5, type 10.

.2 Sand: to ASTM C 144, passing 16 mesh.

.3 Hydrated lime: to ASTM C 207.

.4 Latex additive: formulated for use in cement mortar and thin set bond coat.

.5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

.6 Adhesives: to CGSB 71-CP-22M-78, Type 1.

2.07 GROUT

.1 Colouring Pigments: Colour to be selected by Interior Designer.
- .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C 979.
- .2 Colouring pigments to be added to grout by manufacturer.
- .3 Job coloured grout are not acceptable.
- .4 Use in Commercial Cement Grout, Dry-Set Grout, and Latex Cement Grout.

.2 Cement Grout: to ANSI A108.1.
- .1 Use one part white cement to one part white sand passing a number 30 screen.

.3 Commercial Cement Grout: to CTI A118.6.

.4 Dry-Set Grout: to CTI A118.6.

.5 Latex Cement Grout: to ANSI A108.1, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.

.6 Chemical-Resistant Grout:
- .1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
- .2 Furan grout: to CTI A118.5.

2.08 ACCESSORIES

.1 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.

.3 Cleavage plane: polyethylene film to CGSB 51-34.

.4 Metal lath: to ASTM C 847 galvanized finish, 10 mm rib at 2.17 kg/mý.

.5 Transition Strips: purpose made metal extrusion; anodized aluminum type. Schlutter or approved equal.

.6 Reducer Strips: purpose made metal extrusion; anodized aluminum type; maximum slope of 1:2.

.7 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.

.8 Sealant: in accordance with Section 07 92 00 - Joint Sealants.

.9 Floor sealer and protective coating: to tile and grout manufacturer's recommendations.

2.09 MIXES

.1 Cement:

.1 Scratch coat: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.

.2 Slurry bond coat: cement and water mixed to creamy paste. Latex additive may be included.

.3 Mortar bed for floors: 1 part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.

.4 Mortar bed for walls and ceilings: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.

.5 Levelling coat: 1 part cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.

.6 Bond or setting coat: 1 part cement, 1/3 part hydrated lime, 1 part water.

.7 Measure mortar ingredients by volume.

.2 Dry set mortar: mix to manufacturer's instructions.

.3 Mix bond and leveling coats, and grout to manufacturer's instructions.

.4 Adjust water volumes to suit water content of sand.

2.10 PATCHING AND LEVELLING COMPOUND

.1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.

.2 Have not less than the following physical properties:

.1 Compressive strength - 25 MPa.
.2 Tensile strength - 7 MPa.
.3 Flexural strength - 7 MPa.
.4 Density - 1.9.

.3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.

.4 Ready for use in 48 hours after application.

2.11 CLEANING COMPOUNDS

.1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.

.2 Materials containing acid or caustic material are not acceptable.

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 WORKMANSHIP

.1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, except where specified otherwise.

.2 Apply tile to clean and sound surfaces.

.3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.

.4 Maximum surface tolerance 1:800.

.5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

.6 Lay out tiles so perimeter tiles are minimum 1/2 size.

.7 Sound tiles after setting and replace hollow-sounding units to obtain full

bond.

.8 Make internal angles square, external angles rounded.

.9 Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

.10 Install divider strips at junction of tile flooring and dissimilar materials.

.11 Allow minimum 24 hours after installation of tiles, before grouting.

.12 Clean installed tile surfaces after installation and grouting cured.

3.03 WALL TILE

.1 Install in accordance with TTMAC details.

3.04 FLOOR TILE

.1 Install in accordance with TTMAC details.

3.05 CEILING TILE

.1 Install in accordance with TTMAC details.

3.06 BASE TILE

.1 Install in accordance with TTMAC details.

3.07 STAIR TREADS

.1 Install in accordance with TTMAC details.

3.08 FLOOR SEALER AND PROTECTIVE COATING

.1 Apply in accordance with manufacturer's instructions.

.2 Refer to Section 07 92 00 Joint Sealers.

3.09 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.10 CLEANING

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

END OF SECTION

1 PART 1 – GENERAL

1.1 SUMMARY

1.1.1 Products Supplied

A. Resilient Athletic Flooring.
B. Accessories required for installation, maintenance and repair.

1.1.2 Related Requirements

A. Section 02 25 00 – Existing Material Assessment
B. Section 03 05 00 – Common Work Results for Concrete
C. Section 06 05 00 – Common Work Results for Wood, Plastics, and Composites
D. Section 07 05 00 – Common Work Results for Thermal and Moisture Protection
E. Section 07 10 00 – Dampproofing and Waterproofing

1.2 REFERENCES

1.2.1 ASTM International (ASTM)

A. ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
B. ASTM D2047: Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as measured by the James Machine.
C. ASTM D2240: Standard Test Method for Rubber Property (Durometer Hardness).
D. ASTM D3389: Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader).
E. ASTM E492: Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
F. ASTM E648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
G. ASTM E1643: Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
H. ASTM E1745: Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
I. ASTM E2180: Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials.
J. ASTM F386: Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces.

K. ASTM F710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
L. ASTM F925: Standard Test Method for Resistance to Chemicals of Resilient Flooring.
M. ASTM F970: Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading.
N. ASTM F1514: Standard Test method for Measuring Heat Stability of Resilient Flooring by Color Change.
O. ASTM F1515: Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change.
P. ASTM F1869: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
Q. ASTM F2170: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.2.2 State of California (CA)

A. CA Section 01350: Standard Method for the Testing and Evaluation of Volatile Organic Compound Emissions from Indoor Sources Using Environmental Chambers.

1.2.3 Grenelle Environmental Forum

A. Decree № 2011-321: French labeling requirement for VOC emissions of construction products, wall and floor coverings, as well as paints and varnishes.

1.2.4 GREENGUARD Environmental Institute (GEI)

A. GREENGUARD Certification: Compliant with stringent emission levels for over 360 VOCs, plus a limit on the total of all chemical emissions combined (TVOC).
B. GREENGUARD Gold: Compliant with safety factors to account for sensitive individuals (such as children and the elderly) and ensures that a product is acceptable for use in environments such as schools and healthcare facilities.

1.2.5 International Organization for Standardization (ISO)

A. ISO 9001: Quality management systems – Requirements.
B. ISO 16000-9: Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method.

1.3 SUBMITTALS

1.3.1 Action Submittals

A. Provide current printed data sheets for all Products Supplied.
B. Provide samples, 6 inches x 6 inches, for verification of such characteristics as color and surface texture of each specified Manufactured Product.
C. As necessary, provide shop drawings prepared for project illustrating layouts, details, dimensions and other data.

1.3.2 Informational Submittals

A. Provide Manufacturer's current printed substrate surface preparation guidelines.
B. Provide Manufacturer's current printed installation guidelines for Products Supplied.

1.3.3 Closeout Submittals

A. Provide Manufacturer's current printed maintenance guidelines for Manufactured Product.
B. Provide Manufacturer's current printed standard warranty for Manufactured Product.

1.3.4 Maintenance Material Submittals

A. Provide extra stock materials from original dye lots, for use in facility operations and maintenance (approximately 2% of the total floor surface for each color, surface texture and format of Manufactured Product).

1.4 QUALITY ASSURANCE

A. Manufacturer must be certified ISO 9001.
B. Manufacturer must have a minimum of fifteen (15) years of experience in the manufacturing of prefabricated resilient athletic flooring.
C. Manufactured Product must have undergone a vulcanization process; factory lamination should not be accepted as equivalent.
D. Surfacing Contractor to be recognized and approved by the Manufacturer.
E. Surfacing Contractor shall be fully acquainted with the existing facility and utilities and shall fully understand the difficulties and restrictions attending the execution of the work under contract. Surfacing Contractor to advise the Owner of any restrictions or anticipated difficulty, in writing and before submitting bids.
F. Installer must be approved by the Surfacing Contractor and must have performed installations of the same scale in the last three (3) years.
G. Installation of mock-up is highly recommended and must be deemed acceptable by Owner and Architect. Mock-up is to be installed following the same

procedures and utilizing the same specified materials that will be used for the actual project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Products Supplied must be delivered in Manufacturer's original, unopened and undamaged packaging with identification labels intact.
B. Products Supplied must be protected from exposure to harmful weather conditions and must be safely stored on a clean, dry, flat surface. Store rolls of resilient athletic flooring upright; store tiles of resilient athletic flooring on a flat surface, carefully protecting corners and edges.
C. Climate controlled storage is recommended. Storage temperature must not be below 40°F (4°C) and must not exceed 100°F (38°C). Materials must be delivered to site a minimum of 24 hours before work is scheduled to begin so that they may acclimate.
D. Avoid storing Manufactured Product for extended periods of time or additional material trimming may be required.
E. Products Supplied need not suffer damage during handling (i.e. dents/scratches, edge chipping, excessive warping, etc.).

1.6 SITE CONDITIONS

A. The General Contractor or Construction Manager shall be responsible for ensuring all site conditions meet the requirements of the Manufacturer, as referenced herein at sections 3.2 and 3.3.
B. Concrete slabs, on or below grade, must be installed over a permanent effective vapor retarder, respecting current versions of the standard practice ASTM E1643 and the standard specification ASTM E1745. The vapor retarder must be placed directly underneath the concrete slab, above the granular fill, as per Manufacturer's instructions. The vapor retarder must have a perm rating of 0.1 or less and must have a minimum thickness of 10 mil (0.010 in).
C. No sealers or curing compounds are applied to or mixed into the concrete (refer to Section 03 05 00 – Common Work Results for Concrete of Division 3).
D. Installation of the resilient athletic flooring to be carried out no sooner than the specified curing time of the concrete (normal density concrete curing time is approximately 28 days for development of design strength, having a minimum 3500 psi/25 MPa in compressive strength). Refer to current version of ASTM F710 for additional information.
E. Substrate surface must be free of all contaminants that can inhibit bond (paint, wax, dust, oil or grease, sealer, curing compound, solvent, asphalt, old adhesive residues, etc.). All contaminants must be removed from the surface via mechanical abatement. Use of abatement chemicals is not recommended.

F. Concrete must have a smooth finish, proper density and be highly compacted with a tolerance of 1/8th of an inch in a 10-foot radius (3.2 mm in 3.05 m radius). Floor Flatness (FF) and Floor Levelness (FL) numbers are not recognized.
G. Moisture and alkalinity tests must be performed on all concrete substrates, under in-service conditions. It is recommended to turn on the HVAC unit prior to performing moisture testing, in order to ensure stable testing conditions and accurate results. The concrete's surface pH should be between 7 and 10. Relative humidity of the concrete slab must not exceed the tolerance of the adhesive specified, in accordance with the current version of ASTM F2170 (in situ probes). Moisture vapor emissions from the concrete slab must not exceed the tolerance of the adhesive specified, in accordance with the current version of ASTM F1869 (anhydrous calcium chloride).
H. Maintain stable room and substrate temperatures prior to moisture testing and flooring installation, during the flooring installation, as well as a minimum of 48 hours after the flooring has been completely installed. Recommended ambient temperature range is between 65^{o}F and 86^{o}F (18^{o}C and 30^{o}C) and recommended ambient humidity range is between 35% and 55%.
I. If installing over wood substrates, use exterior grade plywood with at least one good side, such as: APA (Engineered Wood Association) Exterior grade plywood (A-A Exterior, A-B Exterior or A-C Exterior) and CANPLY (Canadian Plywood Association) Exterior certified plywood (Canada: Grade G2S A-A or G1S A-C. USA: Grade G2S A-A, A-B, B-B or G1S A-C and B-C). There must be proper underfloor ventilation, plywood

   must be dry and should have a moisture content ranging from 6% to 12%, when measured with a quality wood moisture meter (electronic hygrometer).
J. Installation of resilient athletic flooring will not commence until the building is enclosed and all other trades have completed their work. It is the General Contractor or Construction Manager's responsibility to maintain a secure and clean working area before, during and after the installation of the resilient athletic flooring.

1.7 LIMITED WARRANTY

A. The resilient athletic flooring is warranted to be free from manufacturing defects for a period of one (1) year, beginning 30 days from the date of shipment from the Manufacturer.
B. The resilient athletic flooring is warranted against excessive wear under normal usage for a period of ten (10) years, beginning 30 days from the date of shipment from the Manufacturer.
C. Refer to current copy of Manufactured Product's Limited Warranty for all terms and conditions.

2 PART 2 – PRODUCTS

2.1 MANUFACTURED PRODUCT

2.1.1 Manufacturer

A. Mondo Luxembourg S.A.: Z.I. Foetz - Rue de l'Industrie, L-3895 Foetz, Luxembourg.

2.1.2 Description

A. Sport Impact is prefabricated resilient athletic flooring, calendered and vulcanized with a base of natural and synthetic rubbers, stabilizing agents and pigmentation, as manufactured by Mondo Luxembourg S.A. or approved equal.
B. Health-Conscious Production: Sport Impact is manufactured without bisphenol A (BPA), formaldehyde, heavy metals, isocyanates and phthalates.
C. Manufactured in two layers which are vulcanized together. Shore hardness of layers to be recommended by the Manufacturer and to respect requirements.
D. Thickness: 0.394 in. (10 mm).
E. Colors: Provided in standard, solid background colors with randomly dispersed colored chips throughout wear layer depth.
F. Surface Texture: Sealskin.
G. Formats: Available in sheets that are 6'1" (1.86 m) wide and 29'6" (9 m) long [min. 19'8" (6 m)/max. 36'1" (11 m)]; available in tiles that are 3' x 3' (0.91 m x 0.91 m).

2.1.3 Performance

A. Performance characteristics of Manufactured Product to conform to the following requirements:

Characteristic	Standard	Requirement	Result*
Elongation at Break	ASTM D412	≥100%	127.69%
Tensile Strength	ASTM D412	≥300 psi	579.8 psi
Static Coefficient of Friction (neolite heel)	ASTM D2047	≥0.5 (dry)	≥0.80 (dry)
Durometer Hardness (wear layer)	ASTM D2240	≥70	80
Durometer Hardness (backing)	ASTM D2240	≥55	75

Abrasion Resistance (H18 wheel, 500g, 1000 cycles)	ASTM D3389	≤0.3 g	<0.3 g
Impact Sound Transmission (Impact Insulation Class)	ASTM E492	-	59 dB (IIC)
Critical Radiant Flux	ASTM E648	≥0.22 (Class II)	≥0.45 (Class I)
Microbial Activity	ASTM E2180	-	Significant Reduction
Thickness	ASTM F386	10 mm (±0.2 mm); 0.394 in (±0.008 in)	Compliant
Chemical Resistance	ASTM F925	≤Slight Change	Compliant**
Static Loading	ASTM F970	≤0.008" (at 250 psi)	0.002" (at 250 psi)
Heat Stability	ASTM F1514	≤8.0 E	Compliant
Light Stability	ASTM F1515	≤8.0 E	Compliant
Indoor Air Quality: CA Section 01350	CA: V1.1-2010	-	Compliant
Indoor Air Quality: Greenguard Gold	Greenguard	-	Compliant
Indoor Air Quality: Greenguard Certification	Greenguard	-	Compliant
Indoor Air Quality: French Decree № 2011-321	ISO 16000-9	-	Compliant

*Results obtained from manufacturing controls can vary between production lots and do not constitute representations or warranties as to any particular production lot. Mondo reserves the right to modify product design and/or specifications at any time without notice. **For the complete list of chemicals tested, concentrations and contact time, please communicate with Mondo's Technical Department.

2.1.4 Limitations

A. For areas subject to surface impacts, such as designated free weight areas, it is recommended to adhere the resilient athletic flooring directly to the concrete substrate for optimal performance. Whenever possible, avoid installing resilient athletic flooring on weaker surfaces that may offer less resistance to continuous impacts.

2.1.5 Materials

A. Provide Sport Impact resilient athletic flooring manufactured by Mondo Luxembourg S.A. or approved equal.
B. Provide resilient athletic flooring as specified in section 2.1.2 Description.

2.2 ACCESSORIES

A. Provide adhesive certified by Manufacturer: Mondo PU 105 (polyurethane) for installations over concrete and wood substrates. For installations over Mondo Everlay, default to Mondo PU 100 (polyurethane). For suitability, recommendations and use, please refer to Manufacturer's current printed adhesive guidelines. In some cases, Mondo EP 55 (epoxy) may be used in areas that have not been specified to receive Everlay, and that will not be subject to surface impacts (such as falling free weights) or heavier dynamic loads (such as bleachers).

3 PART 3 – EXECUTION

3.1 INSTALLERS

A. Refer to section 1.4 of this document for information on installers.

3.2 EXAMINATION

A. Ensure that concrete slabs, on or below grade, are installed over a permanent effective vapor retarder, respecting current versions of the standard practice ASTM E1643 and the standard specification ASTM E1745. The vapor retarder must be placed directly underneath the concrete slab, above the granular fill, as per Manufacturer's instructions. The vapor retarder must have a perm rating of 0.1 or less and must have a minimum thickness of 10 mil (0.010 in).
B. Installation of the resilient athletic flooring to be carried out no sooner than the specified curing time of the concrete (normal density concrete curing time is approximately 28 days for development of design strength, having a minimum 3500 psi/25 MPa in compressive strength). Refer to current version of ASTM F710 for additional information.
C. Ensure that no sealers or curing compounds have been applied to or mixed into the concrete (refer to Section 03 05 00 – Common Work Results for Concrete of Division 3).
D. Ensure that concrete surface is free of any contaminant that could inhibit bond (paint, wax, dust, oil or grease, sealer, curing compound, solvent, asphalt, old adhesive residues, etc.). All contaminants must be removed from the surface via mechanical abatement. Use of abatement chemicals is not recommended.

E. Confirm concrete has a smooth finish, proper density and is highly compacted with a tolerance of 1/8th of an inch in a 10-foot radius (3.2 mm in a 3.05 m radius). Floor Flatness (FF) and Floor Levelness (FL) numbers are not recognized.
F. Moisture and alkalinity tests must be performed on all concrete substrates, under in-service conditions. It is recommended to turn on the HVAC unit prior to performing moisture testing, in order to ensure stable testing conditions and accurate results. The concrete's surface pH should be between 7 and 10. Relative humidity of the concrete slab must not exceed the tolerance of the adhesive specified, in accordance with the current version of ASTM F2170 (in situ probes). Moisture vapor emissions from the concrete slab must not exceed the tolerance of the adhesive specified, in accordance with the current version of ASTM F1869 (anhydrous calcium chloride).
G. Ensure room and substrate temperatures are maintained prior to moisture testing and flooring installation, during the flooring installation, as well as a minimum of 48 hours after the flooring has been completely installed. Recommended ambient temperature range is between 65^{o}F and 86^{o}F (18^{o}C and 30^{o}C) and recommended ambient humidity range is between 35% and 55%.
H. If installing over wood substrates, ensure exterior grade plywood with at least one good side, such as: APA (Engineered Wood Association) Exterior grade plywood (A-A Exterior, A-B Exterior or A-C Exterior) and CANPLY (Canadian Plywood Association) Exterior certified plywood (Canada: Grade G2S A-A or G1S A-C. USA: G2S A-A, A-B, B-B, or G1S A-C, B-C). There must be proper underfloor ventilation, plywood must be dry and should have a moisture content ranging between 6 and 12%, when measured with a quality wood moisture meter (electronic hygrometer).

I. Installation of resilient athletic flooring will not commence until the building is enclosed and all other trades have completed their work. Ensure a secure and clean working area before, during and after the installation of the resilient athletic flooring.

3.3 PREPARATION

A. Prepare substrate surface in accordance with Manufacturer's current printed guidelines.

3.4 INSTALLATION

A. Install sheets of resilient athletic flooring following Manufacturer's current printed guidelines.
B. Install tiles of resilient athletic flooring following Manufacturer's current printed guidelines.
C. Install all accessories following Manufacturer's current printed guidelines.

3.5 REPAIR

A. Refer to section 1.3.4 for extra stock materials. Repair material must come from the same original dye lot as the Manufactured Product initially installed.
B. Repairs are to be performed by Surfacing Contractor's qualified installers/technicians only.

3.6 CLEANING

A. Always wait at least a minimum of 72 hours after the resilient athletic flooring has been completely installed before performing initial maintenance. Always maintain resilient athletic flooring following Manufacturer's current printed guidelines.

3.7 PROTECTION

A. As needed, protect resilient athletic flooring with 1/8" Masonite during and after the installation, prior to acceptance by the Owner.
B. Preserve the integrity of the installation and protect against direct sunlight/UV exposure; always ensure windows and glass doors are fitted with blinds or UV film.

1 GENERAL

1.01 SUMMARY

.1 Section Includes:
- .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.

.2 Related Requirements
- .1 Division 05 - Metals.
- .2 Section 08 11 00 – Metal Doors and Frames.
- .3 Section 08 14 16 – Flush Wood Doors.

1.02 REFERENCES

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

1.03 QUALITY ASSURANCE

.1 Qualifications:
- .1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
- .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

.2 Mock-Ups:
- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
  - .2 Mock-up will be used:
    - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship.
  - .3 Locate where directed.
  - .4 Allow 24 hours for inspection of mock-up before proceeding with work.
  - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. approved mock-up may remain as

part of finished work.

.3 Pre-Installation Meeting:
.1 Convene pre-installation meeting one week prior to beginning on-site installations in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT)
.1 Verify project requirements.
.2 Review installation and substrate conditions.

.3 Coordination with other building subtrades.
.4 Review manufacturer's installation instructions and warranty requirements.

1.04 SCHEDULING

.1 Submit work schedule for various stages of painting to Construction Manager for review. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Construction Manager for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit product data and instructions for each paint and coating product to be used.
.2 Submit product data for the use and application of paint thinner.

.3 Samples:
.1 Submit full range colour sample chips to indicate where colour availability is restricted.
.2 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required.
.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
.4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Lead, cadmium and chromium: presence of and amounts.
.2 Mercury: presence of and amounts.
.3 Organochlorines and PCBs: presence of and amounts.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions:
.1 Submit manufacturer's installation and application instructions.

.7 Closeout Submittals: submit maintenance data for incorporation into manua l specified in Section 01 78 00 - Closeout Submittals include following:
.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour number(s).

1.06 MAINTENANCE

.1 Extra Materials:
.1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
.2 Quantity: provide one four litre can of each type and colour of primer, stain, finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
.3 Delivery, storage and protection: comply with Owners requirements for delivery and storage of extra materials.

1.07 DELIVERY, STORAGE AND HANDLING

.1 Packing, Shipping, Handling and Unloading:
.1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.

.2 Acceptance at Site:
.1 Identify products and materials with labels indicating:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.
.2 Store materials and supplies away from heat generating devices.
.3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.7 Remove paint materials from storage only in quantities required for same day use.

.8 Fire Safety Requirements:
.1 Provide one 9 kg fire extinguisher adjacent to storage area.
.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
.4 Place materials defined as hazardous or toxic in designated containers.
.5 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
.7 Ensure emptied containers are sealed and stored safely.
.9 Unused paint materials must be disposed of at official hazardous material collections site as approved by Consultant.
.10 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
.11 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
.12 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
.13 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
.3 Return solvent and oil soaked rags used during painting operations

for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.14 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.15 Set aside and protect surplus and uncontaminated finish materials.

2 PRODUCTS

2.01 MATERIALS

.1 Provide paint materials for paint systems from single manufacturer.

.2 Super Spec HD Epoxy floor coating by Benjamin Moore or approved equal.

2.02 COLOURS

.1 Refer to Drawings and Room Finish Schedule.

.2 Selection of colours from manufacturer full range of colours.

.3 Where specific products are available in restricted range of colours, selection based on limited range.

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 data sheet.

3.02 GENERAL

.1 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.03 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete

preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavorable conditions before proceeding with work.

3.04 PREPARATION

.1 Protection:
- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Consultant.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.

.2 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.9 Touch up of shop primers with primer as specified.

.10 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.05 APPLICATION

.1 Method of application to be as approved by Consultant. Apply paint by brush, roller, and air sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:
- .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
- .2 Work paint into cracks, crevices and corners.
- .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
- .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
- .5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application:
- .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in uniform layer, with overlapping at edges of spray pattern.

Back roll first coat application.

.4 Brush out immediately all runs and sags.

.5 Use brushes and rollers to work paint into cracks, crevices and place which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.7 Sand and dust between coats to remove visible defects.

.8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.9 Finish closets and alcoves as specified for adjoining rooms.

.10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.06 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with

primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow.

.11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.12 Do not paint interior transformers and substation equipment.

3.07 SITE TOLERANCES

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.08 FIELD QUALITY CONTROL

.1 Standard of Acceptance:
- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

.2 Advise Consultant when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Toilet compartments

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM A 167, Standard Specification for Stainless and Heat-Resisting Chromium- Nickel Steel Plate, Sheet, and Strip.

.2 Canadian Standards Association (CSA International)
.1 CSA-B651, Accessible Design for the Built Environment.

1.3 SUBMITTALS

.1 Provide submittals in accordance with the Conditions of the Contract.

.2 Product Data:
.1 Submit manufacturer's printed product literature for toilet partitions or components, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.2 Indicate fabrication details, plans, elevations, hardware, and installation details.

.4 Samples:
.1 Submit duplicate 300 x 300 mm samples of panel showing finish on both sides, two finished edges and core construction.
.2 Submit duplicate representative samples of each hardware item, including brackets, fastenings, trim

and locking mechanism. Locking mechanism to be approved by Owner.

.5 Closeout Submittals:
.1 Provide maintenance data for plastic laminate for incorporation into manual specified in the Conditions of the Contract.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with the Conditions of the Contract.

.2 Protect finished laminated plastic surfaces during shipment and installation. Do not remove until immediately prior to final inspection.

1.5 WARRANTY

.1 All installation will be guaranteed for one (1) year from date of handover to the Owner. Material warranty will be according to manufacturer.

2 Products

2.1 MANUFACTURERS

.1 Manufacturers of toilet compartments and urinal screens having Product considered acceptable for use:
.1 Bradley Corporation
.2 Hadrian Manufacturing Inc.
.3 ASI Watrous Inc.

2.2 MATERIALS

.1 Doors, panels and pilasters shall be 25 mm thick constructed from High Density Polyethylene (HDPE) resins. Partitions shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.

Refer to “Appendix A” Finish Schedule for colours

2.3 CONSTRUCTION

.1 Doors, panels, and pilasters shall be 25 mm thick with all edges rounded to a 3 mm radius.

.2 Doors and dividing panels shall be 72” high and mounted at 6” above the finished floor.

.3 Pilasters shall be 82” high (standard) and fastened into a 75 mm high pilaster shoe with a stainless steel, torx head sex bolt.

2.4 HARDWARE

.1 Door hardware shall be as noted

Hinges shall be continuous stainless steel spring loaded.

Door strike/keeper shall be 150 mm long and made of heavy-duty extruded aluminum (6463-T5 alloy) with a bright dip anodized finish, with wrap-around flanges that are at least 3 mm wall thickness, and secured to the pilaster with stainless steel, torx head hex bolts. Bumper shall be made of extruded black vinyl.

Latch and housing shall be made of heavy-duty extruded aluminum (6463-T5 alloy). The latch housing shall have a bright dip anodized finish, and the slide bolt and button shall have a black anodized finish.

Each toilet compartment shall have a collapsible coat hook. Refer to Section 10.28.10 (Washroom Accessories) for specification. Mounting height in the barrier free stall shall be maximum 1200mm from the floor.

.2 Pilaster shoes shall be 75 mm high type 304,20 gauge stainless steel, secured to the pilaster with a stainless steel, torx head sex bolt.

.3 Wall brackets shall be 38 mm stirrup type made of heavy-duty aluminum 6463-T5 alloy with a bright dip anodized finish. Stirrup brackets shall be fastened pilasters and panels with stainless steel, torx head sex bolts.

.4 Headrail shall be made of heavy-duty extruded

aluminum (6463-T5 alloy) with anti-grip design and a curtain track integrated into its design. The headrail shall have a bright dip anodized finish and shall be fastened to the headrail bracket by a stainless steel, torx head sex bolt, and fastened to the tops of pilasters with stainless steel, tamper resistant torx screws.

.5 Headrail brackets shall be 16 gauge stainless steel with a satin finish, and secured to the wall with # 14 stainless steel screws.

.6 Inswing doors shall be fitted with a zinc die cast, #4 brushed combined coat hook and bumper. Outswing doors shall be fitted with a #4 brushed stainless steel flat coat hook. Fasteners are theft-proof 6-lobe security head stainless steel screws

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Examine areas to receive toilet partitions, screens and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that may affect installation of partitions. Report any discrepancies to the architect.

.2 Take complete and accurate measurements of complete toilet compartment locations.

.3 Start of work constitutes acceptance of job.

3.3 INSTALLATION

.1 Ensure supplementary anchorage, if required, is in place.

.2 Do work in accordance with CSA-B651.

3.4 ERECTION

.1 Partition erection:
- .1 Install partitions secure, plumb and square.
- .2 Leave 12 mm space between wall and panel or end pilaster.
- .3 Anchor mounting brackets to masonry or concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors.
- .4 Attach panel and pilaster to brackets with through type sleeve bolt and nut.
- .5 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel shoes.
- .6 Equip each door with hinges, latch set, and each stall with coat hook. Adjust and align hardware for proper function. Set door open position at 30 degrees to front.
- .7 Equip outswinging doors with door pulls on outside of door in accordance with CSA-B651.
- .8 Install hardware and grab bars as indicated.

.2 Floor supported and overhead braced partition erection:
- .1 Attach pilasters to floor with pilaster supports and level, plumb, and tighten installation with levelling device.
- .2 Secure pilaster shoes in position.
- .3 Secure headrail to pilaster face with not less than two fasteners per face.
- .4 Set tops of doors parallel with overhead brace when doors are in closed position.

.3 Screen erection:
- .1 Provide urinal screens consisting of panel, as indicated.
- .2 Anchor screen panels to walls with 3 panel brackets.

3.5 CLEANING

.1 Proceed in accordance with the Conditions of the Contract.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION