

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS SURVEY REPORT

PORT SEVERN MAIN DAM AND LOCK 45 PORT SEVERN, ONTARIO

OCTOBER 11, 2018





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CANADA

FINAL REPORT

PSPC PROJECT NO.: R.076951.033

WSP PROJECT NO.: 181-09302-02

DATE: OCTOBER 2018

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October 11, 2018

Public Works and Governmental Services Canada
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Attn: *Selina Chowdhury, Senior Environmental Specialist
Environmental Services, Ontario Region*

**Subject: Project-Specific Designated Substance and Hazardous Materials Survey Report
Port Severn Main Dam and Lock 45, Port Severn, Ontario**

Dear Ms. Chowdhury:

WSP Canada Inc. (WSP) was retained by Public Works and Governmental Services Canada (PWGSC) to carry out a Designated Substance and Hazardous Materials Survey for project-specific areas of the Port Severn Main Dam area along the Trent-Severn Waterway, located in Port Severn, Ontario (the “subject property”).

The purpose of this assignment is to report WSP’s survey findings for the site and to provide PSPC with relevant recommendations for the management and/or removal of designated substances and hazardous materials at the subject property.

The following report discusses the methodologies and findings of this survey.

We trust that the attached report is satisfactory for your purposes at this time. Please contact the undersigned should you have any questions or concerns.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Sh Heikkila'.

Stephen Heikkila, P.Eng.
Project Manager, Environment

A handwritten signature in black ink, appearing to read 'MS'.

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jm/sh

WSP ref.: 181-09302-02



EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by Public Works and Governmental Services Canada (PWGSC) to carry out a Designated Substance and Hazardous Materials Survey for project-specific areas of the Port Severn Main Dam site, located along the Trent-Severn Waterway, in Port Severn, Ontario (the “subject property”). The project-specific scope of work at subject property consisted of ten (10) locations: Dam D, Main Dam, Main Fixed Bridge, Dam G, Lock 45, Lock 45 Upper Approach Walls, Lock 45 Lower Approach Walls, Dam A, Washroom Building and Lockmaster Building. The survey was conducted by WSP on September 6th, 2018.

This survey is required to meet PWGSC’s employer responsibilities under the *Canada Labour Code (The Code)* and to satisfy a building owner’s requirements under Section 30 of the *Ontario Occupational Health & Safety Act (OHSA)* which requires building owners to determine if there are any Designated Substances present, prior to commencement of a project, which may involve Construction, Renovation or Demolition (CRD) related activities. This information allows workers to take appropriate steps to prevent accidental exposure to these harmful substances.

The objectives of this survey were as follows:

- Develop an up-to-date inventory, and gain a better understanding of the asbestos-containing materials, Designated Substances and/or hazardous materials that are present in the subject areas;
- Document their locations, applications, concentrations, quantities, and conditions in the subject areas in order to provide workers, and prospective contractors, with adequate information to prevent accidental exposures; and
- Provide recommendations for the safe removal, handling and disposal of the identified Designated Substances and hazardous materials, as necessary.

A summary of the results of WSP’s site inspection and bulk sampling is presented below:

Table 1 - Summary of Designated Substances & Hazardous Materials Survey Findings

MATERIAL	SURVEY FINDINGS
Asbestos	<p>Based on the laboratory results, no asbestos-containing building materials were confirmed to be present within the accessible locations of the project-specific subject areas.</p> <p>Notes:</p> <ul style="list-style-type: none">– Asbestos-containing materials may be present in inaccessible areas within the subject areas (i.e. underwater or buried materials, roofing, exterior materials, wall and ceiling cavities, etc.).
Lead	<p>Based on the laboratory results, three (3) of the eleven (11) paint samples collected and analyzed had detectable concentrations of lead.</p> <ul style="list-style-type: none">– Dark green paint on metal beams on the Lockmaster Building and throughout the site– Light yellow paint on the metal railings on the Main Dam and Dam G– Grey paint on the metal hatches on Lock 45 <p>Lead is also expected to be present in the following building components:</p> <ul style="list-style-type: none">– within lead-acid batteries suspected to be present in emergency lighting and exit signage;– as a component in ceramic building products such as tiles and bricks;– as a component of the solder on sweated joints between copper pipe and fittings;– as a component of the solder on wire connections of electric components;– as a component of solder used to seal the bell fitting of cast iron rain water leader pipes; and– as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.



MATERIAL	SURVEY FINDINGS
Mercury	Although no samples were analyzed for mercury, it is presumed to be present as a gas in fluorescent and CFL light tubes.
Silica	Building materials and components known to contain silica such as glass, concrete, masonry, stone and mortar etc., were observed throughout the subject building.
Ozone-Depleting Substances (ODS)	No equipment was observed within the buildings that may contain ODS. An external ice machine outside the Washroom Building may contain ODS.

RECOMMENDATIONS

If, during renovation or demolition, additional materials suspected of containing asbestos are encountered, they must be handled in accordance with the appropriate guidelines and regulations. It should be noted that asbestos may be present in the enclosed spaces or other areas that were not accessible at the time of the site visit (i.e. wall/ceiling cavities, buried materials, structural concrete and mechanical components submerged underwater, etc.).

Removal of any asbestos-containing materials must be conducted before any renovation activities that may damage these materials. Removal must be conducted in accordance with the *Occupational Health and Safety Act (OSHA)* regarding worker protection, to avoid the inhalation or ingestion of asbestos fibres, as well as the *Canada Occupational Health & Safety Regulations (SOR/86-304)* under the *Canada Labour Code (The Code)*. Confirmation by a qualified person that the asbestos removal has been conducted in accordance with the aforementioned acts and regulations is recommended prior to any contract work in areas proposed for renovation.

Except for asbestos, all other Designated Substance Regulations apply to industrial establishments and not to construction. Due to this condition, it is imperative that any contractor retained for renovations has a proven record in managing Designated Substances and operates under a control program. All Designated Substances must be handled in accordance with the appropriate guidelines and regulations. Designated Substance and hazardous material information will require updating if corrective measures have been instituted and materials have been removed from the building.

Special precautions should be taken when disturbing any concrete or painted surfaces given the presence of silica, lead and potentially arsenic. All Designated Substances must be handled in accordance with the appropriate guidelines and regulations. The Ministry of Labour (MOL) has published guidelines for handling and controlling lead and silica in construction and it is recommended that these guidelines be followed when removing and cutting into the concrete. Coring, sawing or breaking up the materials containing silica, lead and potentially arsenic should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions as outlined in the MOL Guidance documents and *OHSA*.

The presence of mercury within assembled units (e.g. fluorescent light bulbs) should not be considered a hazard provided that the assembled units remain sealed and intact. Avoid direct skin contact with mercury and avoid inhalation of mercury vapour. Dispose of mercury following applicable legislative requirements.

If mould is discovered during demolition and/or renovation, mould contaminated materials should be removed/handled in accordance with the *Canadian Construction Association document CCA 82/2004*. Contractors should be warned of the potential presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould.

It is the intention of the federal government to phase out the use of ODSs by the year 2030 in order to protect the upper atmosphere. The MOE has issued *Regulation 356* regarding the use, disposal and recycling of ODS's. Recapturing of ODS's during servicing must be done by licensed personnel.

Air conditioning units and refrigerators suspected to contain ODS should be recycled following *Ontario Regulation 189/94, Refrigerants (O. Reg. 189/94)*, as amended. All equipment containing ODS must be serviced by an individual holding a valid Ozone Depletion Prevention (ODP) Card, issued by the MOE and the refrigerant drained from the unit and collected for recycling or disposal in accordance with all applicable legislation.



In accordance with the Canadian Nuclear Safety Commission (CNSC), if smoke alarms contain radium or if more than 10 units have to be disposed of, then the smoke detectors must be disposed of at a low-level radioactive waste management facility in packages containing a maximum of ten smoke detectors per package. Smoke detectors containing Am-241 isotope source of less than 5.0 μCi can be disposed of at a regular landfill site.

Complete commentary on each of the Designated Substances in the project area will be discussed in the report to follow. This executive summary is not intended to substitute for the complete report, nor does it discuss certain specific issues documented within the report.



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1 INTRODUCTION

1.1 BACKGROUND

WSP Canada Inc. (WSP) was retained by Public Works and Governmental Services Canada (PWGSC) to carry out a Designated Substance and Hazardous Materials Survey for project-specific areas of the Port Severn Main Dam site, located along the Trent-Severn Waterway, in Port Severn, Ontario (the “subject property”). The project-specific scope of work at subject property consisted of ten (10) locations: Dam D, Main Dam, Main Fixed Bridge, Dam G, Lock 45, Lock 45 Upper Approach Walls, Lock 45 Lower Approach Walls, Dam A, Washroom Building and Lockmaster Building (the “subject areas”).

The survey was conducted by WSP on September 6th, 2018.

1.2 SITE DESCRIPTION

The subject property is a national heritage site and one of many access points along the Trent-Severn Waterway. The project-specific areas consisted of the following ten (10) locations:

Table 2 - Project-Specific Areas Surveyed

LOCATION	DESCRIPTION
Dam D	Dam D is a concrete retaining wall located on the East side of the Main Fixed Bridge.
Main Dam	The Main Dam is a large concrete dam structure located beneath the Main Fixed Bridge.
Main Fixed Bridge	The Main Fixed Bridge is a concrete structure located on top of the Main Dam overtopped with an asphalt layer.
Dam G	Dam G is a concrete retaining wall located ~500 metres West of the Main Dam.
Lock 45	Lock 45 is a concrete structure that consists of four (4) large, wooden gates and two (2) wooden bridges with galvanized metal railings.
Lock 45 Upper Approach Walls	Lock 45 Upper Approach Walls are two (2) parallel concrete retaining walls located on the upstream (North) side of Lock 45.
Lock 45 Lower Approach Walls	Lock 45 Lower Approach Walls are two (2) parallel concrete retaining walls located on the downstream (South) side of Lock 45.
Dam A	Dam A is a concrete retaining wall located ~1.5 km Northeast of the Main Dam.
Washroom Building	The Washroom Building, constructed in 1988, is a one-storey structure located adjacent to (West) of Lock 45. The building consists of ceramic tile flooring, concrete block walls and drywall ceilings. The attic space in the building is made of a wooden beams and columns and filled with pink man-made mineral fibre (MMMF) insulation. The exterior of the building is comprised of brick walls and a metal sheet roofing.
Lockmaster Building	The Lockmaster Building, constructed in 1988, is a one-storey structure located adjacent to the Washroom Building. The building consists of ceramic tile flooring throughout. The Kitchen is finished with vinyl floor tiles and the Electrical/Mechanical Room has a concrete floor. The interior walls and ceilings are finished with drywall. The attic space in the building is made of wooden beams and columns and filled with pink man-made mineral fibre (MMMF) insulation. The exterior of the building is comprised of brick walls and a metal sheet roofing.

Figure 1 – Project-Specific Areas Surveyed



1.3 SURVEY OBJECTIVES

This survey is required to satisfy a building owner's requirements under Section 30 of the *Ontario Occupational Health & Safety Act (OHSA)* which requires building owners to determine if there are any Designated Substances present, prior to commencement of a project, which may involve construction, renovation or demolition related activities. This information allows workers to take appropriate steps to prevent accidental exposure to these harmful substances. This report should be provided to all maintenance workers, prospective contractors (and in turn to their sub-trades) who are likely to handle, come into contact with, or disturb building materials. Contractors who may work in close proximity to the identified materials and who may also disturb the materials should also be notified.

The objectives of this survey were as follows:

- Develop an up-to-date inventory, and gain a better understanding of the asbestos-containing materials, Designated Substances and/or hazardous materials that are present in the subject areas;
- Document their locations, applications, concentrations, quantities, and conditions in the subject areas in order to provide workers, and prospective contractors, with adequate information to prevent accidental exposures; and
- Provide recommendations for the safe removal, handling and disposal of the identified Designated Substances and hazardous materials, as necessary.

The asbestos information in this survey report complies with the requirements of the *OHSA Ontario Regulation 278/05: Designated Substance - Asbestos on Construction Projects and in Building and Repair Operations (O. Reg. 278/05)* with respect to asbestos-containing materials for the structures.

Ontario Regulation 490/09 (O. Reg. 490/09) states that all necessary measures and procedures are to be taken to ensure the time-weighted average exposure of a worker to any form of airborne asbestos does not exceed 0.1 fibres per cubic centimeter of air, averaged over an 8-hour work period. In order to abide by this regulation, contractors specializing in asbestos removal are required to remove all asbestos-containing building materials from the building prior to any renovation or demolition that will disturb these materials.

1.4 SCOPE OF WORK

The survey was thorough and intrusive which consisted of investigating building spaces, materials and components which are easily accessible, or those which may be accessed by moveable (non-fixed) barriers such as above suspended ceiling tiles, access doors, hatches, panels, etc.

WSP's scope of work for this project consisted of:

- A thorough visual inspection of the subject buildings and structures for designated substances and hazardous materials;
- Collection of bulk samples of materials suspected to contain asbestos according to the requirements stipulated in *O. Reg. 278/05* and PSPC's *Asbestos Management Standard*;
- Assessment of the condition of the asbestos-containing materials;
- Collection of a representative number of bulk paint samples;
- Inventory of (visibly) evident sources of mercury (e.g. thermostats);
- Assessment of the likelihood of exposure to designated substances with recommendations for appropriate corrective action where required;
- Visual identification of suspected and/or obvious signs of mould;
- Visual identification of other Designated Substances and hazardous materials including equipment containing ODS, fuel, oil and/or waste oil storage, chemical storage, and/or radioactive materials. Where possible name plate/label information and quantities were recorded; and
- Production of a site-specific Designated Substance and Hazardous Materials Survey Report and Asbestos Management Plan.

Some areas of the subject property were considered not accessible to the surveyor (ie. structural concrete and mechanical components submerged underwater, wall cavities, electrical equipment, etc.), and materials within such areas have the potential to contain asbestos and other Designated Substances or hazardous materials.

2 METHODOLOGY

2.1 GENERAL SURVEY METHODOLOGY

WSP's survey sought to identify those substances defined as Designated Substances under the *Ontario Occupational Health and Safety Act* including: asbestos (friable and non-friable), lead, mercury, silica, benzene, acrylonitrile, arsenic, coke oven emissions, ethylene oxide, isocyanates, and vinyl chloride. In addition, other hazardous materials, such as PCBs, ozone-depleting substances (ODS), urea-formaldehyde foam insulation (UFFI) and other stored chemicals and wastes were included in the survey scope.

WSP's surveyors performed a systematic survey of the aforementioned subject buildings and structures for the purposes of identifying Designated Substances and hazardous materials and documenting observations made about their locations, estimated quantities and respective conditions. These observations form the basis for developing the recommendations provided within this report.

The survey of the buildings for Designated Substances consisted of a walk through and physical examination of suspected materials in accessible areas of the buildings. A physical examination was completed to assess the condition of materials and to examine for underlying layers. In situations where asbestos-containing materials or other Designated Substances extended into a non-accessible area, such as asbestos cement parging on mechanical pipes it was assumed that the asbestos-containing materials were also present in these areas and were reported as such.

Survey procedures specific to asbestos and lead are documented in the following sections of this report.

2.2 ASBESTOS SURVEY METHODOLOGY

WSP's surveyor performed a systematic survey of the subject buildings and structures for the purposes of identifying asbestos-containing materials (ACM) and documenting observations made about their locations, estimated quantities and respective conditions. These observations form the basis for developing the recommendations provided within this report.

The surveyors inspected the subject buildings for the presence of friable (easily crumbled with hand pressure) and non-friable (not easily crumbled with hand pressure) ACM. Examples of ACM commonly found in buildings may include:

- Sprayed insulation
- Acoustic/texture plaster
- Drywall joint compound
- Mechanical insulation
- Asbestos cement
- Piping
- Acoustic ceiling tiles
- Vinyl floor tiles and vinyl sheet flooring
- Plaster

Bulk samples were collected from suspect materials (i.e. materials known as having the potential to be asbestos-containing) and analyzed to identify or confirm the presence/absence of asbestos.

The number of bulk samples required, in order to establish whether a material is asbestos-containing according to *O. Reg. 278/05*, is summarized in Table 3.

Table 3 - Minimum Number of Bulk Samples to be collected under O. Reg. 278/05 According to Material Area, Application and Friability

TYPE OF MATERIAL	SIZE OF HOMOGENEOUS MATERIAL	MINIMUM NUMBER OF BULK SAMPLES
Surfacing material, including without limitation material that is applied to surfaces by spraying, by troweling or otherwise, such as acoustical plaster on ceilings, fireproofing materials on structural members and plaster	Less than 90 m ²	3
	90 m ² or more, but less than 450 m ²	5
	450 m ² or more	7
Thermal insulation, except as described below	Any size	3
Thermal insulation patch	Less than 2m or 0.5 m ²	1
Other material	Any size	3

Samples were collected from discrete locations with every attempt to minimize damage and to avoid testing duplicates. The following procedures for collection of samples were followed:

- The surface of the material was wetted with amended water (water with surfactant / wetting agent) using a spray bottle. In situations where the material could not be wetted, a plastic bag or other containment device was placed around the sampling device.
- A sample was obtained by one of two methods:
 - A sampling device was slowly pushed into the material with a twisting motion until the entire thickness was penetrated, followed by extraction of the sampling device, or;
 - A knife was cleaned and then used to excise a piece of the material.
- Each sample was placed in a clear bag with a tight closure, labelled appropriately and placed in a second, similar bag. Debris was cleaned with wet paper towels and discarded into a plastic bag.
- Damage to the material sampled was repaired with duct tape and/or filler material as needed.
- A chain of custody form was completed for all samples collected on-site and accompanied samples in transit. Asbestos bulk samples were couriered to an accredited laboratory (EMSL of Mississauga, Ontario).

In accordance with the analysis techniques required by O. Reg. 278/05:

- for layered materials, subsamples are taken from each individual or discrete layer and each subsample is then treated as a discrete sample; and
- if a material is found to contain greater than 0.5% asbestos, additional bulk material samples taken from the same homogeneous material are not required to be analyzed (“stop positive analysis”).

The bulk samples were submitted to an accredited, independent laboratory for analysis (accompanied by a chain of custody form) of asbestos content via US EPA Method EPA/600/R-93/116: *Method for the Determination of Asbestos in Bulk Building Materials* in accordance with the requirements of O. Reg. 278/05.

As per PWGSC’s Statement of Work, the laboratory was instructed to carry out Transmission Electron Microscopy (TEM) analysis of Vinyl Floor Tiles, only if asbestos was not identified via Polarized Light Microscopy (PLM) analysis.

2.3 LEAD SURVEY METHODOLOGY

Bulk paint samples (paint chips) were collected from each distinct colour of paint observed within the subject areas. Samples were collected with the aid of a thin-bladed knife, which was cleaned prior to each sampling event. WSP's surveyor selected sample locations where it appeared that the paint application was most representative of all areas on which it was applied. Each paint chip sample was placed in a clear bag with a tight closure, uniquely labelled and then placed in a second, similar bag. A chain of custody form was completed and accompanied the bulk samples to an accredited, independent laboratory for analysis of lead content. Lead analysis was performed following ASTM Method, ASTM D3335-85A "Standard Method to Test for Low Concentrations of Lead in Paint by Atomic Absorption Spectrophotometry".

2.4 SILICA

The surveyor inspected the subject areas for the presence of materials known to contain silica. Silica is present in materials such as glass, concrete, masonry, stone and mortar which are prevalent materials in building construction. No samples were collected or analyzed.

2.5 MERCURY

The surveyor inspected the subject areas for equipment which is likely to contain mercury. Pertinent information of the suspected equipment including: manufacturer, dates, model and serial numbers, and quantities were noted when available. No samples were collected or analyzed.

2.6 OZONE-DEPLETING SUBSTANCES (ODS)

The surveyor inspected the subject areas for equipment which is likely to contain ODS. Pertinent information of the suspected equipment including: manufacturer, dates, model and serial numbers, and quantities were noted when available. No samples were collected or analyzed.

2.7 POLYCHLORINATED BIPHENYLS (PCB)

The surveyor inspected the subject areas for equipment which may contain PCBs. Equipment that is generally suspected of containing PCBs includes lamp ballasts, transformers, hydraulic fluid, compressors, switchgears, capacitors and other electric equipment. Pertinent information of the suspected equipment including: manufacturer, dates, model and serial numbers, and quantities were noted when available. No samples were collected or analyzed.

2.8 MOULD

The surveyor inspected the subject areas for the presence of mould. This included a non-intrusive visual assessment of exterior and interior building material surfaces and components for evidence of obvious visible mould, and/or areas conducive to mould growth (i.e. demonstrating significant moisture saturation and water damage). No samples were collected or analyzed.

3 REGULATORY CONTEXT

3.1 DESIGNATED SUBSTANCES

Section 30 of the *Occupational Health and Safety Act* stipulates that prior to the commencement of a project a list shall be prepared of all Designated Substances that are present at the project site (i.e. a Designated Substances survey). In accordance with *OHSA*, the locations of Designated Substances must be identified in writing to all prospective constructors, contractors and sub-contractors who may work, disturb or come into contact with this type of material, at the same time as, or prior to, project tendering.

The term “Designated Substance” refers to the eleven chemical or physical agents specifically identified within the Act. Each of these substances is governed by a consolidated Designated Substances regulation, *O. Reg. 490/09*, which defines the minimum health and safety requirements for assuring safe worker-substance interaction as well as the obligations of employers and workers in workplaces containing these substances. *O. Reg. 490/09* further stipulates the maximum concentrations of each of the respective substance to which a worker may be exposed, according to short-term exposure values and time-weighted average exposure values.

3.2 ADDITIONAL REGULATORY REQUIREMENTS FOR ASBESTOS

3.2.1 FEDERAL LEGISLATION

CANADA LABOUR CODE

Since the subject property is considered a federal site, and will be accessed by federal employees, the *Canada Labour Code (Part II) (The Code)* applies. Under *The Code*, the *Canada Occupational Health and Safety Regulations (SOR/86-304)* govern the health and safety of employees working in federally-regulated industries and organizations which includes the federal government and crown corporations. *The Code* establishes responsibilities and requirements of employers, managers and supervisors who act on behalf of the employer and employees, in order to maintain safe workplaces and working environments.

Part X of *SOR/86-304* states that every employer shall keep and maintain a record of all hazardous substances that, in the work place, are used, produced, handled, or stored for use in the work place, and may either keep and maintain such a record in the work place or keep and maintain a centralized record in respect of several work places, in one work place. In addition, *SOR/86-304* details requirements for hazard investigations, sampling, medical examinations, signage/labelling, training, and the establishment of an Asbestos Exposure Management Plan.

NATIONAL JOINT COUNCIL – OCCUPATIONAL HEALTH AND SAFETY DIRECTIVE

The National Joint Council (NJC) *Occupational Health and Safety Directive (the OHS Directive)* contains enhancements to *The Code* for dealing with asbestos and materials containing asbestos. *The OHS Directive* states that departments and agencies will comply with Public Works and Government Services Canada Departmental Policy *DP 057*. In June 2017, PWGSC replaced *DP 057* with the Public Services and Procurement Canada *Asbestos Management Standard*. ISEDC has opted to use the PSPC *Asbestos Management Standard* as a guidance document for asbestos management in their facilities. This Asbestos Survey Report should be read in conjunction with the PSPC *Asbestos Management Standard* and the ISEDC Asbestos Management Plan.

3.2.2 PROVINCIAL LEGISLATION (ONTARIO)

DESIGNATED SUBSTANCES

Asbestos is one of the eleven designated substances specifically identified within Section 30 of the *Occupational Health and Safety Act (OHS)*. Each of the identified substances is governed by a consolidated regulation, *Designated Substances - Ontario Regulation 490/09 (O. Reg. 490/09)*, which defines the minimum health and safety requirements for assuring safe worker-substance interaction as well as the obligations of employers and workers in workplaces containing these substances. The regulation further stipulates the maximum concentrations of each of the respective substances to which a worker may be exposed, according to short-term exposure values and time-weighted average exposure values.

ADDITIONAL REGULATORY REQUIREMENTS FOR ASBESTOS

Among the Designated Substances, asbestos is unique in that it is governed by two regulations under *OHS* - one for the general mining and processing operations of asbestos and one for asbestos on construction projects and in buildings and repair operations.

Ontario Regulation 278/05 (O. Reg. 278/05), made under *OHS*, entitled “Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations” came into effect on November 1, 2005, with some sections contained therein becoming effective on November 1, 2007. This regulation revoked and replaced the previous asbestos regulation, *O. Reg. 838/90*.

O. Reg. 278/05 introduced significant changes to how asbestos management is regulated in Ontario. Many of the regulatory changes adopted by *O. Reg. 278/05* were already in wide use in industry as part of best management practices. Noteworthy regulatory changes included modifications to asbestos survey requirements, the management of asbestos on-site, abatement operations and procedures (i.e. Type 1, 2 and 3), the use of personal protective equipment (PPE) and air monitoring requirements.

ADDITIONAL REGULATORY REQUIREMENTS FOR WASTE MANAGEMENT

The disposal of Designated Substances is regulated under the Ontario *Environmental Protection Act*, specifically *R.R.O. 1990, Regulation 347, General – Waste Management* (most recently amended by *O. Reg. 334/13*). The regulation details the minimum requirements for the appropriate transport and disposal of wastes.

3.3 ADDITIONAL REGULATORY REQUIREMENTS FOR LEAD

The Ontario Ministry of Labour (MOL) has not prescribed specific criteria for classification of lead-containing paints or other surface coatings and construction materials. The *Surface Coating Materials Regulation (SOR/2005-109)* made under the federal *Hazardous Products Act (HPA)* prescribes an acceptable level of 0.009% (90 ppm) lead by dry weight or less, as determined by bulk chemical analysis in accordance with good laboratory practises. Under *SOR/2005-109* Section 4.2, the following paints and surface coatings are excluded from the above noted acceptable lead level:

- 1 as an anti-corrosive or an anti-weathering coating applied on the interior or exterior surface of any building or equipment that is used for an agricultural or industrial purpose;
- 2 as an anti-corrosive or an anti-weathering coating applied on any structure other than a building, that is used for an agricultural, industrial or public purpose;
- 3 as a touch-up coating for metal surfaces;
- 4 on traffic signs;
- 5 for graphic art on billboards or similar displays;
- 6 for identification marks in industrial buildings; or
- 7 as materials for the purposes of arts, crafts or hobbies, other than material for use by children.

However, based on a recent publication (*EACO Lead Guideline For Construction, Renovation, Maintenance or Repair*, dated October 2014) from the Environmental Abatement Council of Ontario (EACO), an industry group representing consultants and contractors in the Ontario abatement industry, various occupational and workplace safety authorities and agencies consider that any detectable amount of lead in paint and similar materials has the potential to produce an airborne hazard to workers and building occupants when these materials are disturbed.

As such, for the purpose of this survey, WSP has classified any material containing detectable/measurable amounts of lead as “lead-containing” materials and recommends that all disturbances to these materials be conducted in accordance with the EACO or MOL *Guideline for Lead on Construction Projects*.

3.4 ADDITIONAL REGULATORY REQUIREMENTS FOR WASTE MANAGEMENT

The disposal of Designated Substances is regulated under the Ontario *Environmental Protection Act*, specifically *R.R.O. 1990, Regulation 347, General - Waste Management* (most recently amended by *O. Reg. 334/13*). The regulation details the minimum requirements for the appropriate transport and disposal of wastes.

3.5 OTHER APPLICABLE REGULATIONS AND GUIDELINES

The following regulations and guidance documents may also apply to this survey:

- Guideline for Lead on Construction Projects (MOL, September 2004, as amended)
- Guideline for Silica on Construction Projects (MOL, September 2004, as amended)
- The United States Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint in Housing
- Canadian PCB Regulations (*SOR/2008-273*)
- *O. Reg. 362* Waste Management – PCBs
- Mercury-Containing Products Pollution Prevention Fact Sheet #21 (Ministry of Environment (MOE), September 2001, as amended)
- *R.R.O. 1990, Reg. 347: General Waste Management*
- *R.R.O. 1990, Reg. 833: Control of Exposure to Biological or Chemical Agents*
- Canadian Chlorofluorocarbon Regulations (*SOR/90-127*), Ozone-Depleting Substances Regulation (*SOR/94-408*) and Ozone-Depleting Substances Products Regulations (*SOR/90-584*)
- Federal Halocarbon Regulations (*SOR/2003-289*)
- *O. Reg. 463/10: Ozone-Depleting Substances and Other Halocarbons*
- *O. Reg. 180/07: Refrigerants*
- Lead Guideline For Construction, Renovation, Maintenance or Repair (Environmental Abatement Council of Ontario, October 2014)
- Mould Abatement Guidelines (Environmental Abatement Council of Ontario, 2010)
- CCA 82/2004 – Mould Guidelines for the Canadian Construction Industry (Canadian Construction Association, 2004)

4 OBSERVATIONS AND RESULTS

Information in this section of the report should be provided to all prospective contractors, tenants, and/or workers who are likely to handle, come into contact with, or disturb asbestos or other designated substances. Detailed specifications that outline specific abatement procedures are recommended when tendering the renovation/demolition work.

This information may require updating upon the removal of Designated Substances from various sections of the building upon completion of the renovations or demolition. A close out report stating that the materials are no longer present is also required once the materials are removed. If ACM is to remain in place, *O. Reg. 278/05* requires the preparation and establishment of an Asbestos Management Plan for the building.

Contractors and maintenance personnel should be warned of the possibility of undisclosed materials when breaking into enclosed areas. Friable and Non-Friable building materials discovered in enclosed areas should be treated as asbestos until proven otherwise and other substances, self-evident as designated substances, should be handled in a likewise fashion.

4.1 ASBESTOS

4.1.1 ASBESTOS-CONTAINING MATERIALS

SOR/86-304 and *O. Reg. 278/05* both establish definitions of asbestos-containing material (ACM), however, *O. Reg. 278/05* is more stringent. In accordance with the requirements of *O. Reg. 278/05*, homogenous materials (i.e. materials uniform in color and texture) must be considered to be asbestos-containing, if any sample which is collected from that homogeneous material, is identified to have an asbestos concentration of 0.5% or greater.

A total of fifty-three (53) building material samples were collected from sixteen (16) homogenous building materials and submitted for laboratory analysis of asbestos content. **None of the materials sampled were found to contain asbestos.**

As the survey was non-destructive in nature, suspect materials may be present within concealed structural/electrical materials, and should be presumed to contain asbestos, if observed. Prior to disturbance of suspect ACM, samples should be collected and analyzed to confirm the presence or absence of asbestos.

If any potential asbestos-containing materials are encountered unexpectedly, a qualified environmental consultant should be contacted to sample, monitor and/or document the removal of suspected or confirmed asbestos-containing materials, and to ensure that appropriate procedures are being followed. If renovation or demolition activities are likely to disturb such materials, it is required that any identified asbestos-containing materials be removed in accordance with *O. Reg. 278/05* and PSPC's *Asbestos Management Standard*.

4.1.2 POTENTIAL ASBESTOS-CONTAINING MATERIALS

Certain building materials which have historically contained asbestos were not included in the survey since they were inaccessible, are used in a random fashion, or have a low risk of asbestos fibre release.

These materials include:

- Materials below water at the time of the inspection.
- Buried services such as underground piping; these pipes were commonly manufactured from a non-friable form of asbestos cement but are inaccessible for sampling without excavation work. Site drawings should be consulted and reviewed to ascertain the presence or absence of such structures.
- Floor levelling compounds; these materials were used in a random fashion, may or may not contain asbestos, and require demolition of floor finishes to access for sample collection. Floor levelling compounds were not observed but may be present.
- Packing materials in valves, fittings, etc., may be present but are inaccessible without demolition activities (e.g. within concealed areas behind bulkheads).
- Insulation materials within wall cavities (e.g. vermiculite).

In addition, inspection of mechanical equipment such as HVAC systems or within electrical equipment was not conducted due to safety limitations. These areas are considered not accessible to the surveyor and as such materials suspected to contain asbestos may be present within these inaccessible areas, including:

- electrical wiring insulation,
- underground utilities such as sewers or drain lines,
- electrical conductors,
- high temperature gaskets,
- incandescent light fixture backing,
- ductwork connections,
- thermal insulator around electrical elements around baseboard heaters,

Once services are decommissioned, these areas should be inspected and/or sampled for presence or absence of asbestos.

If renovation or demolition activities are likely to disturb the materials, it is required that all identified asbestos-containing materials be removed in accordance with *O. Reg. 278/05*. If any potential asbestos-containing materials are encountered unexpectedly, WSP should be contacted to sample, monitor and/or document the removal of asbestos-containing materials, and to ensure that appropriate procedures are being followed.

4.1.3 SUMMARY OF BULK SAMPLES IDENTIFIED AS “NON-ASBESTOS”

The table below summarizes the results of bulk material samples collected from suspect materials during the current survey, which had either no detectable concentrations of asbestos, or had asbestos concentrations less than the threshold limit of 0.5% (by weight), and therefore can be considered as “non-asbestos”.

Table 4 – Summary of Bulk Samples Identified as “Non-Asbestos”

MATERIAL DESCRIPTION / LOCATION	SAMPLE ID ¹
Exterior brick mortar from the Washroom Building	M-1A-C
Grey, exterior window caulking from the Washroom Building	CLK-2A-C
Tar paper insulation under the metal sheet roofing of the Washroom Building	TP-3A-C
Concrete block mortar from the interior walls of the Washroom Building	CBM-4A-C
Exterior brick mortar from the Lockmaster Building	M-5A-C
Brown exterior caulking around the doors of the Lockmaster Building	CLK-6A-C
Brown exterior caulking around the windows of the Lockmaster Building	CLK-7A-C
Tar paper insulation under the metal sheet roofing of the Lockmaster Building	TP-8A-C
Drywall joint compound from drywall finishes throughout the Lockmaster Building	DJC-9A-G
Black membrane between the exterior and interior walls in the Lockmaster Building	MEM-10A-C
12” x 12”, beige vinyl floor tile & black mastic from the Kitchen in the Lockmaster Building	VFT-11A-C TEM-Floor Tile ² TEM-Mastic ²
Acoustic undercoating, Kitchen sink in the Lockmaster Building	AC-12A-C
Grey caulking, expansion joints on the Upper Approach Walls	CLK-13A-C
White caulking, expansion joints on the Lower Approach Walls	CLK-14A-C
Asphalt, Main Bridge	ASP-15A-C
Grey caulking, expansion joints on Lock 45	CLK-16A-C
Drywall joint compound on the drywall ceilings in the Washroom Building	Previously Sampled ³
Brown caulking around the exterior doors of the Washroom Building	Previously Sampled ³

- 1 For sample ID and concentration levels refer to attached Laboratory Certificates of Analysis.
- 2 Material also analyzed via Transmission Electron Microscopy, as per PWGSC Statement of Work.
- 3 See Appendix C – Previous Report for sample ID and Locations.

4.2 LEAD

Eleven (11) paint samples was collected and analyzed at the time of the investigation. The table below summarizes the results of laboratory analyses for the bulk paint and surface coating samples collected during the survey.

Table 5 - Summary of Lead Concentrations in Bulk Paint Samples

MATERIAL DESCRIPTION	ASSESSMENT	ACTION ¹
<p>Dark Green Paint (Photo #1)</p> <p>Lead-containing paint observed on the metal beams attached to the Lockmaster Building and throughout the Main Dam Site.</p>	<p>Sample ID: Pb-07</p> <p>Concentration: 1,400 ppm</p> <p>Paint Condition: Good</p>	<p>In general, the following procedures are recommended if/when removing lead-containing materials, coatings and paint applications:</p> <ul style="list-style-type: none"> – Follow Type 1 – if the coating is to be removed with a chemical gel or paste; – Follow Type 1 – if operating construction or demolition equipment (e.g. excavator, bulldozer) during building renovation or demolition where lead-based paints or surface coatings are present on building materials and are being disturbed; – Follow Type 2a – if the coating is to be removed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted building components by striking with sledgehammer or similar tool; – Follow Type 3a – if the coating is to be removed using power tools; or, – Follow Type 3b – if the coating is to be removed by abrasive blasting. <p>If lead-containing paint applications and surface coatings are not removed prior to demolition, ensure that demolition waste complies with the requirements of <i>General - Waste Management Regulation, R.R.O. 1990, Regulation 347</i>.</p>
<p>Light Yellow Paint (Photo #2 & 3)</p> <p>Lead-containing paint observed on the metal railings on the Main Dam and Dam G</p>	<p>Sample ID: Pb-08</p> <p>Concentration: 32,000 ppm</p> <p>Paint Condition: Good</p>	
<p>Grey Paint (Photo #4)</p> <p>Lead-containing paint observed on the metal hatches around Lock 45</p>	<p>Sample ID: Pb-10</p> <p>Concentration: 3,800 ppm</p> <p>Paint Condition: Good</p>	

MATERIAL DESCRIPTION	ASSESSMENT	ACTION ¹
Beige Paint Paint observed on the upper half of the concrete block walls in the Washroom Building	Sample ID: Pb-01 Concentration: <82 ppm Paint Condition: Good	<p>Sample has a lead concentration less than the laboratory detection limit of 90 ppm (0.009%).</p> <p>No remedial action is required.</p>
Brown Paint Paint observed on the lower half of the concrete block walls in the Washroom Building	Sample ID: Pb-02 Concentration: <82 ppm Paint Condition: Good	
Beige Paint Paint observed on the drywall walls and ceilings in the display & reception rooms of the Lockmaster Building	Sample ID: Pb-03 Concentration: <82 ppm Paint Condition: Good	
Grey Paint Paint observed on the drywall walls in the Kitchen and Mechanical Room in the Lockmaster Building	Sample ID: Pb-04 Concentration: <81 ppm Paint Condition: Good	
Grey Paint Paint observed on the concrete floor in the Mechanical Room in the Lockmaster Building	Sample ID: Pb-05 Concentration: <80 ppm Paint Condition: Good	
Blue Paint Paint observed on the concrete Pier and Lower Approach Walls of the Main Dam	Sample ID: Pb-06 Concentration: <81 ppm Paint Condition: Good	
Yellow Paint Paint observed on the metal railings of Lock 45	Sample ID: Pb-09 Concentration: <82 ppm Paint Condition: Good	
White Paint Paint observed on the drywall ceiling of the Lockmaster Building	Sample ID: Pb-11 Concentration: <81 ppm Paint Condition: Good	
White Paint Paint observed on the concrete floor of the Storage Room of the Washroom Building	Sample ID: Previously Sampled ² Concentration: 0.005% Paint Condition: Good	
Green Paint Paint observed on the metal door frames of the Washroom Building	Sample ID: Previously Sampled ² Concentration: 0.008% Paint Condition: Good	
Beige Paint Paint observed on the drywall ceilings of the Washroom Building	Sample ID: Previously Sampled ² Concentration: <0.009% Paint Condition: Good	

¹ For sample ID and concentration levels refer to Appendix A: Analytical Results – Asbestos & Lead.

² See Appendix C – Previous Report for sample ID and Locations.

Lead is also expected to be present in the following building components:

- within lead-acid batteries suspected to be present in emergency lighting and exit signage;
- as a component in ceramic building products such as tiles and bricks;
- as a component of the solder on sweated joints between copper pipe and fittings;
- as a component of the solder on wire connections of electric components;
- as a component of solder used to seal the bell fitting of cast iron rain water leader pipes; and
- as a malleable metal sheeting/flashing around roof edges, vent stacks, HVAC fixtures, etc.

Work that will disrupt and/or pulverize (including drilling, cutting, grinding or abrading) confirmed or suspected lead-containing materials must follow the recommendations provided in the EACO *Lead Abatement Guidelines* (dated 2014) or Ministry of Labour *Guideline for Lead on Construction Projects*, dated September 2004 (revised April 2011). In addition, the aforementioned painted surfaces (containing lead) should be handled with appropriate health and safety precautions so as to comply with requirements of the Designated Substances regulation, *O. Reg. 490/09*, and disposal of these materials must also comply with the requirements of *O. Reg. 347 – General – Waste Management*.

4.3 OTHER DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS

The following table summarizes other Designated Substances and hazardous materials which were also included in the survey. Identification of these materials and substances were based on visual observations only, and where appropriate, recommendations and necessary actions have been provided.

All designated substances must be handled in accordance with the appropriate guidelines and regulations. Designated Substance and Hazardous Material information will require updating as corrective measures are instituted and materials have been removed from various sections of the building.

Table 6 - Summary of Other Designated Substances and Hazardous Materials

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Mercury	Mercury is used in thermometers, batteries and some electrical switches. It is also used in dental fillings and in latex paint to protect against fungal attack and mildew. Mercury vapour is also present as a vapour in fluorescent lights, metal halide lights and mercury vapour lights.	Although no samples were analyzed for mercury, it is presumed to be present in the following building components: <ul style="list-style-type: none"> – as a gas in fluorescent light tubes. <i>Twenty-six (26) fluorescent light tubes observed (12 in the Washroom Building and 14 in the Lockmaster Building)</i>	The presence of mercury within assembled units (e.g. fluorescent light bulbs) should not be considered a hazard provided that the assembled units remain sealed and intact. Avoid direct skin contact with mercury and avoid inhalation of mercury vapour. Dispose of mercury following applicable legislative requirements.

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Ozone-Depleting Substances (ODSs)	It is the intention of the federal government to phase out the use of ODSs by the year 2030 in order to protect the upper atmosphere. The MOE has issued <i>Regulation 356</i> regarding the use, disposal and recycling of ODSs. Recapturing of ODSs during servicing must be done by licensed personnel.	HVAC equipment within the Washroom Building and Lockmaster Building are not suspected to contain ODS. However, the ice chest freezer located adjacent to the washroom building is presumed to contain ODS refrigerants.	In the event of removal, the units should be recycled following <i>Ontario Regulation 189/94 - Refrigerants (O. Reg. 189/94)</i> , as amended. All equipment containing ODSs must be serviced by an individual holding a valid Ozone Depletion Prevention (ODP) Card, issued by the MOE and the refrigerant drained from the unit and collected for recycling or disposal in accordance with all applicable legislation.
Silica	Silica, or silicon dioxide (SiO ₂), is the basic component of sand, quartz and granite rock. Crystalline Silica (the designated substance) is encountered in industry in three forms: quartz, tridymite, and cristobalite.	Crystalline Silica should be assumed to be present in brick, concrete, asphalt, cement and mortar.	<i>O. Reg. 490/09</i> regarding silica as a Designated Substance applies to areas where airborne silica is present and where workers are likely to inhale, ingest or absorb silica. Every precaution and procedure should be taken during demolition or renovation activities to control the time-weighted exposure of a worker to airborne silica and exposure should not exceed 0.05 milligrams Cristobalite per cubic meters of air, or 0.1 milligrams Quartz or Tripoli per cubic meters of air. Coring, sawing, or breaking up the materials containing silica should be completed only with appropriate dust suppression methods, proper respiratory protection and general worker safety precautions as outlined in the MOL Guidance document and the <i>Occupational Health and Safety Act</i> .

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Radioactive Materials	Smoke/heat detectors may contain a radioactive power source. In accordance with the Canadian Nuclear Safety Commission (CNSC), if smoke detectors contain radium or if more than 10 units will be disposed of, then the smoke detectors must be disposed of at a low-level radioactive waste management facility. Smoke detectors containing Am-241 isotope source of less than 5.0 µCi can be disposed of at a regular landfill site.	Smoke/heat detectors were observed in various locations within the Lockmaster and Washroom Buildings.	Smoke detectors must be disposed of in packages containing a maximum of ten smoke detectors per package.
Mould	Mould is a group of various species of simple, microscopic organisms found in every ecological niche, indoors and outdoors. Moulds are necessary for recycling of organic materials in nature. To grow, mould needs: <ul style="list-style-type: none"> — A mould spore — An organic food source (i.e. paper, drywall, wood, dirt, paint, etc.) — Moisture — Time (this will vary depending on the site-specific conditions, including the cleanliness of the water source) 	Suspected mould growth was not observed in the subject areas at the time of the survey.	If found during renovation/demolition, mould-contaminated materials should be removed and handled in accordance with the Canadian Construction Association document CCA 82/2004. Contractors should be warned of the presence of mould and every precaution should be taken to prevent airborne exposure to workers where mould is present and where workers are likely to inhale or ingest mould.

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Arsenic	Arsenic is used with other metals (chiefly copper, lead and zinc) to make alloys. Arsenic compounds are also used in pigments, animal poisons, insecticides, paints, wallpaper, ceramics, and poison gases for chemical warfare, glass making, in calico and indigo printing, pyrotechnics, integrated circuits and transistors. Arsenic is also a major waste material from the gold mining industry.	Arsenic is not expected to be present in the subject areas.	N/A
Acrylonitrile	Acrylonitrile is mostly used as a feedstock or chemical aid in the production of nitrile-butadiene rubber and in acrylonitrile-butadiene-styrene and styrene-acrylonitrile polymers. Acrylonitrile is also used to make other chemicals such as plastics, synthetic rubber, and acrylic fibre (e.g. clothing, blankets, carpeting) and nitrile rubber for oil-resistant hoses.	Acrylonitrile is not expected to be present in the subject areas.	N/A
Benzene	Benzene is widely used in the chemical industry as a starting material and solvent. Benzene occurs naturally in crude oil and is present in all gasoline products, automobile emissions and cigarette smoke. Benzene is highly volatile, and will release into the atmosphere over a short time.	Benzene is not expected to be present in the subject areas.	N/A

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Coke Oven Emissions	Coke oven emissions are complex mixtures of coal and coke particles, various vapors, gases and tars emitted during carbonization of coal to produce coke. The primary use of coke (pure carbon) is in the manufacture of iron and steel. Coke is also used to synthesize calcium carbide and to manufacture graphite and electrodes.	Coke oven emissions are not expected to be present in the subject areas.	N/A
Ethylene Oxide	Ethylene Oxide is an extremely flammable gas used in the manufacture of several industrial chemicals including textiles, detergents, polyurethane foam, antifreeze (especially ethylene glycol), solvents, medicinal products, adhesives, and other related products. It is also used as a fumigant and as a sterilizing agent for food (spices), cosmetics, and surgical tool and plastic devices in hospitals as an alternative to steam.	Ethylene Oxide is not expected to be present in the subject areas.	N/A
Isocyanates	Isocyanates are the raw materials from which all polyurethane products are made. Isocyanates are widely used in the manufacture of flexible and rigid foams, fibres, coatings such as paints and varnishes, elastomers, and also in materials used in auto body repair and building insulation.	Isocyanates are not expected to be present in the subject areas.	N/A

MATERIAL	DESCRIPTION	FINDINGS	ACTION
Polychlorinated Biphenyls (PCBs)	The federal Regulation <i>SOR/2008-273</i> (September 5, 2008) states that any solid material containing 50 parts per million (ppm) or more of PCBs must be handled as a PCB-containing material in accordance with all applicable regulations.	Based on the age of the buildings (1988), PCBs are not expected to be present in the subject areas.	N/A

5 LIMITATIONS

As this survey was generally non-destructive in nature, asbestos could be present in areas not accessible to the surveyor(s) for identification. Contractors and maintenance personnel should be warned of the possibility of unidentified materials when breaking into enclosed areas. Suspect friable and non-friable building materials discovered in these areas should be treated as asbestos until proven otherwise.

This report is prepared for the sole use of PWGSC, who are responsible for its distribution to any third parties. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted industry practices for asbestos surveys and regulatory requirements for sampling and identifying asbestos and are subject to the following inherent limitations:

1. The data and findings presented in this report are valid as of the date(s) of the investigation only. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration of the Site, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.
2. The findings, observations, conclusions, and recommendations expressed by WSP Canada Inc. in this report do not represent an opinion concerning compliance of any past or present owner or operator of the Site with any federal, provincial or local laws or regulations.
3. WSP Canada Inc.'s assessment presents professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental and occupational health & safety laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental and occupational health and safety laws, rules, regulations or policies of federal, provincial, or local governmental agencies. WSP Canada Inc. liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

APPENDIX

A

LABORATORY CERTIFICATE
OF ANALYSIS



EMSL Canada Inc.

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EMSL Canada Order 551810668
Customer ID: 55WPTH42
Customer PO: 181-09302-02
Project ID:

Attn: Joey Mainwaring Phone: (905) 882-1100
WSP Canada, Inc. Fax:
100 Commerce Valley Road Collected: 9/ 6/2018
Thornhill, ON L3T 0A1 Received: 9/10/2018
Analyzed: 9/17/2018
Proj: 181-09302-02/ Port Severn Dam

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: M-1A **Lab Sample ID:** 551810668-0001

Sample Description: Exterior Brick Mortar, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: M-1B **Lab Sample ID:** 551810668-0002

Sample Description: Exterior Brick Mortar, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: M-1C **Lab Sample ID:** 551810668-0003

Sample Description: Exterior Brick Mortar, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: CLK-2A **Lab Sample ID:** 551810668-0004

Sample Description: Grey Caulking, Windows, Exterior, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-2B **Lab Sample ID:** 551810668-0005

Sample Description: Grey Caulking, Windows, Exterior, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-2C **Lab Sample ID:** 551810668-0006

Sample Description: Grey Caulking, Windows, Exterior, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: TP-3A **Lab Sample ID:** 551810668-0007

Sample Description: Tar Paper, Under Metal Sheeting, Roof, Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	15%	85%	None Detected	



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Customer ID: 55WPTH42
Customer PO: 181-09302-02
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: TP-3B **Lab Sample ID:** 551810668-0008
Sample Description: Tar Paper, Under Metal Sheeting, Roof. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	20%	80%	None Detected	

Client Sample ID: TP-3C **Lab Sample ID:** 551810668-0009
Sample Description: Tar Paper, Under Metal Sheeting, Roof. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	10%	90%	None Detected	

Client Sample ID: CBM-4A-Texture **Lab Sample ID:** 551810668-0010
Sample Description: Concrete Block Mortar, Interior Walls. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown/White	0%	100%	None Detected	

Client Sample ID: CBM-4A-Mortar **Lab Sample ID:** 551810668-0010A
Sample Description: Concrete Block Mortar, Interior Walls. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CBM-4B-Texture **Lab Sample ID:** 551810668-0011
Sample Description: Concrete Block Mortar, Interior Walls. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown/White	0%	100%	None Detected	

Client Sample ID: CBM-4B-Mortar **Lab Sample ID:** 551810668-0011A
Sample Description: Concrete Block Mortar, Interior Walls. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CBM-4C-Texture **Lab Sample ID:** 551810668-0012
Sample Description: Concrete Block Mortar, Interior Walls. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown/White	0%	100%	None Detected	

Client Sample ID: CBM-4C-Mortar **Lab Sample ID:** 551810668-0012A
Sample Description: Concrete Block Mortar, Interior Walls. Washroom Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	



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EMSL Canada Order 551810668
Customer ID: 55WPTH42
Customer PO: 181-09302-02
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: M-5A **Lab Sample ID:** 551810668-0013
Sample Description: Exterior Brick Mortar, LockMaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: M-5B **Lab Sample ID:** 551810668-0014
Sample Description: Exterior Brick Mortar, LockMaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: M-5C **Lab Sample ID:** 551810668-0015
Sample Description: Exterior Brick Mortar, LockMaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: CLK-6A **Lab Sample ID:** 551810668-0016
Sample Description: Brown Caulking, Doors, Exterior, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: CLK-6B **Lab Sample ID:** 551810668-0017
Sample Description: Brown Caulking, Doors, Exterior, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: CLK-6C **Lab Sample ID:** 551810668-0018
Sample Description: Brown Caulking, Doors, Exterior, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Brown	0%	100%	None Detected	

Client Sample ID: CLK-7A **Lab Sample ID:** 551810668-0019
Sample Description: Brown Caulking, Windows, Exterior, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-7B **Lab Sample ID:** 551810668-0020
Sample Description: Brown Caulking, Windows, Exterior, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	



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EMSL Canada Order 551810668
Customer ID: 55WPTH42
Customer PO: 181-09302-02
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: CLK-7C **Lab Sample ID:** 551810668-0021

Sample Description: Brown Caulking, Windows, Exterior, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: TP-8A **Lab Sample ID:** 551810668-0022

Sample Description: Tar Paper, Under Metal Sheeting, Roof, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	10%	90%	None Detected	

Client Sample ID: TP-8B **Lab Sample ID:** 551810668-0023

Sample Description: Tar Paper, Under Metal Sheeting, Roof, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	10%	90%	None Detected	

Client Sample ID: TP-8C **Lab Sample ID:** 551810668-0024

Sample Description: Tar Paper, Under Metal Sheeting, Roof, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	20%	80%	None Detected	

Client Sample ID: DJC-9A **Lab Sample ID:** 551810668-0025

Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	

Client Sample ID: DJC-9B **Lab Sample ID:** 551810668-0026

Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	

Client Sample ID: DJC-9C **Lab Sample ID:** 551810668-0027

Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	

Client Sample ID: DJC-9D **Lab Sample ID:** 551810668-0028

Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	



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Customer ID: 55WPTH42
Customer PO: 181-09302-02
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: DJC-9E **Lab Sample ID:** 551810668-0029
Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	

Client Sample ID: DJC-9F **Lab Sample ID:** 551810668-0030
Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	

Client Sample ID: DJC-9G **Lab Sample ID:** 551810668-0031
Sample Description: Drywall Joint Compound, Drywall Finishes, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White	0%	100%	None Detected	

Client Sample ID: MEM-10A **Lab Sample ID:** 551810668-0032
Sample Description: Black Membrane between exterior and interior walls, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	0%	100%	None Detected	

Client Sample ID: MEM-10B **Lab Sample ID:** 551810668-0033
Sample Description: Black Membrane between exterior and interior walls, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	0%	100%	None Detected	

Client Sample ID: MEM-10C **Lab Sample ID:** 551810668-0034
Sample Description: Black Membrane between exterior and interior walls, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	White/Black	0%	100%	None Detected	

Client Sample ID: VFT-11A-Floor Tile **Lab Sample ID:** 551810668-0035
Sample Description: 12"x12", Beige vinyl floor tile & black mastic, Kitchen, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Beige	0%	100%	None Detected	

Client Sample ID: VFT-11A-Mastic **Lab Sample ID:** 551810668-0035A
Sample Description: 12"x12", Beige vinyl floor tile & black mastic, Kitchen, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	0%	100%	None Detected	



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Customer ID: 55WPTH42
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Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: VFT-11B-Floor Tile **Lab Sample ID:** 551810668-0036

Sample Description: 12"x12", Beige vinyl floor tile & black mastic, Kitchen, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Beige	0%	100%	None Detected	

Client Sample ID: VFT-11B-Mastic **Lab Sample ID:** 551810668-0036A

Sample Description: 12"x12", Beige vinyl floor tile & black mastic, Kitchen, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	0%	100%	None Detected	

Client Sample ID: VFT-11C-Floor Tile **Lab Sample ID:** 551810668-0037

Sample Description: 12"x12", Beige vinyl floor tile & black mastic, Kitchen, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Beige	0%	100%	None Detected	

Client Sample ID: VFT-11C-Mastic **Lab Sample ID:** 551810668-0037A

Sample Description: 12"x12", Beige vinyl floor tile & black mastic, Kitchen, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Black	0%	100%	None Detected	

Client Sample ID: AC-12A **Lab Sample ID:** 551810668-0038

Sample Description: Acoustic Undercoating, Kitchen Sink, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Beige	85%	15%	None Detected	

Client Sample ID: AC-12B **Lab Sample ID:** 551810668-0039

Sample Description: Acoustic Undercoating, Kitchen Sink, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Beige	85%	15%	None Detected	

Client Sample ID: AC-12C **Lab Sample ID:** 551810668-0040

Sample Description: Acoustic Undercoating, Kitchen Sink, Lockmaster Bldg

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Beige	85%	15%	None Detected	

Client Sample ID: CLK-13A **Lab Sample ID:** 551810668-0041

Sample Description: Grey Expansion Caulking, Upper Approach Walls

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	



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EMSL Canada Order 551810668
Customer ID: 55WPTH42
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Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: CLK-13B **Lab Sample ID:** 551810668-0042
Sample Description: Grey Expansion Caulking, Upper Approach Walls

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-13C **Lab Sample ID:** 551810668-0043
Sample Description: Grey Expansion Caulking, Upper Approach Walls

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-14A **Lab Sample ID:** 551810668-0044
Sample Description: White Expansion Caulking, Lower Approach Walls

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-14B **Lab Sample ID:** 551810668-0045
Sample Description: White Expansion Caulking, Lower Approach Walls

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-14C **Lab Sample ID:** 551810668-0046
Sample Description: White Expansion Caulking, Lower Approach Walls

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-16A **Lab Sample ID:** 551810668-0050
Sample Description: Grey Expansion Caulking, Lock 45

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-16B **Lab Sample ID:** 551810668-0051
Sample Description: Grey Expansion Caulking, Lock 45

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	

Client Sample ID: CLK-16C **Lab Sample ID:** 551810668-0052
Sample Description: Grey Expansion Caulking, Lock 45

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	9/17/2018	Gray	0%	100%	None Detected	



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EMSL Canada Order 551810668
Customer ID: 55WPTH42
Customer PO: 181-09302-02
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: TEM-Floor Tile **Lab Sample ID:** 551810668-0053
Sample Description: 12"x12" Beige VFT/Black Mastic for TEM Analysis

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
TEM Grav. Reduction	9/17/2018	Beige	0.0%	100%	None Detected	

Client Sample ID: TEM-Mastic **Lab Sample ID:** 551810668-0053A
Sample Description: 12"x12" Beige VFT/Black Mastic for TEM Analysis

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
TEM Grav. Reduction	9/17/2018	Black	0.0%	100%	None Detected	

Analyst(s):

- Anne Balayboa PLM (11)
- Kira Ramphal PLM (8)
- Michelle Lung PLM (36)
- Natalie D'Amico TEM Grav. Reduction (2)

Reviewed and approved by:

Matthew Davis or other approved signatory
or Other Approved Signatory

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

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

Initial report from: 09/18/2018 14:11:17



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EMSL Canada Or 551810668
CustomerID: 55WPTH42
CustomerPO: 181-09302-02
ProjectID:

Attn: **Joey Mainwaring**
WSP Canada, Inc.
100 Commerce Valley Road
Thornhill, ON L3T 0A1

Phone: (905) 882-1100
Fax:
Received: 09/10/18 4:30 PM
Analysis Date: 9/18/2018
Collected: 9/6/2018

Project: **181-09302-02/ Port Severn Dam**

Test Report: Polarized Light Microscopy (PLM) - Point Count Performed by EPA 600/R-93/116 Method with Gravimetric Reduction and 400 Point Count

SAMPLE ID	DESCRIPTION	APPEARANCE	(% Matrix Organic Acid		NON- ASBESTOS	NON- ASBESTOS	ASBESTOS
					% Fibrous	% NON-FIBROUS	% TYPES
ASP-15A 551810668-0047	Asphalt, Main Bridge	Black Non-Fibrous Homogeneous	4.7	16.7		78.6 Non-fibrous (other)	None Detected
ASP-15B 551810668-0048	Asphalt, Main Bridge	Black Non-Fibrous Homogeneous	5.7	20.6		73.7 Non-fibrous (other)	None Detected
ASP-15C 551810668-0049	Asphalt, Main Bridge	Black Non-Fibrous Homogeneous	4.8	10.2		85.0 Non-fibrous (other)	None Detected

Analyst(s)
Natalie D'Amico (3)

Matthew Davis or other approved signatory
or other approved signatory

Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. The limit of detection as stated in the method is 0.25%. EMSL Analytical Inc. suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical Inc.. This report must not be used to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical Inc. bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layer samples. EMSL Analytical Inc. liability is limited to the cost of sample analysis. The test results contained within this report meet the requirements of NELAC unless otherwise noted. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.
Samples analyzed by EMSL Canada Inc. Mississauga, ON

Initial report from 09/18/2018 14:11:24

**EMSL Canada Inc.**

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EMSL Canada Or	551810687
CustomerID:	55WPTH42
CustomerPO:	181-09302-02
ProjectID:	

Attn: **Joey Mainwaring**
WSP Canada, Inc.
100 Commerce Valley Road
Thornhill, ON L3T 0A1

Phone: (905) 882-1100
 Fax:
 Received: 09/10/18 4:30 PM
 Collected: 9/6/2018

Project: 181-09302-02 / PORT SEVERN DAM

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

Client SampleDescription	Collected	Analyzed	Weight	RDL	Lead Concentration
Pb-01 551810687-0001	9/6/2018	9/13/2018	0.2451 g	82 ppm	<82 ppm
Site: Beige paint, concrete block walls (upper half), Washroom Bldg					
Pb-02 551810687-0002	9/6/2018	9/13/2018	0.2446 g	82 ppm	<82 ppm
Site: Brown paint, concrete block walls (lower half), Washroom Bldg					
Pb-03 551810687-0003	9/6/2018	9/13/2018	0.2430 g	82 ppm	<82 ppm
Site: Beige paint, drywall walls/ceilings, Display & Reception Rooms, Lockmaster Bldg					
Pb-04 551810687-0004	9/6/2018	9/13/2018	0.2465 g	81 ppm	<81 ppm
Site: Grey paint, drywall walls, Kitchen & Mechanical Room, Lockmaster Bldg					
Pb-05 551810687-0005	9/6/2018	9/13/2018	0.2496 g	80 ppm	<80 ppm
Site: Grey paint, concrete floor, Mechanical Room, Lockmaster Bldg					
Pb-06 551810687-0006	9/6/2018	9/13/2018	0.2457 g	81 ppm	<81 ppm
Site: Blue paint, concrete, Pier & Lower Approach Walls Main Dam					
Pb-07 551810687-0007	9/6/2018	9/13/2018	0.2467 g	81 ppm	1400 ppm
Site: Dark green paint, metal beams, Lockmaster Bldg & throughout Main Dam site					
Pb-08 551810687-0008	9/6/2018	9/13/2018	0.2410 g	1700 ppm	32000 ppm
Site: Light yellow paint, metal railings, Main Dam & Dam G					
Pb-09 551810687-0009	9/6/2018	9/13/2018	0.2425 g	82 ppm	<82 ppm
Site: Yellow paint, metal railings, Lock 45					
Pb-10 551810687-0010	9/6/2018	9/13/2018	0.2454 g	81 ppm	3800 ppm
Site: Grey paint, metal around hatches, Lock 45					

Rowena Fanto, Lead Supervisor
 or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

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

Initial report from 09/17/2018 08:51:49



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CustomerID: 55WPTH42
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ProjectID:

Attn: **Joey Mainwaring**
WSP Canada, Inc.
100 Commerce Valley Road
Thornhill, ON L3T 0A1

Phone: (905) 882-1100
Fax:
Received: 09/10/18 4:30 PM
Collected: 9/6/2018

Project: **181-09302-02 / PORT SEVERN DAM**

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

<i>Client SampleDescription</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Weight</i>	<i>RDL</i>	<i>Lead Concentration</i>
Pb-11 551810687-0011	9/6/2018	9/13/2018	0.2474 g	81 ppm	<81 ppm
Site: White paint, drywall ceiling, Lockmaster Bldg.					

Rowena Fanto, Lead Supervisor
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

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

Initial report from 09/17/2018 08:51:49

APPENDIX

B

SITE PHOTOGRAPHS



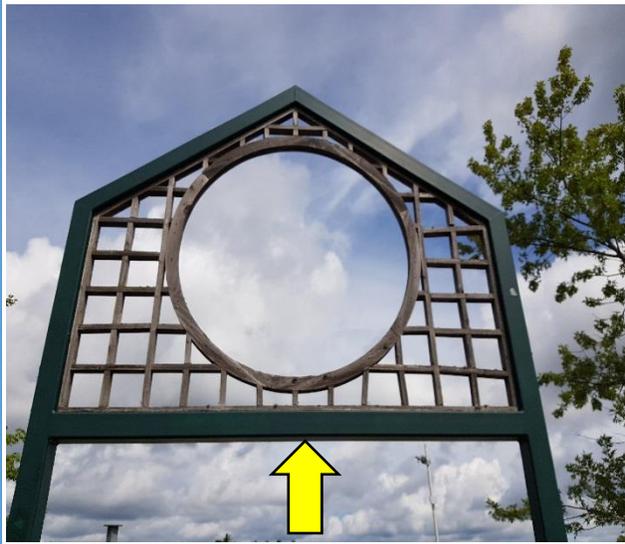


Photo #1: View of lead-containing dark green paint on metal beams throughout the subject areas.

Sample ID: Pb-07



Photo #2: View of lead-containing light yellow paint on the metal railings on the Main Dam.

Sample ID: Pb-08



Photo #3: View of lead-containing light yellow paint on the metal railings on the Dam G.

Sample ID: Pb-08



Photo #4: View of lead-containing grey paint on the metal hatches on Lock 45.

Sample ID: Pb-10



Photo #5: View of the Washroom Building.

Sample ID: N/A



Photo #6: View of the non-asbestos exterior brick mortar on the Washroom Building.

Sample ID: M-1A-C



Photo #7: View of the non-asbestos tar paper insulation under the metal sheet roofing of the Washroom Building.

Sample ID: TP-3A-C

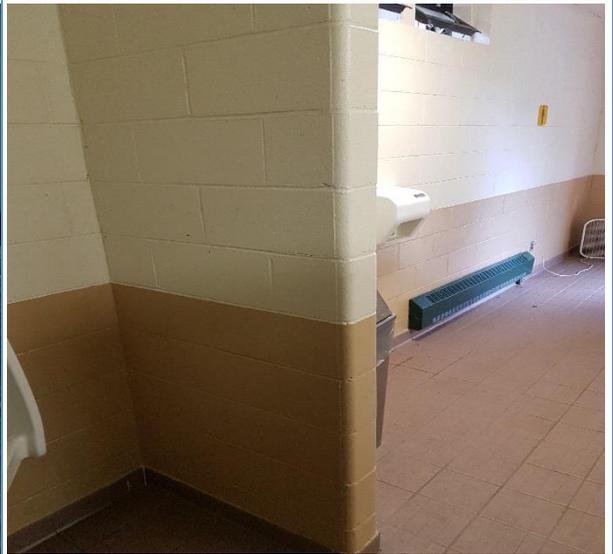


Photo #8: View of the non-asbestos concrete block mortar from the interior walls of the Washroom Building.

Sample ID: CBM-4A-C



Photo #9: View of the Lockmaster Building.

Sample ID: N/A



Photo #10: View of the non-asbestos exterior brick mortar on the Lockmaster Building.

Sample ID: M-5A-C



Photo #11: View of the drywall finishes with non-asbestos drywall joint compound in the Lockmaster Building.

Sample ID: DJC-9A-C



Photo #12: View of the non-asbestos black membrane between the exterior and interior walls of the Lockmaster Building.

Sample ID: MEM-10A-C



Photo #13: View of the non-asbestos 12"x12" beige vinyl floor tile in the Kitchen of the Lockmaster Building.

Sample ID: VFT-11A-C



Photo #14: View of the non-asbestos acoustic undercoating on the sink in the Kitchen of the Lockmaster Building.

Sample ID: AC-12A-C



Photo #15: View of the Lock 45 Upper Approach Wall.

Sample ID: N/A



Photo #16: View of the non-asbestos grey caulking used in the expansion joints on the Upper Approach Wall.

Sample ID: CLK-13A-C



Photo #17: View of the Lock 45 Lower Approach Walls.

Sample ID: N/A



Photo #18: View of the non-asbestos white caulking on the Lower Approach Walls.

Sample ID: CLK-14A-C



Photo #19: View of the Main Dam.

Sample ID: N/A



Photo #20: View of the Main Bridge.

Sample ID: N/A



Photo #21: View of Lock 45.

Sample ID: N/A

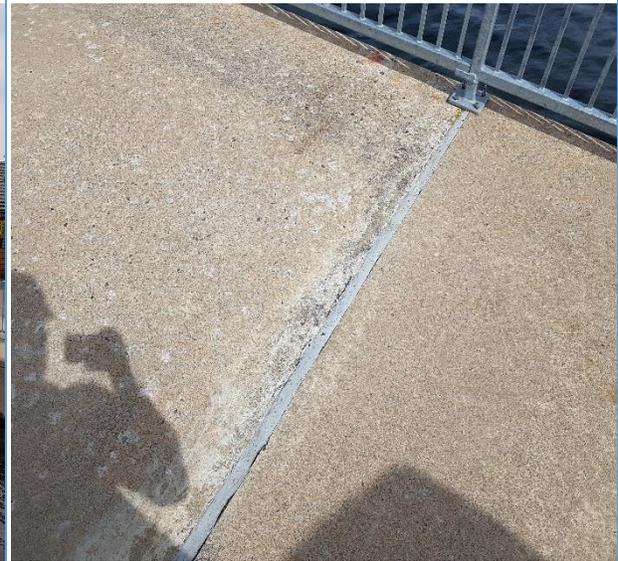


Photo #22: View of the non-asbestos grey caulking on Lock 45.

Sample ID: CLK-16A-C



Photo #23: View of Dam G.

Sample ID: N/A



Photo #24: View of Dam A.

Sample ID: N/A



Photo #25: View of T-8 fluorescent light tubes containing mercury in the Washroom Building.

Sample ID: N/A



Photo #26: View of the emergency lighting in the Lockmaster Building. Emergency lights are presumed to contain lead-acid batteries.

Sample ID: N/A

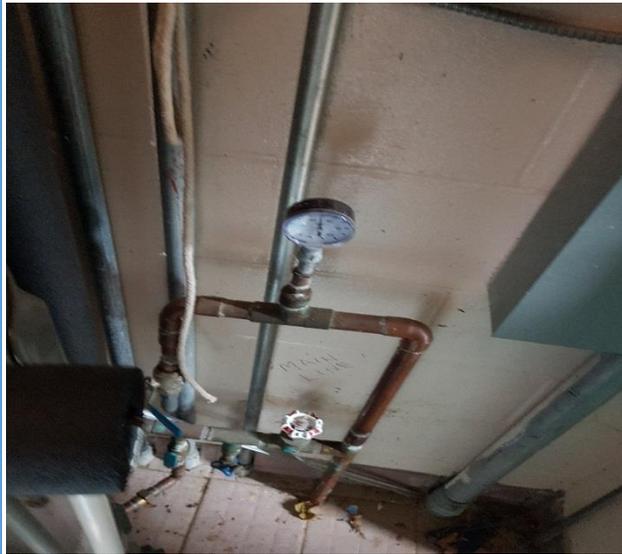


Photo #27: View of copper piping in the Janitor's Closet in the Washroom Building. Lead-containing solder is presumed to be present.

Sample ID: N/A

APPENDIX

C

PREVIOUS REPORT





FINAL
Hazardous Building
Materials Assessment
Washroom Building, Lock 45,
Port Severn, Ontario

Prepared for:

**Parks Canada, Ontario Waterways,
Trent-Severn Waterway**
2155 Ashburnham Drive, P.O. Box 567
Peterborough, Ontario K9J 6Z6

Attention: Mary MacLeod
Asset Manager

September 29, 2015

Pinchin File: 102740



Issued to: Parks Canada, Ontario Waterways, Trent-Severn Waterway
Contact: Mary MacLeod
Asset Manager
Issued on: September 29, 2015
Pinchin file: 102740
Issuing Office: 204-160 Charlotte Street, Peterborough, ON K9J 2T8
Primary Contact: Chris Moose - Project Manager

Author:

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EXECUTIVE SUMMARY

Parks Canada, Ontario Waterways, Trent-Severn Waterway (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment of the Washroom Building at Lock 45 located at 3214 Port Severn Road in Port Severn, Ontario. The assessment was performed on August 14, 2015.

The objective of the assessment was to document the locations of specified hazardous building materials, evaluate their condition, and develop corrective action plans as required for the purposes of long term management.

The assessed area consisted of the entire building. The building was vacant at the time of the assessment work.

SUMMARY OF FINDINGS

The following designated substances were confirmed to be present in the building:

Material	Description	Location	Recommendations
Lead	Solder on copper pipes. Lead-acid batteries in backup emergency lighting.	All locations where domestic water pipes are present in the building. Storage room.	In the absence of construction or maintenance activities, lead based materials should be managed in place. At the time of renovation or maintenance, observe the work procedures in the Ministry of Labour Guideline (MOL) if lead-containing materials are to be disturbed. Recycle products containing lead wherever possible.
Silica	Poured concrete, masonry and mortar, ceramic tiles, grout, plaster.	Throughout building.	Construction disturbance of silica-containing products may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding or demolition of materials containing silica should be conducted with proper procedures and precautions as outlined by the MOL Silica on Construction Guideline.
Mercury	Fluorescent light tubes.	Throughout building.	Avoid direct skin contact with mercury materials and avoid inhalation of mercury vapour. Avoid breaking light tubes. If disposed of, waste light tubes should be treated as hazardous waste, due to mercury content. Pinchin recommends recycling fluorescent light tubes to reclaim mercury.



The following potentially hazardous substances were confirmed to be present in the building:

Material	Description	Locations	Recommendations
Man-Made Mineral Fibres (MMMMF)	Glass fibre and/or mineral wool.	As insulation in the attic. As insulation around the domestic hot water tank.	If MMMF is affected by renovation or maintenance work, protect workers with gloves, respirators, and disposable coveralls as recommended by The Construction Safety Association of Ontario document "Synthetic Vitreous Fibres – Guidelines for Construction".

Please refer to Section 4.0 of this report for detailed recommendations regarding administrative and remedial actions.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.



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1.0 INTRODUCTION AND SCOPE

Parks Canada, Ontario Waterways, Trent-Severn Waterway (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment of the Washroom Building at Lock 45 located at 3214 Port Severn Road in Port Severn, Ontario..

The assessment was performed by Chris Moose on August 14, 2015. The surveyor was not accompanied during the assessment. The building was vacant at the time of the assessment.

The objective of the assessment was to document the locations of specified hazardous building materials, evaluate their condition and develop corrective action plans as required.

1.1 Scope of Assessment

The assessment was performed to establish the location and type of specified hazardous building materials incorporated in the structure and its finishes. The assessed area consisted of all parts of the building.

For the purpose of the assessment and this report, designated substances are defined as follows:

- Asbestos;
- Lead;
- Silica; and
- Mercury.

The assessment also included a visual examination for the presence:

- Mould;
- Ozone Depleting Substances;
- Urea Formaldehyde Foam Insulation; and
- Man-Made Mineral Fibres.

The following Ontario Designated Substances are not typically found in building materials in a composition/state that is hazardous and were not included in this assessment:

- Arsenic;
- Acrylonitrile;
- Benzene;
- Coke oven emissions;
- Ethylene oxide;
- Isocyanates; and



- Vinyl chloride monomer.

2.0 BACKGROUND INFORMATION

2.1 Building Description

Item	Details
Building Use	Washroom building
Number of Floors/Levels	One story
Total Area of Building (Square Feet)	500
Year of Construction	1988
Structure	Concrete, wood
Exterior Cladding	Brick, wood
HVAC	Electric baseboards
Roof	Wood shingles
Flooring	Ceramic tile, concrete
Interior Walls	Concrete block
Ceilings	Drywall

3.0 FINDINGS

3.1 Asbestos

3.1.1 Suspect Building Materials Not Found

The following types of building materials may historically contain asbestos but were not observed in the building and are not discussed in the report findings:

- Spray-applied fireproofing or thermal insulation;
- Texture finishes (acoustic/decorative);
- Thermal systems insulation;
- Vermiculite;
- Acoustic ceiling tiles;
- Plaster
- Asbestos cement products;
- Vinyl sheet flooring; and
- Vinyl floor tiles and mastic.

3.1.2 *Drywall Joint Compound*

Drywall (gypsum board) and drywall joint compound is present as a ceiling finish throughout the building. Three building samples of drywall joint compound were collected (samples b122703.0001A-C) and found to be non-asbestos.



Photo 1 – Non-asbestos drywall located throughout the building.

3.1.3 *Sealants, Caulking, and Putty*

Brown caulking is present around exterior doors. Three samples of caulking were collected and all were determined to be non-asbestos (samples b122703.0002A-C).



Photo 2 – Non-asbestos caulking located on exterior door.

3.1.4 *Presumed Asbestos Materials*

A number of materials which might contain asbestos were not sampled during our assessment due to limitations in scope and methodology. Where present, these materials must be presumed to be an asbestos material and are best sampled during project planning and preparation of contract documents for their removal. Materials presumed to contain asbestos include:

- Adhesives.

3.2 Lead

3.2.1 Paints and Surface Coatings

A total of three paint samples were collected from interior and exterior painted finishes. The following table summarizes the analytical results for paints sampled and their locations:

Sample Number	Colour, Substrate Description	Locations	Lead (%)
L001	White paint on concrete	Storage room floor	0.005
L002	Green paint on steel	Door frames	0.008
L003	Beige paint on drywall	Ceilings	<0.009

All paints tested were found to contain an insignificant amount of lead.

Appendix II-B presents the bulk sample analytical results.

3.2.2 Lead Products and Applications

Lead-containing batteries are present in emergency lighting present in the storage room.



Photo 3 – Backup emergency lighting with lead-acid batteries present in the storage room.

3.2.3 Presumed Lead Materials

Lead may be present in a number of materials which were not assessed and/or sampled. Solder on copper domestic water pipes should be considered to contain lead.

3.3 Silica

Crystalline silica is a presumed component of the following building materials where present in the building:

- poured concrete;
- masonry and mortar; and
- ceramic tiles, grout.

Mercury

3.3.1 Lamps

Mercury vapour is present in fluorescent light tubes in the building.

3.3.2 Mercury-Containing Devices

Mercury-containing devices were not found during the survey.

3.4 Ozone Depleting Substances

Equipment containing ozone depleting substances was not found during the survey.

3.5 Mould

Visible mould growth was not found in the assessed area.

3.6 Man-Made Mineral Fibres

Glass and/or Mineral Wool insulation is present in the building as insulation in the attic and around the domestic hot water tank.



Photo 4 – Batt insulation present in attic.

3.7 Urea Formaldehyde Foam Insulation (UFFI)

UFFI was not found by the assessment.



4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

Performing remedial work recommended by this report does not require additional assessment or testing provided that all drywall in the basement is removed. Section 4.4.5 of this report discusses intrusive testing be conducted to determine the extent of necessary mould removal and the source of water infiltration which has led to mould growth. Based on our assessment, mouldy drywall finishes in the basement are not expected to be concealing any hazardous building materials other than MMMF.

Perform an intrusive assessment prior to building renovation or demolition operations (ie removal of wall finishes, flooring, exterior cladding, etc.) which may uncover building materials not tested or assessed by this report. The assessment should include; destructive testing (i.e. coring and/or removal of building finishes and components), and sampling of suspect asbestos-containing materials excluded from this report (i.e. roofing materials, caulking, mastics, etc.).

4.2 On-going Management and Maintenance

The following recommendations are made regarding on-going management and maintenance work involving the hazardous materials identified.

4.2.1 Lead

Construction disturbance of materials identified of containing or suspected to contain lead may results in overexposure to workers. Protect workers using the procedures outlined by “Best Practice” documents such as the Environmental Abatement Council of Ontario (EACO) Lead Guideline or the Ontario Ministry of Labour Guideline “Lead on Construction Projects”. Recycle materials containing lead wherever possible.

4.2.2 Silica

Disturbance of silica-containing products during maintenance activities may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with provincial standards or guidelines.

4.2.3 Mercury

Recycle and reclaim mercury from fluorescent light tubes and thermostats when taken out of service. Do not break lamps or separate liquid mercury from components. Light tubes are accepted free of charge at many local recycling depots. Liquid mercury is classified as a hazardous waste and must be disposed of in accordance with local regulations.



4.2.4 *Man-Made Mineral Fibres*

The presence of MMMF in a building does not pose a hazard to occupants unless disturbed by renovation or demolition activities.

Protect workers installing or removing MMMF with gloves, respirators, and disposable coveralls as recommended by The Construction Safety Association of Ontario document “Synthetic Vitreous Fibres – Guidelines for Construction”.

5.0 LIMITATIONS

The work performed by Pinchin Ltd. was conducted in accordance with generally accepted engineering or scientific practices current in this geographical area at the time the work was performed. No warranty is either expressed or implied by furnishing written reports or findings. The Client acknowledges that subsurface and concealed conditions may vary from those encountered or inspected. Pinchin Ltd. can only comment on the environmental conditions observed on the date(s) the survey is performed. The work is limited to those materials or areas of concern identified by the Client or outlined in our proposal. Other areas of concern may exist but were not investigated within the scope of this assignment.

Pinchin Ltd. makes no other representations whatsoever, including those concerning the legal significance of its findings or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issue, regulatory statutes are subject to interpretation and these interpretations may change over time. Pinchin Ltd. accepts no responsibility for consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The liability of Pinchin Ltd. or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Pinchin will not be responsible for any consequential or indirect damages. Pinchin is only liable for damages resulting from the negligence of Pinchin Ltd. All claims by the Client shall be deemed relinquished if not made within two years after last date of services provided.

Information provided by Pinchin Ltd. is intended for Client use only. Pinchin Ltd. will not provide results or information to any party unless disclosure by Pinchin Ltd. is required by law. Any use by a third party of reports or documents authored by Pinchin Ltd. or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin Ltd. accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.



6.0 REFERENCES

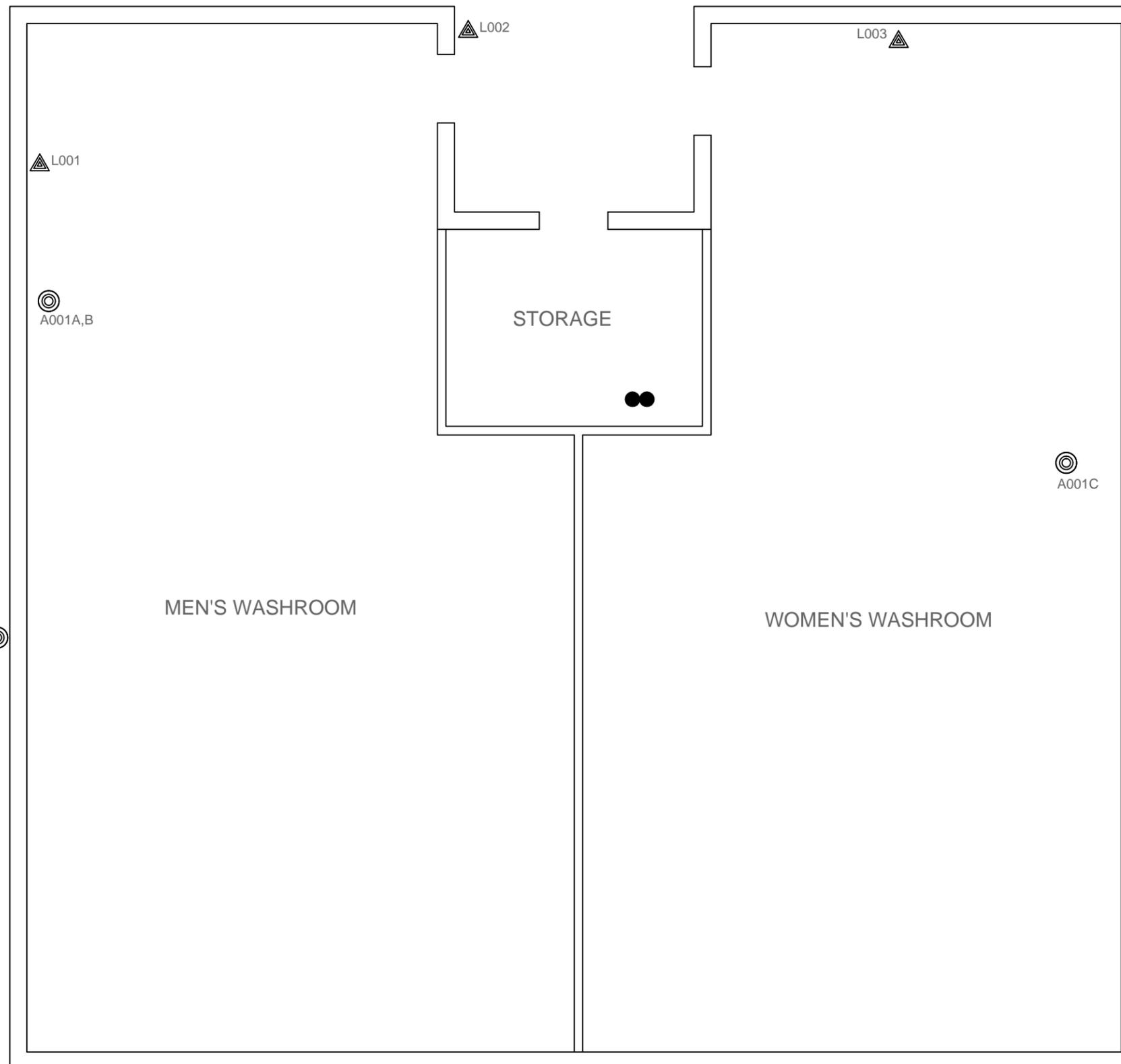
The following legislation and documents were referenced in completing the assessment and this report:

1. Asbestos on Construction Projects and in Buildings and Repair Operations, Ontario Regulation 278/05.
2. Designated Substances, Ontario Regulation 490/09.
3. Lead on Construction Projects, Ministry of Labour Guidance Document.
4. Ministry of the Environment Regulation, R.R.O. 1990 Reg. 347 as amended.
5. Surface Coating Materials Regulations, SOR/2005-109, Hazardous Products Act.
6. Silica on Construction Projects, Ministry of Labour Guidance Document.
7. Alert – Mould in Workplace Buildings, Ontario Ministry of Labour.

J:\102000s\102740 PARKSCANADA,2155Ashburnha,DSUB,ASSMT\Buildings\Lock 45\Report\102740 Final Hazardous Building Materials Assessment Lock 45 Parks Canada September 2015.docx

Template: Master Report for Hazardous Materials Assessment Report (Management), Haz, December 10, 2014

APPENDIX I
Drawings



LEGEND:

-  ASBESTOS BULK SAMPLE
-  LEAD BULK SAMPLE
-  LEAD ACID BATTERIES

CLIENT:
PARKS CANADA, ONTARIO WATERWAYS
TRENT-SEVERN WATERWAY

LOCATION:
WASHROOM BUILDING AT LOCK 45
3214 PORT SEVERN ROAD
PORT SEVERN, ONTARIO

TITLE:
HAZARDOUS BUILDING
MATERIALS ASSESSMENT
GROUND FLOOR

DATE: 2015/09/11	PROJECT # : 102740
----------------------------	------------------------------

DRAWN BY: RLN	DRAWING: 1 OF 1
-------------------------	--

CHECKED BY: CM

SCALE: NTS

APPENDIX II-A
Asbestos Analytical Certificates



Pinchin Ltd. Asbestos Laboratory Certificate of Analysis

Project Name:	Parks Canada, Washroom Building, Port Severn, ON		
Project No.:	102740		
Prepared For:	Chris Moose	Date Received:	August 21, 2015
Lab Reference No.:	b122703	Date Analyzed:	August 31, 2015
Analyst(s):	T. Tran	# Samples submitted:	6
		# Phases analyzed:	6

Method of Analysis:

EPA 600/R-93/116 - Method for the Determination of Asbestos in Bulk Building Materials dated July, 1993

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold (see chart below) indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

Provincial Jurisdiction	Regulatory Threshold	Provincial Jurisdiction	Regulatory Threshold
Ontario, British Columbia, Nova Scotia	0.5%	Manitoba	0.1% friable 1% non-friable
Quebec	0.1%	Saskatchewan	0.5% friable 1% non-friable
Alberta, NWT, Yukon, Nunavut	1%	Newfoundland and Labrador, PEI and New Brunswick	1%

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

Pinchin Ltd. is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 101270-0) for the 'EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples' and meets all requirements of ISO/IEC 17025:2005.

This report relates only to the items tested.

NOTE: *This test report may not be reproduced, except in full, without the written approval of the laboratory. The client may not use this report to claim product endorsement by NVLAP or any agency of the U.S. Government. This report is valid only when signed in blue ink by the analyst. Vinyl asbestos floor tiles contain very fine fibres of asbestos and may be missed by some laboratories using the PLM method. Internal verification studies performed by Pinchin indicate that the chance of missing asbestos in floor tiles is no higher than about 2%. The vinyl tile study and laboratory documentation on measurement uncertainty is available upon request. The analysis of dust samples by PLM cannot be used as an indicator of past or present airborne asbestos fibre levels.*



**Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis**

Project Name: Parks Canada, Washroom Building, Port Severn, ON
Project No.: 102740
Prepared For: Chris Moose

Lab Reference No.: b122703
Date Analyzed: August 31, 2015

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
0001A Drywall Joint Compound - Located in the Men's Washroom	Homogeneous, white, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
0001B Drywall Joint Compound - Located in the Men's Washroom	Homogeneous, white, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
0001C Drywall Joint Compound - Located in the Women's Washroom	Homogeneous, white, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
0002A Brown Caulking - Exterior	Homogeneous, brown, soft, caulking material.	None Detected	Non-Fibrous Material > 75%
0002B Brown Caulking - Exterior	Homogeneous, brown, soft, caulking material.	None Detected	Non-Fibrous Material > 75%
0002C Brown Caulking - Exterior	Homogeneous, brown, soft, caulking material.	None Detected	Non-Fibrous Material > 75%

REVIEWED BY

ANALYST

APPENDIX II-B
Lead Analytical Certificates



Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3050B/6010C/7420



Customer: Pinchin Ltd.
204-160 Charlotte Street
Peterborough ON K9J 2T8

Attn: Chris Moose
Mike Wilson

Lab Order ID: 1516356
Analysis ID: 1516356_PBP
Date Received: 8/21/2015
Date Reported: 8/31/2015

Project: Lock 45

Sample ID	Description	Mass (g)	Concentration (ppm)	Concentration (% by weight)
Lab Sample ID	Lab Notes			
L001	White paint on concrete paint	0.0841	52	0.005%
1516356PBP_1				
L002	Green paint on steel door frame	0.0675	81	0.008%
1516356PBP_2				
L003	Beige paint on drywall	0.0442	< 90.	< 0.009%
1516356PBP_3				

Unless otherwise noted blank sample correction was not performed on analytical results. Scientific Analytical Institute participates in the AIHA IHPAT program. IHPAT Laboratory ID: 173190. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. Analytical uncertainty available upon request. The quality control samples run with the samples in this report have passed all EPA required specifications unless otherwise noted. RL: (Report Limit for an undiluted 50ml sample is 4µg Total Pb).

Daniel Olson (3)

Analyst

Laboratory Director

1516356

Version 1-15-2012

Client:	Pinchin Ltd.
Contact:	Chris Moose
Address:	160 Charlotte Street, Suite 204
City:	Peterborough, Ontario
Phone:	705-748-4627
Fax:	705-748-6927
Email:	cmoose@pinchin.com
cc email:	mwilson@pinchin.com
Project Name:	Lock 45
Pinchin File #:	102740
Date Submitted:	8/20/2015 0:00
Analysis:	Lead in Paint
TurnAroundTime:	144 Hours

***Instructions:**
 Use Column "B" for your contact info

To See an Example Click the bottom Example Tab.

Enter samples between "<<" and ">>"
Begin Samples with a "<<" above the first sample and end with a ">>" below the last sample.
 Only Enter your data on the first sheet "Sheet1"

Note: Data 1 and Data 2 are optional fields that do not show up on the official report, however they will be included in the electronic data returned to you to facilitate your reintegration of the report data.

Invoice to:

Mike Wilson
mwilson@pinchin.com

Scientific Analytical Institute



4604 Dundas Dr.
 Greensboro, NC 27407
 Phone: 336.292.3888
 Fax: 336.292.3313
 Email: lab@sailab.com

Sample Number	Data 1 (Lab use only)	Sample Description	Data 2 (Lab use only)
---------------	-----------------------	--------------------	-----------------------

<<			
L001		White paint on concrete paint	
L002		Green paint on steel door frame	
L003		Beige paint on drywall	

Accepted

Rejected

>>

Shelton 8/21 1030A

APPENDIX III
Methodology



1.0 GENERAL

Pinchin Ltd. conducts a room-by-room survey (rooms, corridors, service areas, exterior, etc.) to identify the designated substances and potentially hazardous substances as defined by the scope.

Information regarding the approximate quantity, location, and condition of designated substances and potentially hazardous substances encountered and visually estimated quantities are recorded. The locations of any samples collected are recorded on small-scale plans.

1.1 Limitations on Scope

The assessment excludes the following:

- Owner or occupant articles (e.g. stored items, furniture, appliances, etc.);
- Underground materials or equipment (e.g. vessels, drums, underground storage tanks, pipes, etc.);
- Building envelope, structural components, inaccessible or concealed materials or other items where sampling may cause consequential damage to the property;
- Energized systems (e.g. internal boiler components, elevators, mechanical or electrical components);
- Controlled products (e.g. stored chemicals, operational or process-related substances); and
- Materials not typically associated with construction (e.g. settled dust, spills, residual contamination from prior spills, etc.).

The assessment is limited to non-intrusive testing. Concealed spaces such as those above solid ceilings and within shafts and pipe chases are accessed via existing access panels only. Pinchin does not conduct demolition of walls, solid ceilings, structural items, interior finishes or exterior building finishes, to determine the presence of concealed materials.

1.2 Asbestos

Pinchin Ltd. conducts an inspection for the presence of friable and non-friable asbestos-containing materials (ACM). A friable material is a material that when dry can be crumbled, pulverized or powdered by hand pressure.



A separate set of samples is collected of each type of homogenous material suspected to contain asbestos. A homogenous material is defined by the US EPA¹ as material that is uniform in texture and appearance, was installed at one time, and is unlikely to consist of more than one type or formulation of material. The homogeneous materials are determined by visual examination, available information on the phases of the construction and prior renovations.

Pinchin collects samples at a rate that is in compliance with Table 1 of O.Reg. 278/05.

The sampling strategy is also based on known ban dates and phase out dates of the use of asbestos; sampling of certain building materials is not conducted after specific construction dates. In addition, to be conservative, several years past these dates are added to account for some uncertainty in the exact start / finish date of construction and associated usage of ACM.

Delineation of asbestos-containing drywall compound from newer, non-asbestos drywall compound is not conducted.

Flooring mastic or adhesive is sampled and analyzed if present on the underside of flooring samples (vinyl floor tile and vinyl sheet flooring).

Pinchin submits the bulk samples to a NVLAP² accredited laboratory for analysis. The analysis is performed in accordance with Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, July 1993.

The asbestos analysis is completed using a stop positive approach. Only one result of greater than the regulated criteria (0.5%) is required to determine that a material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos. The laboratory stops analyzing samples from a homogeneous material once a result greater than the regulated criteria is detected in any of the samples of that material. All samples of a homogeneous material are analyzed if no asbestos is detected. In some cases, all samples are analyzed in the sample set regardless of result. Where building materials are described in the report as non-asbestos, or described as containing no asbestos, this is subject to the limitations of the analytical method used, and should be understood to mean no asbestos was detected.

¹ Environmental Protection Agency

² National Voluntary Laboratory Accreditation Program

Asbestos materials are evaluated in order to make recommendations regarding remedial work. The priority for remedial action is based on several factors:

- friability (friable or non-friable).
- condition (good, fair, poor, debris).
- accessibility (ranking from accessible to all building users to inaccessible).
- visibility (whether the material is obscured by other building components).
- efficiency of the work (for example, if damaged ACM is being removed in an area, it may be most practical to remove all ACM in the area even if it is in good condition).

This includes friability, condition and efficiency and practicality of the work.

1.3 Lead

Pinchin Ltd. collects samples of distinctive paint finishes and surface coatings present in more than a limited application, where removal of the paint is possible. Pinchin Ltd. collects samples by scraping the painted finish to include base and covering applications. Drawings included with this report show sample locations.

Analysis for lead in paints or surface coatings is performed in accordance with EPA Method No. 3050B/Method No. 7420; flame atomic absorption at an accredited laboratory.

For this report, all paints containing lead at a concentration of 0.009% or greater are discussed. Paint and surface coatings are evaluated for condition.

Lead building products (e.g. batteries, lead sheeting, flashing) are identified by visual observation only.

1.4 Silica

Pinchin Ltd. identifies building materials suspected of containing crystalline silica (e.g. concrete, cement, tile, brick, masonry, mortar) by knowledge of current and historic applications and visual inspection only. Pinchin Ltd. does not perform sampling of these materials for laboratory analysis of crystalline silica content.

1.5 Mercury

Building materials/products/equipment (e.g. thermostats, barometers, pressure gauges, light tubes), suspected to contain mercury were identified by visually inspection only. Dismantling of equipment suspected of containing mercury was not performed. Sampling of these materials for laboratory analysis of mercury content was not performed.

Mercury spills or damaged mercury-containing equipment was recorded where observed.

1.6 Ozone Depleting Substances (ODS)

Pinchin Ltd. determines the potential presence of ODS (chlorofluorocarbon, hydrochlorofluorocarbon, hydrofluorocarbon, halon, etc.) in air conditioning units, by visual inspection of manufactures' labels or plates, maintenance records, or log books, etc.

1.7 Visible Mould

Pinchin Ltd. identifies the presence of mould if visibly present in a significant quantity on exposed building surfaces. If any mould growth is concealed within wall cavities it is not addressed in this assessment.

Mould bulk samples were performed at the Pinchin Environmental Microbiology Laboratory, Mississauga. The Pinchin laboratory is independently accredited to ISO/IEC 17025:2005 for mould and bacteria analysis, by the American Industrial Hygiene Association (AIHA)³ and the Quebec Ministry of Sustainable Development, Environment and the Fight against Climate Change (MDDEP).⁴ The laboratory also participates in *Escherichia coli*, coliform bacteria and Heterotrophic Plate Count (HPC) proficiency testing program of the Canadian Association of Laboratory Accreditation (CALA) (Lab ID 3758).

1.8 Man-Made Mineral Fibres

Pinchin reviewed the building for the presence of man-made mineral fibres (MMMMF). No destructive testing was performed to determine the extent of MMMF. Sampling of MMMF was not performed.

Where possible, Glass / Mineral Wool was identified separately from Refractory Ceramic Fibres (RCF) given the more stringent personal protective requirements needed when working with RCF.

1.9 Urea Formaldehyde Foam Insulation

Electrical cover plates were removed on exterior walls to verify the presence/absence of UFFI.

Testing to confirm the presence of Formaldehyde was not performed as visual identification and knowledge of historical uses of UFFI is sufficient.

³ Accredited by the American Industrial Hygiene Association Laboratory Accreditation Program LLC (AIHA LAP LLC) under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), for Bulk, Surface and Air testing for moulds, and for Legionella testing (Lab ID 158835).

⁴ Accredited by the Quebec Ministry of Sustainable Development, Environment and the Fight against Climate Change (MDDEP) and the (Quebec) Institut de recherche Robert-Sauvé en santé et sécurité au travail (IRSST), under the Programme d'accréditation des laboratoires d'analyse (PALA) for Air Microbiology for Airborne Heterotrophic Plate Count, Airborne Mould and Yeast (Viable), Airborne Mould (DME), and Legionella.

APPENDIX

D

BACKGROUND AND PAST
USES OF DESIGNATED
SUBSTANCES

BACKGROUND AND PAST USES OF DESIGNATED SUBSTANCES

Prior to the establishment and mainstream acknowledgement of the negative health consequences associated with human exposure to designated substances defined in the Act, these substances found use in an assortment of applications. The adverse health effects and common applications of substances regulated under the Act are summarized in this section.

ASBESTOS

Unlike other designated substances regulated under the act that are unimolecular (one chemical), asbestos is a term used to describe a group of minerals, all with long, thin fibrous crystals. In the late 19th century, asbestos maintained large popularity among the manufacturing and construction industries due to its resistance to heat, chemical and electrical damage, its sound absorption properties, tensile strength and affordability. These desirable characteristics resulted in the appearance of asbestos-containing materials (ACM) in construction products such as flat and corrugated sheets, pipes and shingles, vinyl flooring, linoleum, roofing felts, reinforced cement products, coatings and mastics and asbestos paper products. Asbestos' thermal insulating properties resulted in its appearance in sprayed insulation and fireproofing for steel structures, often in high relative ratios. Its capacity to absorb both heat and acoustic energy prompted its use as thermal/acoustic insulation for pipes and boilers. The three most prevalent and widely used types of asbestos were; 1) chrysotile; 2) amosite, and; 3) crocidolite.

In the early 1970s, the use of asbestos products declined sharply due to increasing concerns raised over the material's health effects. By mid-1979, the specific prohibition and the availability of safer alternatives largely put an end to the use of many asbestos products.

Due to the extensive use of ACM in the construction industry over a period of approximately 50 years, the concern over the possibility of individuals being exposed to ACM is a legitimate one. It has been shown that inhalation of asbestos fibres at high concentrations or over extended periods of time can cause asbestosis, lung cancer or mesothelioma. However, it has been well established that, unless damaged or disturbed, satisfactorily encapsulated ACM does not pose a hazard to worker or employee health and safety.

LEAD

Lead is a heavy metal that has been used by humans in industrial applications for several millennia. Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Inorganic lead compounds (lead salts) result when lead forms an ionic bond with atomic or polyatomic anions, examples of which include lead oxide, lead chromate, lead carbonate and lead nitrate.

Inorganic lead compounds may exist in either the solid or liquid state and have found use in applications such as insecticides, pigments, paints, glasses, plastics and rubber compounds. Lead was used as a primary ingredient in many interior and exterior oil-based paints from the early 1900s to the late 1970s. Interior or exterior paints produced after 1970 may however; still contain small amounts of lead. Lead can enter the human body through all known mechanisms of toxicological exposure; inhalation, ingestion and dermal absorption. The toxicological dynamics and kinetics of lead are such that no amount of lead exposure is safe. Worker exposure to lead in the form of a high dose sustained over a short time period or after chronic exposure to low doses can both result in severe adverse health effects.

Lead dust is a particular hazard in buildings. Lead conjugated particulate has been documented to be aerosolized in facilities that house applications such as rifle/gun ranges or industrial processes such as sanding, cutting or grinding of lead-containing materials.

SILICA

Silica has found use in a variety of applications, including; sandblasting; abrasive grinding and scouring, resin, moulds casting and glass manufacturing and in processes related to the production of electronic components and fibreglass.

The prolonged inhalation of dust containing free crystalline silica results in a disease known as silicosis. Silicosis is a pneumoconiosis (a lung disease caused by the inhalation of dust) and is characterized by progressive fibrosis of the lungs and marked by shortness of breath, impaired lung function and subsequent complications that sometimes result in death. In the construction sector, silica (as common sand) is a major ingredient of concrete and cement products such as masonry and mortar. Concern over silica's adverse health effects are raised when silica becomes respirable for two reasons; 1) smaller silica particles

can more deeply permeate into the lungs, resulting in a higher capacity for the material to cause adverse damage on a per mass basis and; 2) these smaller sized particles are more easily aerosolized than their larger, non-respirable counterparts. Processes such as cutting, abrading, and drilling of concrete and other sand-containing materials creates respirable silica-containing dust that has the potential to be inhaled by workers who do not use appropriate protective measures and personal protective equipment.

MERCURY

Mercury is a silver-coloured metal that exists in the liquid state at room temperature. Mercury has been and is currently used in commercial applications as both a pure metal and in metallic, chelated compounds. The greatest use of elemental mercury in Ontario is in electrical equipment such as silent switches. Small amounts of mercury compounds are present in fluorescent tubes and mercury vapour lamps, older thermostats and paints.

OTHER DESIGNATED SUBSTANCES

ETHYLENE OXIDE is used in the pharmaceutical industry and by hospitals as a disinfectant of plastic items that cannot be autoclaved.

ISOCYANATES are a class of chemicals used in the manufacture of certain types of plastics, foams, coatings and other products.

ACRYLONITRILE is a clear, (colourless or yellow) liquid that is explosive, flammable and toxic. It is used as a polymer or resin in the production of rubbers, coatings and adhesives.

COKE OVEN EMISSIONS are the benzene-soluble fraction of total particulate matter produced by the destructive distillation or carbonization of coal for the production of coke.

BENZENE is a clear, colourless and highly volatile organic solvent. It is used in a tremendous number of processes in chemical laboratories and within the chemical industry and is demonstrated to be highly carcinogenic.

ARSENIC is a metalloid used to harden copper, lead and other alloys, in the manufacture of electronics and glass and in numerous other applications. Its mechanism of toxicity is via the arrest of cellular respiration and can be absorbed via ingestion, inhalation or dermal absorption.

VINYL CHLORIDE is a colourless gas with a sweet odour that is used in the manufacture of various products in the building and construction sectors, including the automotive industry, electrical wire insulation, cables, piping, industrial and household equipment, and medical supplies. The carcinogenicity of this substance has been widely established.

OTHER HAZARDOUS MATERIALS

POLYCHLORINATED BIPHENYLS (PCB) have been synthetically manufactured on a commercial basis since 1929. They have never been manufactured in Canada, with the entire supply coming from the USA. By the late 1960s, the toxic effects of PCBs started to gain recognition, as did its bio-accumulative properties, as significant levels of PCBs were being detected within species throughout the world's most remote environments. Throughout the 1970s, the manufacture of PCBs was phased out; however considerable amounts remain in use.

PCBs were commonly used in electrical equipment because of their excellent electrical and fire-resistant properties. For a considerable period of time, Askarels (a mixture of chlorobenzenes and PCBs) were the coolants of choice for indoor transformers. Many outdoor transformers with mineral oil coolant became contaminated with PCBs during manufacture or servicing. PCBs were also used in a variety of other products including heat transfer fluids, lubricants, plasticizers, inks, dyes, pesticides and adhesives.

OZONE-DEPLETING SUBSTANCES (ODS) such as halocarbons are synthetic, organic compounds that containing halogen species, namely fluorine, chlorine, and bromine. These substances have either been classified into groups based on chemical structure (such as the fluorocarbons, the halons, the chlorofluorocarbons (CFCs), and the hydrochlorofluorocarbons (HCFCs) or are molecules that cannot be grouped into such classifications on the basis of their physical/chemical properties (such as carbon tetrachloride, methyl chloroform, and methyl bromide). Canadian environmental legislation aimed at prohibiting the release of these substances is in effect, as they are known contributors to ozone depletion.

ODS-based solvents (particularly CFCs and HCFCs) have found general use in numerous domestic, commercial and industrial applications. Halocarbons are used primarily as a refrigerant and as a blowing agent in foam product manufacturing. In buildings, ODSs are commonly found in refrigeration systems, halon fire extinguishers and air conditioning systems.

UREA FORMALDEHYDE FOAM INSULATION (UFFI) is a solid product that was used in buildings (particularly residential dwellings) as injectable insulation, often in cases where it was otherwise impractical to provide conventional insulation. UFFI was used extensively throughout the 1970s, with particular usage between 1975 and 1978, the time period during which the Canadian Home Insulation Program, a financial incentive program to encourage home insulation upgrades administered by the federal government, was in effect. The insulation was approved for use in Canada in exterior wood-frame walls only and was banned for use in 1980.

UFFI contains formaldehyde, which in a non-vapour state, is not believed to cause adverse health effects in humans. Concerns regarding the safety of UFFI were raised when it became known that the material has the capacity to release formaldehyde gas, a well-known probable human carcinogen. As a solid product, UFFI is considered to be safe for human contact. However, upon initial application of the foam, small amounts of formaldehyde may be released to the air. Given that there is a finite amount of formaldehyde available for off-gassing, the rate of formaldehyde release from the foam declines steadily as time progresses. Studies have shown that within two years of application, half of the available formaldehyde has been released.

OTHER CHEMICALS AND WASTES include potentially toxic substances that may exist at the subject building. These may include water treatment chemicals associated with heating and cooling systems, heating fuels, building maintenance supplies such as paint and paint stripper, building cleaning supplies containing chemicals such as sodium hypochlorite and ammonium hydroxide and pesticides. In line with the objectives of this assessment, efforts were made to identify whether substances were in use, are present for intended future use or have become obsolete. It is recommended that; 1) the health and safety information of those substances identified as having use at the subject facility be reviewed in order to ensure that they appropriately stored and handled and; 2) wastes be gathered at a central location, classified and disposed of in accordance with the applicable regulatory requirements.

APPENDIX

E

PSPC ASBESTOS
MANAGEMENT STANDARD
(2017)



Title: Asbestos Management Standard

1. **Effective date:** June 5, 2017

2. Authority

This standard is issued under the authority of the Assistant Deputy Minister (ADM), Real Property Branch (RPB), Public Services and Procurement Canada (PSPC).

3. Context

This standard enhances and supplements Part II of the *Canada Labour Code - Occupational Health and Safety*, as well as the *Canada Occupational Health and Safety Regulations* (COHSR) Part X - Hazardous Substances, subsection 10.19 Control of Hazards, and should be read in that context.

This standard should also be read in conjunction with the National Joint Council *Occupational Health and Safety Directive*, Part XI - Hazardous Substances, and the PSPC *Standard on Hazardous Substances*, which is part of the departmental occupational health and safety policy suite.

4. Scope

This standard applies to buildings and engineering assets, both Crown-owned and leased (including lease-purchase, and sale leaseback), where PSPC is the custodian, in which either:

- asbestos-containing material has been found to be present; or
- no professional certification attesting that the building does not include any known asbestos-containing material can be obtained.

This includes buildings and engineering assets that are managed internally, as well as those managed on behalf of PSPC by real property contractors.

5. Purpose

This standard sets out Real Property Branch's requirements regarding the operational and technical activities required to be carried out for the management of asbestos-containing material.

6. Details on Asbestos Management, Maintenance and Repair Work Processes

Each building that contains asbestos-containing material shall have in place an Asbestos Management Plan that must be kept onsite, and be available to building systems technicians, building operator maintainers, and service providers through the Asset Manager, or Property and Facility Manager, as well as departmental employees through the Employer representatives. Annual reassessment of asbestos-containing material, work records, and sampling results must be part of the Asbestos Management Plan.

An Asbestos Management Plan is required for all buildings unless a professional certification confirming that the building does not include any known asbestos-containing materials is obtained. The certification must be kept onsite and be available to all building occupants upon request.

The asbestos management requirements for leased buildings are subject to the existing lease clauses, in addition to the requirements named in this standard.

Processes regarding the contents and preparation of the Asbestos Management Plan are provided in Section 6.1, Asbestos Management Plan.

Maintenance and renovation work performed in a building known to contain asbestos-containing material shall be conducted as per the processes outlined in Section 6.2, Maintenance, renovations and construction processes involving asbestos-containing materials.

6.1. Asbestos Management Plan

6.1.1. Background information

An Asbestos Management Plan is required to ensure that asbestos-containing material is managed and controlled in PSPC custodial buildings and engineering assets, both Crown-owned and leased (including lease-purchase, and sale leaseback), to reduce the risk of damaging asbestos-containing material, and potential occupant exposure to airborne asbestos fibers. The Asbestos Management Plan is to be reviewed and updated to reflect changes in policy and regulations at least every 5 years, or more frequently if required. Whenever reviewed or updated, the Asbestos Management Plan must be provided to the Employer representatives and retained in accordance with section 6.2.11. A record must be kept reflecting when and to whom the report was presented.

The Asbestos Management Plan performs the following functions:

- At the building level, it is a central repository of all information related to the management of asbestos for each facility.
- It acts as a control mechanism to ensure compliance.
- It communicates roles and responsibilities of those required to work with or around asbestos-containing materials.
- It describes work classification for disturbances of asbestos-containing materials.

- It communicates the departmental processes for working with asbestos-containing materials.
- It acts as common terms of reference for the safe operation and management of a building or engineering asset with asbestos-containing materials.

The Asbestos Management Plan includes the following elements at a minimum:

- a list of applicable regulatory requirements
- a brief summary of locations and types of material that contain asbestos present in the building
- a survey and inventory of asbestos-containing materials, and assessment of material condition
- annual asbestos-containing material reassessment
- notification of location, quantity, and condition of asbestos-containing materials and the potential for disturbance
- training and awareness requirements
- notification of Employer representatives when work will be performed that disturbs asbestos
- repair and maintenance procedures
 - classification
 - sample collection and analysis
 - processes
 - project inspection
 - air monitoring
- emergency work procedure(s)
- laboratory results for all materials tested (to be included whether samples are positive or negative for asbestos content)

6.1.2. Crown-owned Buildings and Engineering Assets' asbestos-containing material inspection, assessment, and inventory

6.1.2.1. Inspection

In order to determine the presence of asbestos-containing material in buildings and engineering assets, and to ensure the maintenance of a complete inventory of asbestos-containing materials, an initial baseline survey must be completed by a qualified person on all buildings and engineering assets which have the potential to contain asbestos. An annual reassessment must be performed by a qualified person on all asbestos-containing materials identified in the baseline asbestos survey, and on those materials which may have subsequently been identified during maintenance, renovations, or other construction activities at the site.

The baseline survey must include:

- identification, location, condition, accessibility, and quantity of suspected and confirmed friable and non-friable asbestos-containing material; and

- an action matrix (as described in Annex A, Section 1.4.3.), which establishes recommended asbestos control action(s).

Any material suspected of containing asbestos must have its status confirmed through laboratory analysis; until confirmed, it is assumed to be asbestos-containing material.

6.1.2.2. Laboratory material analysis

The collection of material samples shall be carried out as randomly-collected bulk samples, and be representative of the homogeneous surfaces, areas, and types of material present. Samples are to be collected following the procedures outlined in Section 6.2.6.

The analysis of bulk samples shall be performed by a laboratory accredited by either the National Voluntary Laboratory Accreditation Program (NVLAP), American Industrial Hygiene association (AIHA), or the Canadian Association for Laboratory Accreditation (CALA), or using a method noted in provincial regulations where the sample was taken, to the detection limits specified in Annex A, Section 1.2. Frequency of sample collection must meet federal/provincial/territorial regulations, but can be more frequent at the discretion of the surveyor.

Analysis of bulk samples are to be performed, where possible, using the United States Environmental Protection Agency method EPA/600/R-93/116 for Polarized Light Microscopy (PLM). In some instances, analysis must be performed using Transmission Electron Microscopy (TEM) (an example of this would be analysis of vinyl floor tile).

6.1.3. Assessment of asbestos-containing materials

Asbestos-containing materials that are identified as a result of the survey and laboratory analysis shall be assessed for their condition and accessibility. Annex A - *Evaluation of Asbestos-Containing Materials and Recommendations for Control*, provides specific criteria for the assessment of asbestos-containing materials based on condition and accessibility, as well as mandatory Asbestos Management Program response(s) relative to health risk. It also provides an action matrix, which is used to determine the recommended action to control asbestos-containing materials based on the particular circumstances. Detailed information regarding the requirements to properly undertake each action is also provided.

6.1.4. Inventory of asbestos-containing materials

An inventory of asbestos-containing materials must be maintained, and the inventory shall contain information for the specific building or engineering asset. The inventory record shall remain in the building or engineering asset. The inventory shall contain a list of all known asbestos-containing materials and their locations. If access to an area is not permitted due to security or other reasons, it will be noted in the inventory.

In general, inventories are in table format and include the following:

- type of building material that contains asbestos (example: floor tile)
- asbestos location
- asbestos type and percent content (example: amosite 3%)

- asbestos friability (friable or non-friable)
- quantity of building material
- asbestos condition
- accessibility of the asbestos

Floor plans indicating the location(s) of asbestos-containing materials may be included.

It must be ensured that a copy of the current inventory is maintained onsite at a location that is accessible, and provided to the Employer representatives, and facility maintenance staff.

6.1.5. Annual asbestos-containing material reassessment

On a yearly basis, the building or engineering asset's asbestos-containing material inventory information is to be updated through a reassessment based primarily on change in condition and quantity (refer to Annex B), and outdated versions of the inventory records must be archived and retained in accordance with section 6.2.11. The Asbestos Management Plan shall be updated with new inventory information as changes are made at the various locations, or where new information identifies the existence of asbestos-containing material not previously identified.

The reassessment must be signed by, and conducted under the direction of, a person qualified in asbestos management. The results of this assessment are to be added to the building Asbestos Management Plan as described in section 6.1.1.

In a timely fashion, the annual re-assessment, along with a summary of the report in plain language, must be provided to the Employer representatives and Regional Asbestos Coordinator. A record must be kept reflecting when and to whom the report was presented.

6.1.6. Leased Space

If a building is known to contain asbestos-containing materials, then before leased space is occupied, an Asbestos Management Plan must be obtained from the Lessor that identifies all friable and non-friable asbestos-containing materials located within the building and on the property. Otherwise, a professional certification confirming that the building does not include any known asbestos-containing materials is required.

The Asset Manager, or Property and Facility Manager will keep an electronic copy of the Asbestos Management Plan available to be distributed upon request.

For detail on lease clauses, refer to *PWGSC's Invitation to Offer document*, owned by the Real Estate Services Service Line.

6.2. Maintenance, renovations and construction processes involving asbestos-containing materials

6.2.1. Classification of asbestos-related work

The following criteria shall be used in determining the classification of asbestos work.

6.2.1.1. Low risk work

Low risk work includes:

- non-destructive (i.e. without breaking, cutting, drilling, abrading) removal of non-friable asbestos-containing material;
- destructive work (i.e. breaking, cutting, drilling, abrading) on wetted non-friable asbestos-containing material with non-powered hand-held tools;
- removal of one square meter or less of drywall in which joint compounds contain asbestos-containing materials;
- removal or replacement of 7.5 square metres or less of asbestos-containing compressed-mineral-fibre-type ceiling tiles; and
- collecting samples of materials suspected of containing friable asbestos.

6.2.1.2. Intermediate risk work

Intermediate risk work includes:

- entry into ceiling spaces, crawlspaces, pipe tunnels, etc., where friable asbestos debris is or may be present;
- removing more than 7.5 square meters of asbestos-containing suspended ceiling tiles;
- removal of more than one square metre of drywall where asbestos-containing joint compound materials has been used;
- destructive work (i.e. breaking, cutting, drilling, abrading) on non-wetted, non-friable asbestos-containing material with non-powered hand held tools;
- destructive work (i.e. breaking, cutting, drilling, abrading) on non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust collecting devices equipped with a high efficiency particulate air (HEPA) filters;
- minor removal or disturbance of friable asbestos-containing material. Minor is defined as follows:
 - in British Columbia: up to 0.1 m² surface area, or 3 linear metres of pipe insulation
 - in Quebec: up to 0.03 m³ of debris
 - all others: up to 1 m² of surface area
- enclosing friable asbestos-containing material;
- applying tape or cover to asbestos-containing insulation;
- glove bag removal of asbestos-containing material from a pipe, duct or similar structure;
- removing filters in an air handling unit in a building that has sprayed-on asbestos-containing fireproofing; and
- work not otherwise classified as either low or high risk.

6.2.1.3. High risk work

High risk work includes:

- major removal or disturbance of friable asbestos-containing material (greater than quantities defined under intermediate work);

- destructive work (i.e. breaking, cutting, drilling, abrading) of non-friable asbestos-containing material using power tools not attached to dust-collecting devices equipped with HEPA filters;
- encapsulating friable asbestos-containing material by spray application of an encapsulant or sealant;
- cleaning or removal of ductwork and air handling equipment serving or passing through areas of buildings with sprayed, friable asbestos-containing material; and
- repair, alteration or demolition of a boiler, furnace, kiln, or similar equipment made of asbestos-containing refractory materials.

6.2.2. Asbestos work processes

Written processes for performing low, intermediate, and high risk work are to be developed for the work to be undertaken, based on the friability of the asbestos-containing material, processes to be used, and the worksite. These processes shall be developed in accordance with the *Canadian National Master Construction Specification (NMS)*, Sections 02 82 00.01 (Asbestos Abatement - Minimum Precautions), 02 82 00.02 (Asbestos Abatement - Intermediate Precautions), or 02 82 00.03 (Asbestos Abatement - Maximum Precautions).

6.2.3. Notification

Written notification must be given to the Asset Manager, or Property and Facility Manager of the potential disturbance of asbestos-containing materials during repair, maintenance and construction projects.

6.2.4. Control prior to maintenance work

All maintenance work shall be reviewed for the possibility of disturbance of asbestos-containing material when work is required.

Before undertaking any work that may disturb asbestos-containing materials, a report shall be prepared stating the type(s) of asbestos and the condition of the asbestos-containing material, and the location of the asbestos-containing material.

When there are friable or non-friable asbestos-containing materials in the work area and this material will be disturbed by the work, then the work shall be considered asbestos-related work, and the risk level classified by a qualified person in accordance with the work to be performed.

Prior to the start of work, the Asset Manager, or Property and Facility Manager will inform the Employer representatives.

Arrangements shall be made for specifications to be prepared for asbestos work by a qualified person, following the appropriate specifications according to *Canadian National Master Construction Specification (NMS)* format mentioned in Section 6.2.2. Alterations to specifications, in order to accommodate specific federal and provincial requirements, shall be determined based on work requirements.

When there are asbestos-containing materials in the maintenance area, and it has been determined that these materials could be disturbed by the work, the maintenance staff or the service provider must be notified.

Before asbestos abatement work is started, the following documentation must be provided by the service provider as proof of competency as per provincial/territorial regulations:

- third-party liability insurance
- fit test certificate
- service provider's site-specific safety plan
- Notice of Project
- copy of Workplace Safety and Insurance Board / Ministry of Labour clearance
- copy of trade certificates / competency cards
- other certificates where required (fall protection, confined space, man lift, etc.)

Also prior to the commencement of asbestos abatement work, the following precautions must be ensured:

- management has received proof of adequate training for employees performing asbestos work and approved personal protective equipment is provided;
- containers for asbestos waste shall be labeled as asbestos waste and are held at a pre-determined, secure location in the building; and
- the collection and disposal of asbestos-containing material waste is performed in accordance with the applicable provincial regulations.

In the event of a suspected release of asbestos-containing material outside of the contained work area, the processes detailed in the building Asbestos Management Plan concerning emergency work procedures must be complied with.

6.2.5. Control prior to renovation and construction work

Prior to commencement of projects that include the demolition of material suspected of containing asbestos which has not yet been tested (such as material not accessible in the original survey), testing of this material for asbestos shall be undertaken, unless previous comprehensive testing in the building has shown this material to be free of asbestos. Along with the asbestos surveys of the building, records of test results shall be maintained on site as per Section 6.2.11.

When there are friable or non-friable asbestos-containing materials in the work area and this material will be disturbed by the work, then the work shall be determined as asbestos-related work and the risk level classified by a qualified person in accordance with the work to be performed.

In a timely fashion, a summary report, written in plain language, concerning the asbestos work must be provided to the Employer representatives. A record must be kept reflecting when and to whom the report was provided.

Arrangements shall be made for specifications to be prepared for asbestos work by a qualified person, following the appropriate *Canadian National Master Construction Specification (NMS)* format mentioned in Section 6.2.2. Alterations to specifications, in order to accommodate specific federal and provincial requirements, shall be determined based on work requirements.

Services related to the design and preparation of specifications shall be performed by a qualified person with the appropriate training, experience, and insurance for asbestos-related work.

When there are asbestos-containing materials in the renovation area, and it has been determined that these materials could be disturbed by the work, the maintenance staff and/or the service provider must be notified of the presence of asbestos-containing material.

Prior to the start of asbestos abatement work, documentation and work precautions must be ensured as per section 6.2.4.

In the event of a suspected release of asbestos-containing material outside of the contained work area, the processes detailed in the building Asbestos Management Plan concerning emergency work procedures must be followed.

Upon completion of any project work which alters the amount or condition of asbestos-containing material in the building or engineering asset, a report will be prepared that indicates the work that has been completed. The inventory shall be updated, and this information is to be retained in accordance with Section 6.2.11.

6.2.6. Bulk sample procedures

During the annual reassessment or investigation prior to renovation projects, material may be discovered that could contain asbestos. The only way to confirm the presence of asbestos is by means of laboratory testing. In order to establish whether there are any asbestos-containing materials, and to identify the type and concentration of asbestos, bulk material samples must be collected by a qualified person from a homogeneous surface, area or insulation. The information gathered is essential in ensuring proper identification of asbestos materials by microscope analysis. Bulk material sampling is conducted as follows:

1. The material must be sampled when the area is not in use where feasible. Only those persons needed for sampling should be present in the immediate area.
2. The use of a National Institute for Occupational Safety and Health (NIOSH) approved respirator is recommended for all sampling. Depending on the condition and location of the material, airborne fibres can be generated during sampling.
3. Under the work area, polyethylene drop sheet must be placed over flooring that absorbs dust (such as carpeting) and over flooring in the asbestos work area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.

4. The material is to be sprayed with a light mist of water to prevent asbestos fibre release during sampling, if possible. The material must not be disturbed any more than necessary.
5. Materials of different appearance should be sampled separately. Mechanical insulation must be sampled separately on all systems, tanks, vessels, etc. Both the straight sections of pre-formed insulation, and the insulating cement typically present at elbows, fittings, etc. (unless visually identified as fibreglass) must be sampled. Frequency of sampling must meet federal/provincial/territorial regulations.
6. For asbestos insulation, the sample is collected by penetrating the entire depth of the material, as the insulation may have been applied in more than one layer or covered with paint or other protective coating.
7. If pieces of material break off during sampling, the contaminated area must be cleaned up by wet cleaning. Any debris generated must be placed in plastic bags, labelled, sealed and disposed of as asbestos waste in accordance with requirements of the provincial/territorial and/or federal authority having jurisdiction.
8. Samples must be placed in labeled plastic bags with a zip-lock closure or in sealed plastic vials. Samples shall be identified with the following information:
 - sample number
 - location (e.g. building name, room number)
 - date of sampling
 - name of sampler
 - source of sample, e.g. cold water pipe, cold water fitting, etc.
9. Any openings created to collect the sample must be sealed (e.g. self-adhesive tape, paint or metal-foil tape to be wrapped completely around the pipe, duct or structure).
10. Bulk sample analysis shall be done by an accredited laboratory (refer to Section 6.1.2.2, Laboratory material analysis).
11. The minimum number of bulk material samples to be collected for each type of test material is 3. When sampling homogeneous materials such as plaster, or materials applied by troweling, 5 samples are required when the area is greater than 90 square meters, 7 samples are required when the area exceeds 450 square meters.

6.2.7. Respirator fitting, inspection and maintenance

For matters pertaining to respiratory protection, refer to the departmental *Procedure on Respiratory Protection* which is under the *Standard on Personal Protective Equipment and Clothing for Employees*.

6.2.8. Asbestos work inspection and air quality monitoring

6.2.8.1. Low risk work

Work classified as low risk shall be subject to the standard maintenance or project inspection requirements, ensuring all asbestos-containing material has been removed and the area cleaned of dust and debris. Air monitoring is not required during or after work.

6.2.8.2. Intermediate risk work

Work classified as intermediate risk shall be inspected by a qualified person during the work. Air monitoring for total fibre concentration outside of work areas will be conducted adjacent to the work area daily by a qualified person. Upon completion of work, with acceptable results attained by the inspection and air monitoring, asbestos precautions in the area are no longer required.

The air samples will be analyzed by phase contrast microscopy as determined by NIOSH Method 7400, or an equivalent under provincial regulations. Analysis of samples shall be performed by organizations participating in a recognized external quality control program. A stop-work order will be issued when phase contrast microscopy measurements of the air samples exceed 0.05 fibres/cm³. This order is in effect until work processes are corrected and subsequent tests are less than 0.05 fibres/cm³.

6.2.8.3. High risk work

Arrangements shall be made for a qualified person to inspect and perform daily air monitoring for total fibre concentration outside of work areas classified as high risk. If required, additional monitoring shall be performed to meet provincial/territorial regulations.

The air samples are to be analyzed by phase contrast microscopy as determined by NIOSH, Method 7400, or an equivalent under provincial regulations. Analysis of samples shall be performed by organizations participating in a recognized external quality control program. A stop-work order will be issued when phase contrast microscopy measurements of the air samples exceed 0.05 fibres/cm³. This order is in effect until work processes are corrected and subsequent tests are less than 0.05 fibres/cm³.

All high risk removal projects shall be subject to final clearance air testing. The clearance criterion shall be a concentration of less than 0.01 fibres per cubic centimetre (fibres/cm³) of air, as determined by NIOSH, Method 7400, or an equivalent under provincial regulations. If any sample does not pass the phase contrast microscopy test, samples shall be further analyzed via transmission electron microscopy following NIOSH Method 7402.

6.2.9. Hazardous occurrence investigation and reporting

When a building occupant is, or may have accidentally been, exposed to airborne asbestos as a result of disturbance of asbestos-containing material, or by inadvertent contact during regular maintenance, renovation or construction work, a qualified person shall be appointed to conduct a hazard investigation as defined by the *Canada Occupational Health and Safety Regulations*.

The assessment shall determine the potential hazard, and must conclude as to whether the hazardous material could be present as an airborne hazard, at a level of at least 50% of the exposure limit as determined by the threshold limit values identified by the American Conference of Governmental Industrial Hygienists (ACGIH). The Asset Manager or Property and Facility Manager, building Employer representatives, and the Workplace Health and Safety Committee must be invited to participate in the assessment. At the conclusion of the assessment, all participants will receive a copy of the Hazardous Occurrence Investigation report.

When airborne asbestos-containing materials are likely present at level of at least 50% of the exposure limit, a control plan shall be instituted. The control plan must address the following:

- a record of where asbestos-containing material was found
- written procedures for control
- a communication plan with building Employer representatives
- medical surveillance, when applicable
- training of employees

6.2.10. Emergency work procedures

A building’s Asbestos Management Plan outlines emergency work procedures.

6.2.11. Records

Records shall be kept in accordance with the following:

Document	Length of retention – electronic copy	Information on site
Annual record of inspection	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Asbestos Management Plan	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Asbestos Containing Materials inventory	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Test results (air and bulk sampling)	30 years (including beyond the life of the building / disposal of the building / building no longer managed by PSPC)	Most recent copy
Medical test records	30 years from date of test - Refer to human resources document storage requirements	Refer to human resources requirements

In addition, for records noted above to be kept on site, these shall be retained on site as long as a building is occupied or managed by PSPC. For electronic copies (other than medical

records), these records shall be saved and retained in GCDOCS as per the above retention schedule, and managed subject to any instructions for a hazardous substances information management system.

All other documents related to asbestos management and abatements shall be maintained and disposed of as per PSPC's departmental policy *Records Management and Information Holdings (044)*, and the associated Departmental Records Retention and Disposal Plan.

7. Definitions

Asbestos: naturally occurring fibrous silicates, including chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

Asbestos containing material (ACM): any material found to contain asbestos that is at or above the limit defined by provincial standards, as determined by the standard Polarized Light Microscopy (PLM) or Transmission Electron Microscopy (TEM) methods for the analysis of bulk samples.

Asbestos-related work: work that will disturb friable or non-friable asbestos-containing material in the area.

Asbestos work area: area where work is being performed which will or may disturb asbestos-containing material, including overspray and fallen material or settled dust that may contain asbestos.

Assets and facilities for which PSPC is the custodian: any federal real property or federal immovable acquired or leased by the Department for the purposes of the Department under the administration of the Minister of Public Services and Procurement.

Construction: any work or undertaking in connection with a project, including, but not restricted to, erection, alteration, repair, dismantling, demolition, structural maintenance, painting, land clearing, earth moving, grading, excavating, trenching, digging, boring, drilling, blasting or concreting; the installation of any machinery or plant; and ship repair/maintenance when in dry dock.

Custodian: a department whose minister has administration of real property for the purposes of department or agency programs, or for the accommodation of other federal departments and agencies.

Department: Public Service and Procurement Canada (PSPC)

Employee: a person employed in the part of the public service to which the Public Service Commission has exclusive authority to make appointments; this includes students and part-time employees and casual workers.

Employer: a person who employs one or more employees, and includes an employer's organization and any person who acts on behalf of an employer.

Employer representative: a person who acts on behalf of the employer department, as designated by the department. This means that each department located in a building has a representative who communicates with his or her department's Workplace Health and Safety Committee, in compliance with the *Canada Labour Code*, Part II.

Encapsulation: application of a liquid sealant to asbestos-containing material; the sealant may penetrate and harden the material, or cover the surface with a protective coating (bridging sealants). Also called encasement.

Enclosure: a structure made of polyethylene or other suitable material to prevent the spread of asbestos containing material from the work area.

Friable asbestos product: asbestos-containing material that, when dry, can be crumbled, pulverized or powdered by hand pressure. This definition also includes dust or debris arising from non-friable materials that are, or will become, crumbled, pulverized or powdered, i.e. asbestos-containing plaster disturbed by demolition.

Glove bag removal: a method of removing friable insulation from a piping system using a prefabricated bag which isolates the section of insulation being removed.

Hazard: any source of potential damage, harm or adverse effects on life, health, property or environment at work. It refers to any biological, chemical, ergonomic, physical, psychosocial or safety factor that is reasonably likely to cause harm or damage to humans, other organisms, or the environment in the absence of its control. Sometimes a hazard is referred to as being the actual harm or the health effect it caused rather than the hazard. For example the disease tuberculosis might be called a hazard by some but in general the tuberculosis-causing bacteria would be considered the "hazard" or "hazardous biological agent". Exposure to tuberculosis would be the hazardous incident.

Hazardous occurrence: an event occurring at a PSPC-managed building or worksite, or through the course of an employee's work, that results in, or has the potential to result in, a fatality, injury, illness, exposure to a hazardous substance or property damage, or an escapement of a hazardous material. For the purpose of investigating, recording and reporting hazardous occurrences, the following are included under this term: disabling injuries, minor injuries and near-misses.

Hazardous substance: a controlled product that is a chemical, biological or physical agent that, by reason of a property that the agent possesses, is hazardous to the safety or health of a person exposed to it.

Investigation: act or process of a qualified person investigating a hazardous occurrence; a careful search or examination in order to discover facts, identify the root cause and contributing factors to produce a report of corrective measures.

Manager: an employee who forms part of a management team and is accountable for exercising delegated authority over human and financial resources to accomplish the objectives of the organization.

Personal protective equipment: any clothing, equipment, or device worn or used by a person to protect that person from injury or illness, and to minimize exposure to specific occupational hazards.

Professional certification: a document which has been validated by the signature of a person formally certified by a professional body.

Qualified person: a person who:

- has the required knowledge, training and experience to organize the work and its performance;
- is familiar with all legislation and regulations that apply to the work; and
- has knowledge of any potential or actual danger to health or safety in the workplace.

Examples of a qualified person include a Professional Engineer, Industrial Hygienist, or someone who has another professional designation for the purposes of this standard that are related to asbestos management.

Risk: for the purposes of this document, the potential for harm befalling an individual, given the probability of an incident occurring, combined with the potential severity of the harm.

Real property contractor: a person, entity, or entities named in contracts to supply services to Canada as defined in procurement mechanisms such as RP-1 property management and project delivery services; RP-2 National Capital Area property management, project delivery services and optional services; and subsequent real property procurement mechanisms RP-n.

Service provider: a person or entity who performs work for and/or supplies services to the owner for monetary compensation, either by undertaking the work alone, by employing one or more workers, or by contracting the services of one or more workers.

Supervisor: a person who has the responsibility for day to day supervision of other employees, e.g. assigns work, sets priorities, assesses performance, and approves or recommends approval of leave.

Workplace: any place where an employee is engaged in work for the department.

Workplace Health and Safety Committee: as defined in the *Canada Labour Code*, Part II, Occupational Health and Safety, Sections 134.1, 135, and 136.

Vermiculite: silicate mineral with a layered (mica-like) morphology which may range in colour from silvery-blond to dark grey-brown. For the purposes of this document, vermiculite with any concentration of asbestos measured in a composite sample taken in accordance with provincial/territorial sampling and analysis standards is considered an asbestos-containing material.

8. References

Federal acts and regulations:

[Canada Labour Code, Part II](#)
[Canada Occupational Health and Safety Regulations](#)
[Canadian Environmental Protection Act](#)
[Hazardous Materials Information Review Act](#)
[Hazardous Products Act](#)

National Joint Council publications:

[Occupational Health and Safety Directive](#)
[Occupational Health Evaluation Standard](#)

PSPC publications:

[Directive on occupational health and safety - Hazard prevention program \(007-1\)](#)
[Policy on occupational health and safety \(007\)](#)
[Procedure on Respiratory Protection](#)
[Records management and information holdings](#)
[Standard on Hazardous Occurrence Investigation and Reporting](#)
[Standard on Personal Protective Equipment and Clothing for Employees](#)
PWGSC's Invitation to Offer document

Other publications:

Provincial and territorial occupational health and safety legislation
Provincial and territorial environmental protection legislation
American Conference of Governmental Industrial Hygienists (ACGIH), TLVs and BEIs Book (as amended from time to time)
[Canadian National Master Construction Specification \(NMS\)](#) - Asbestos Abatement Precautions

Attachments

Annex A – Evaluation of Asbestos-Containing Materials and Recommendations for Control
Annex B – Asbestos-containing Material Reassessment

9. Enquiries



Please direct all enquiries regarding this standard to:
Senior Director, Environment, Health & Safety
Technical Services
Real Property Branch, PSPC

Evaluation of Asbestos-Containing Materials and Recommendations for Control

1. Assessment of condition

1.1. Spray-applied fireproofing, insulation and texture finishes

In evaluating the condition of asbestos-containing material spray applied as fireproofing, thermal insulation, or texture, decorative or acoustic finishes, the following criteria apply:

GOOD Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent of the surface area having visible damage to surface is allowed within range of GOOD. Evaluation of sprayed fireproofing requires the assessor to be familiar with the irregular surface texture typical of sprayed asbestos products. GOOD condition includes un-encapsulated or unpainted fireproofing, insulation or texture finishes where no delamination or damage is observed, and encapsulated fireproofing, insulation or texture finishes where the encapsulation has been applied after the damage or fallout occurred.

POOR Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of asbestos-containing material spray.

In observation areas, where damage exists in isolated locations, both GOOD and POOR condition may be reported. The extent or percentage of each condition will be recorded on the survey or reassessment form.

NOTE: FAIR condition is not used or considered as a valid criterion in the evaluation of sprayed fireproofing, sprayed insulation, or texture coat finishes.

The evaluation of asbestos-containing material spray applied as fireproofing, non-mechanical thermal insulation, or texture, decorative, or acoustic finishes which are present above ceilings may be limited by the number of observations made, and by building components such as ducts or full-height walls that obstruct the above-ceiling observations. Persons entering the ceiling area are advised to be watchful for asbestos-containing material debris prior to accessing or working above ceilings in areas of buildings with asbestos-containing material, regardless of the reported condition.

1.2. Detection limit of bulk analysis

Asbestos-containing material is defined as any material found to contain asbestos at or above the limit defined by provincial/territorial standards for an asbestos-containing material, as determined by the allowable analytical method for the analysis of bulk samples (refer to *Asbestos Management Standard*, Section 6.1.2.2). Except in the case of vermiculite, the provincially/territorially-regulated limits or generally-accepted guidelines to consider a

material as an asbestos-containing material, subject to asbestos in buildings regulation, are provided as follows:

MINIMUM CONCENTRATION TO CONSIDER AS AN ASBESTOS-CONTAINING MATERIAL (BY PROVINCE)

QUEBEC (includes part of National Capital Area)	0.1%
MANITOBA, SASKATCHEWAN (for friable material)	0.1%
ONTARIO (includes part of National Capital Area) BRITISH COLUMBIA	0.5%
NOVA SCOTIA	0.5%
All other provinces and territories, (non-friable material in Manitoba, Saskatchewan)	1.0%

Note that these concentrations may change with regulatory amendments, therefore applicable legislation should be consulted to confirm that they are still valid.

Vermiculite is considered an asbestos-containing material in the presence of any concentration of asbestos measured in a composite sample taken in accordance with provincial/territorial sampling standards.

1.3. Mechanical insulation

In evaluating the condition of mechanical insulation (on boilers, breeching, ductwork, piping, tanks, equipment, etc.) the following criteria are used:

GOOD Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration, i.e. no insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e. scuffs or stains), but the jacketing is not penetrated.

FAIR Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination), or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation should range from minor to none.

POOR Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

The evaluation of mechanical insulation may be limited by the number of observations made and building components such as ducts or full-height walls that obstruct observations. In these circumstances, it is not possible to observe each foot of mechanical insulation from all angles.

1.4. Non-friable and potentially-friable materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage, but can become friable if disturbed by drilling or abrading.

However, some non-friable materials, e.g. exterior asbestos cement products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly-deteriorated non-friable material, the material will be treated as a friable product.

1.4.1. Asbestos-containing material debris

1.4.1.1. Debris from friable asbestos-containing material

The presence of fallen friable asbestos-containing material is noted separately from the presumed friable asbestos-containing material source (sprayed fireproofing, thermal insulation, texture, decorative or acoustic finishes or mechanical insulation) and is referred to as **debris**.

The presence of fallen asbestos-containing material from damaged non-friable asbestos-containing material is reported separately from the non-friable asbestos-containing material source. Fallen non-friable asbestos-containing material that has become friable is reported as debris. Workers are advised to be watchful for the presence of debris prior to accessing, or working in proximity to, mechanical insulation or above ceiling areas of buildings with asbestos-containing material, regardless of the reported presence or absence of debris.

1.4.2. Evaluation of accessibility

The accessibility of building materials known or suspected of being asbestos-containing material is rated according to the following criteria:

- ACCESS (A) Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users (e.g. basketball on gym ceiling) may result in disturbance of asbestos-containing material not normally within reach from floor level.

- ACCESS (B) Frequently entered maintenance areas within reach of maintenance staff, without the need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, e.g. tops of equipment, mezzanines.

- ACCESS (C)
EXPOSED Areas of the building above 8'0" where use of a ladder is required to reach the asbestos-containing material. Only refers to asbestos-containing material materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently-accessed service areas of the building.

ACCESS (C)

CONCEALED Areas of the building which require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems such as a ventilation plenum. Includes rarely-entered crawl spaces, attic spaces, etc. Observations are limited to the extent visible from the access points.

ACCESS (D) Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc., where demolition of the ceiling, wall or equipment, etc., is required to reach the asbestos-containing material. Evaluation of condition and extent of asbestos-containing material is limited or impossible, depending on the assessor's ability to visually examine the materials in areas rated Access (D).

1.4.3. Action matrix and action descriptions

The action matrix below (Table 1) prioritizes the corrective actions in terms of potential health risk based on condition, accessibility, and potential for future disturbance.

The following factors shall be considered in making site-specific recommendations for corrective actions in conformance with the existing applicable regulation or codes of practice in most provinces, and for the practical implementation of asbestos management:

1. Asbestos-containing material in POOR condition is not routinely repairable. If an abatement action is necessary, removal is the recommended action (enclosure is a viable option in unusual circumstances, e.g. where removal is difficult or costly and the asbestos-containing material can be thoroughly enclosed).
2. Mechanical insulation in FAIR condition will be repaired or removed based on the following general recommendations, applied on a case-by-case basis:
 - Asbestos-containing mechanical insulation found in FAIR condition in ACCESS (B) or ACCESS (C) EXPOSED areas is to be repaired.
 - Asbestos-containing mechanical insulation found in FAIR condition in ACCESS (B) and ACCESS (C) EXPOSED areas, where future damage to the asbestos-containing material is likely to occur, is to be removed.
3. Asbestos-containing material in GOOD condition present in ACCESS (A) can be managed by surveillance, as long as it is not disturbed by future renovation, maintenance or demolition. Proactive removal of the asbestos-containing material in ACCESS (A) will be considered where damage is possible by ongoing occupant activity (accidental or intentional).
4. Non-friable or manufactured products are considered in the action matrix as follows:
 - Non-friable and manufactured products reported in POOR condition, or friable DEBRIS resulting from the deterioration of non-friable asbestos-containing material, are treated as friable materials and the appropriate action, depending on

accessibility, is determined from the action matrix for friable asbestos-containing material.

- For non-friable or manufactured products reported in GOOD condition, Action 7 (surveillance) is recommended regardless of accessibility.

5. All asbestos-containing material from a particular area is to be removed where small quantities of asbestos are present and removal will negate the need for the use of an Asbestos Management Program in that area.

The action matrix provided below establishes the recommended asbestos control action. The ACTIONS themselves are described in full following the table.

Table 1: Action matrix for determining actions required based on the location and condition of asbestos-containing materials.

ASBESTOS-CONTAINING MATERIAL				
ACCESS	CONDITION			DEBRIS
	GOOD	FAIR	POOR	
(A)	ACTION 5/7 ¹	ACTION 5/6 ²	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5 ³	ACTION 3	ACTION 1
(C) exposed	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) concealed	ACTION 7	ACTION 7	ACTION 4	ACTION 2
(D)	ACTION 7	ACTION 7	ACTION 7	ACTION 7

¹ If material in **ACCESS (A)/GOOD** condition is not removed, **ACTION 7** is required.

² If material in **ACCESS (A)/FAIR** condition is not removed, **ACTION 6** is required.

³ Remove asbestos-containing material in **ACCESS (B)/FAIR** condition if asbestos-containing material is likely to be disturbed.

ACTION 1 Immediate clean-up of debris that is likely to be disturbed.

Access that is likely to cause a disturbance of the ASBESTOS-CONTAINING MATERIAL DEBRIS is to be restricted and clean up ASBESTOS-CONTAINING MATERIAL DEBRIS is to be done immediately. Use correct asbestos procedures. This action is required for compliance with regulatory requirements and good practice. The assessor should immediately notify the Asset or Property and Facility Manager, or Regional/Area Asbestos Management Coordinator of this condition.

ACTION 2 Entry into areas with asbestos-containing material debris requires intermediate risk precautions.

At locations where ASBESTOS-CONTAINING MATERIAL DEBRIS can be isolated in lieu of removal or cleaned up, appropriate means to limit entry to the area is to be used. Access to the area is restricted to persons using intermediate risk asbestos-work precautions. The precautions will be required until the ASBESTOS-CONTAINING MATERIAL DEBRIS has been cleaned up, and the source of the DEBRIS has been stabilized or removed following intermediate risk (if minor) or high risk precautions.

ACTION 3 Asbestos-containing material removal required for compliance.

Asbestos-containing material must be removed for compliance with regulatory requirements and good practice. Use asbestos procedures appropriate to the scope of the removal work.

ACTION 4 Access into areas where asbestos-containing material is present and likely to be disturbed by access requires intermediate risk precautions.

Intermediate risk asbestos precautions are to be used when entry or access into an area is likely to disturb the asbestos-containing material. ACTION 4 must be used until the asbestos-containing material is removed (Use ACTION 1 or 2 if DEBRIS is present). Intermediate risk or high risk precautions should be used for removal (depending on extent of removal).

ACTION 5 Proactive asbestos-containing material removal.

Removal of asbestos-containing material in lieu of repair may be considered, even if it is in GOOD condition at locations, where asbestos-containing material is easily accessible, limited in quantity, and removal would be cost-effective.

ACTION 6 Asbestos-containing material repair.

Asbestos-containing material may be repaired if found in FAIR condition and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the repair work, asbestos-containing material is to be treated as being in GOOD condition and ACTION 7 is to be implemented. If asbestos-containing material is likely to be damaged or disturbed during normal use of the area or room, ACTION 5 is to be implemented.

ACTION 7 Routine Surveillance.

Routine surveillance of the asbestos-containing material is to be instituted. Trained workers or service providers must use appropriate asbestos precautions (low, intermediate or high) during disturbance of the remaining asbestos-containing material.

Asbestos-containing Material Reassessment

The following outlines the **minimum** requirements to include in all Asbestos Reassessment Reports.

Table of contents

The table of contents is to include a list of tables and a list of appendices. At minimum, appendices include:

- photographs of damaged asbestos (clearly labeled linking to findings tables); and
- the requirements set out in the *Asbestos Management Standard*.

Executive summary

The following must be noted when preparing the executive summary:

1. The executive summary is to be written in layman's terms. Every effort must be made to use plain language, and where technical information is used, context must be given for the average reader.
2. Reference is to be made to the previous year's assessment/reassessment, and the status of any areas previously identified as Action level 1.
3. When identifying asbestos materials, it is to be noted if the location is accessible to building occupants, maintenance staff, or service providers.
4. The term "not compliant" is only to be used when referring to a regulation - the exact title of the regulation is to be cited, as well as the specific section where there is a compliance issue. NOTE: guidelines, and departmental/Employer policies and processes are not regulatory items and "compliance" terminology cannot be used for these type of documents.

Introduction

The introduction is to include the following elements:

- The regulatory and "other" requirements are to be outlined:
 - applicable requirements under the *Canada Labour Code*
 - applicable provincial acts and regulations
 - RPB policy/directive/standard requirements
- Purpose
- Scope
- Limitations of the assessment conducted

Methodology

Information must be included as to how RPB documentation is used when assessing condition of materials, as well as accessibility.

Survey findings

This section must include a general description of the building. Findings are to be presented in a table format as follows:

- Table 1 – Summary of Findings (Action level 1 – This must include any newly-discovered materials covered in Table 3 which are considered Action level 1). A note must be included stating that items in this table should be actioned as soon as possible.
- Table 2 – Summary of Findings (for all materials other than Action level 1). A note must be included stating that items in this table are less urgent and can be addressed through long term action plans.
- Table 3 – Summary of Findings (newly-discovered materials – if applicable)

Each table in which the findings are presented must use the following headings (example provided):

Floor	Location	Material Description	Quantity	Condition	Accessibility	Action Level
8th	Rm 812	Pipe Fitting (paring cement)	5 fittings	Good	C (concealed)	7

Conclusions and recommendations

State any conclusions reached and recommendations for further action.

Abatement strategies

If applicable, provide abatement strategies, including the following:

- the complexity of the abatement (low, intermediate, or high risk); and
- a general description of the project, as well as the estimated scope/size of the abatement.

PART 1 - GENERAL

1.1 SUMMARY

- .1 Comply with requirements of this Section, in compliance with the Ontario Ministry of Labour Guideline - Lead on Construction Projects, April, 2011, and the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014, when disturbing and/or removing lead-containing paints and materials providing that operations are limited to:
 - .1 Demolition of entire structure without scraping, grinding or cutting through lead-containing paint applications or materials.
 - .2 Operating demolition equipment (e.g. excavator, bulldozer) during demolition where lead-based paints are present on building materials and are being disturbed.
 - .3 Work operations that generate an airborne lead concentration of less than 0.05 mg/m³.

1.2 REFERENCES

- .1 Ontario Ministry of Labour
 - .1 Occupational Health and Safety Branch, Guideline Lead On Construction Projects, September 2004, and O. Reg. 490/09 respecting Designated Substances - Lead made under the Occupational Health and Safety Act as amended by O. Reg. 148/12 and O. Reg. 149/12.
- .2 Environmental Abatement Council of Ontario (EACO) - Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014.
- .3 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .5 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .7 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-[1995], Sampling House Dust for Lead.

- .8 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .9 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62-1993.
- .10 Underwriters' Laboratories of Canada (ULC)

1.3 DEFINITIONS

- .1 Authorized Visitors: Departmental Representative or designated representatives.
- .2 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .3 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .4 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m³) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic meter of air for removal of lead based paint by methods noted in paragraph 1.1.
- .5 Competent person: Departmental Representative capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .6 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains

more than 40 micrograms of lead in dust per square foot.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Sections 01 11 01, 01 11 06 and 01 33 00.
- .2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead-based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide proof of Contractor's General and Environmental Liability Insurance.
- .4 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead-based paint waste and proof that lead-based paint waste has been received and properly disposed.
 - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers and visitors in work Area include:
 - .1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of 10, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure. Provide sufficient amount of filters.
 - .2 Half mask respirator: half-mask particulate respirator with P-series filter, and 100%

- efficiency could be provided.
- .2 Eating, drinking, chewing, and smoking are not permitted in work area.
- .3 Ensure workers wash hands and face when leaving work area.
- .4 Visitor Protection:
 - .1 Provide approved respirators to Authorized Visitors to work areas.

.3 Instruct Authorized Visitors procedures to be followed in entering and exiting work area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with **Section 01 11 01 and 01 74 20**.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 0.152 mm thick bags or leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.7 EXISTING CONDITIONS

- .1 Information pertaining to lead-based paints to be handled, removed, or otherwise disturbed and disposed of during this project, including the report entitled "*Designated Substances and Hazardous Materials Survey - Port Severn Main Dam and Lock 45, Port Severn, ON (PSPC Project R.076951.033), WSP Canada Inc., October 2018*", is bound into this specification.
- .2 Notify Departmental Representative of lead-based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.8 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify following in writing:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.

- .3 Provide Departmental Representative copy of notifications prior to start of Work.

1.9 OWNER'S INSTRUCTIONS

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
 - .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
 - .3 Instruction and training must be provided by competent, qualified person.
 - .4 Supervisory personnel to complete required training.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Tape: fibreglass-reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .3 Slow-drying sealer: non-staining, clear, water-dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual lead paint residue.
- .4 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 SUPERVISION

- .1 One Supervisor for every ten workers is required.
- .2 Supervisor must remain within work area during disturbance, removal, or handling of lead based paints.

3.2 PREPARATION

- .1 Remove and store items to be salvaged or reused.

- .1 Protect and wrap items and transport and store in area specified by Departmental Representative.
- .2 Work Area:
 - .1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
 - .2 Pre-clean fixed casework and equipment within work area, using HEPA vacuum and cover and seal with polyethylene sheeting and tape.
 - .3 Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise dust.
 - .4 Seal off openings with polyethylene sheeting and seal with tape.
 - .5 Protect floor surfaces covered from wall to wall with polyethylene sheets.
 - .6 Maintain emergency fire exits or establish alternatives satisfactory to Authority having jurisdiction.
 - .7 Where water application is required for wetting lead-containing materials, provide temporary water supply appropriately sized for application of water as required.
 - .8 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment.
- .3 Do not start work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment, and materials waste containers are on site.
 - .3 Arrangements have been made for building security.
 - .4 Notifications have been completed and preparatory steps have been taken.

3.3 LEAD ABATEMENT

- .1 Removal of lead-containing coatings using non-powered hand tools, other than manual scraping and sanding.
- .2 Remove lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external

surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

- .4 After completion of stripping work, wire brush and wet sponge surface from which lead-based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead-based paint, and after encapsulating lead-containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Departmental Representative apply continuous coat of slow drying sealer to surfaces of work area. Do not disturb work area for 8 hours no entry, activity, ventilation, or disturbance during this period.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 FINAL CLEANUP

- .1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead-containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.6 RE-ESTABLISHMENT OF

- .1 Repair or replace objects damaged in course of work

OBJECTS AND SYSTEMS

to their original state or better, as directed by
Departmental Representative.

END OF SECTION

PART 1 - GENERAL

- 1.1 SUMMARY .1 Comply with requirements of this Section, in compliance with the Ontario Ministry of Labour Guideline - Lead on Construction Projects, April, 2011, and the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014, when disturbing and/or removing lead-containing paints and materials providing that operations are limited to:
- .1 Removal of lead-based paint by scraping or sanding using non-powered hand tools.
 - .2 Manual demolition of lead-painted plaster walls or building components by striking wall with sledgehammer or similar tool.
 - .3 Work operations that generate an airborne lead concentration from 0.05 mg/m³ to 1.25 mg/m³.
- 1.2 REFERENCES .1 Ontario Ministry of Labour
- .1 Occupational Health and Safety Branch, Guideline Lead On Construction Projects, September 2004, O. Reg. 490/09 respecting Designated Substances - Lead made under the Occupational Health and Safety Act as amended by O. Reg. 148/12 and O. Reg. 149/12.
 - .2 Environmental Abatement Council of Ontario (EACO) - Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014.
 - .3 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
 - .4 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
 - .5 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
 - .6 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
 - .7 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.

- .8 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .9 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62-1993.
- .10 Underwriters' Laboratories of Canada (ULC)

1.3 DEFINITIONS

- .1 Authorized Visitors: Departmental Representative or designated representatives and representatives of regulatory agencies.
- .2 Occupied Area: areas of building or work site that is outside Work Area.
- .3 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.
- .4 Airlock: ingress or egress system, without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.
- .5 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows:
 - .1 Place two overlapping polyethylene sheets over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway, and secure other sheet along opposite vertical side of doorway.
 - .2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
 - .3 Overlap each polyethylene sheet at openings 1.5 m on each side.
- .6 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic meter of air calculated as 8 hour time-weighted average (TWA). Intermediate precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic meter of air within Work

Area.

- .7 Competent person: Departmental Representative capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.
- .8 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .9 Lead in Dust: wipe sampling on vertical and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Sections 01 11 01, 01 11 06 and 01 33 00.
- .2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide: Provincial and local requirements for Notice of Project Form.
- .4 Provide proof of Contractor's General and Environmental Liability Insurance.
- .5 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead-based paint waste and proof that it has been received and properly disposed.
 - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.
 - .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.
- .6 Product data:
 - .1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
 - .1 Encapsulants.

- .2 Amended water.
- .3 Slow-drying sealer.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with **Section 01 35 29.06**.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers and visitors in Work Area includes:
 - .1 Respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.
 - .2 Disposable type protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .2 Requirements for workers:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
 - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead-contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use

in Work Area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from Work Area or from Equipment and Access Room.

- .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not to use this system as means to leave or enter work area.
- .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
- .4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.
- .5 Ensure workers wash hands and face when leaving Work Area.
- .6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.
- .7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.
- .8 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to Work Areas.
 - .2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with **Section 01 11 01 and 01 74 20**.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, and Municipal regulations. Dispose of lead waste in

sealed double thickness 0.152 mm thick bags or leak proof drums. Label containers with appropriate warning labels.

- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.7 EXISTING CONDITIONS

- .1 Information pertaining to lead-based paints to be handled, removed, or otherwise disturbed and disposed of during this project, including the report entitled "*Designated Substances and Hazardous Materials Survey - Port Severn Main Dam and Lock 45, Port Severn, ON (PSPC Project R.076951.033), WSP Canada Inc., October 2018*", is bound into this specification.
- .2 Notify Departmental Representative of lead-based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.8 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify the following in writing, where appropriate:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

1.9 OWNER'S INSTRUCTIONS

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel to complete required training.

PART 2- PRODUCTS

2.1 MATERIALS

- .1 Polyethylene: 0.15 mm unless otherwise specified; in sheet size to minimize joints.
- .2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass-reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Slow-drying sealer: non-staining, clear, water-dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.
- .5 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 SUPERVISION

- .1 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead based paints.

3.2 PREPARATION

- .1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Departmental Representative.
- .2 Work Area:
 - .1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
 - .2 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
 - .3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.
 - .4 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.
 - .5 Cover floor surfaces in work area from wall

- .6 to wall with FR polyethylene drop sheets to protect existing floor during removal.
- .6 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.
- .7 At point of access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:
 - .1 CAUTION LEAD HAZARD AREA (25 mm).
 - .2 NO UNAUTHORIZED ENTRY (19 mm).
 - .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).
 - .4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).
- .8 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.
- .9 Where water application is required for wetting lead-containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.
- .10 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.
- .3 Worker Decontamination Enclosure System:
 - .1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:
 - .1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of suite, and one to work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.
 - .2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror

to permit workers to fit respiratory equipment properly.

- .4 Construction of Decontamination Enclosures:
 - .1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.
 - .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.
- .5 Separation of Work Areas from Occupied Areas
 - .1 Barriers between Work Area and occupied area to be constructed as follows:
 - .1 Construct floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
 - .2 Cover plywood with polyethylene sheeting and sealed with duct tape.
- .6 Maintenance of Enclosures:
 - .1 Maintain enclosures in clean condition.
 - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
 - .3 Visually inspect enclosures at beginning of each work day.
 - .4 Use smoke test method to test effectiveness of barriers as directed by Departmental Representative.

3.3 LEAD-BASED ABATEMENT

- .1 Removal of lead-based paint to be performed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted plaster walls or building components by striking a wall with sledgehammer or similar tool.
- .2 Remove lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom,

and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

- .4 After completion of stripping work, wire brush and wet sponge surface from which lead-based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead-based paint, and after encapsulating lead-containing material impossible to remove, wet clean work area including equipment and access room, and equipment used in process. After inspection by Departmental Representative, apply continuous coat of slow-drying sealer to surfaces. Do not disturb work for 8 hours with no entry, activity, ventilation or disturbance during this period.
- .6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Departmental Representative.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.
- .3 When lead dust leakage from Work Area occurs Departmental Representative may order Work shutdown.
 - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 LEAD SURFACE SAMPLING
- WORK AREAS

- .1 Final lead surface sampling to be conducted as follows:
 - .1 After Work Area has passed a visual inspection for cleanliness approved by Departmental Representative and acceptable

coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period of 8 hours has passed. Departmental Representative will perform lead wipe sampling in Work Area.

- .1 Final lead wipe sampling results from horizontal and vertical surfaces where lead-based paints have been removed must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples must be collected and analyzed in accordance with EPA 747-R-95-007.
- .2 If wipe sampling results show levels of lead in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.
- .3 Repeat as necessary until fibre levels are less than 40 micrograms per square foot.

3.6 FINAL CLEANUP

- .1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead-containing particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Clean-up Work Areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF
OBJECTS AND SYSTEMS

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Comply with requirements of this Section, in compliance with the Ontario Ministry of Labour Guideline - Lead on Construction Projects, April, 2011, and the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014, when disturbing and/or removing lead-containing paints and materials providing that operations are limited to:
 - .1 Removal of lead-based paint using power tools without an effective dust collection system equipped with HEPA filter.
 - .2 Abrasive blasting of lead-based paint.
 - .3 Removal of lead-containing dust using air mist extraction system.
 - .4 Work operations that generate an airborne lead concentration in excess of 1.25 mg/m³.

1.2 REFERENCES

- .1 Ontario Ministry of Labour
 - .1 Occupational Health and Safety Branch, Guideline Lead On Construction Projects, September 2004, and O. Reg. 490/09 respecting Designated Substances - Lead made under the Occupational Health and Safety Act as amended by O. Reg. 148/12 and O. Reg. 149/12.
- .2 Environmental Abatement Council of Ontario (EACO) - Lead Guideline for Construction, Renovation, Maintenance or Repair, October 2014.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z180.1-00 (R2005), Compressed Breathing Air and Systems.
- .4 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .5 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .6 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .7 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

- .8 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.
- .9 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .10 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62-[1993].
- .11 Underwriters' Laboratories of Canada (ULC)

1.3 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Departmental Representative or designated representatives of regulatory agencies.
- .3 Occupied Area: area of building or work site outside Work Area.
- .4 Dioctyl Phthalate (DOP) Test: testing method used to evaluate particle penetration and air flow resistance properties of filtration materials - HEPA filter leak test.
- .5 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Appropriate capacity for scope of work.
- .6 Airlock: ingress or egress system without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.
- .7 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
 - .1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of

- doorway.
- .2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
 - .3 Overlap each polyethylene sheet at openings 1.5 m on each side.
-
- .8 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic metre of air calculated as an 8-hour time-weighted average (TWA). Maximum precautions for lead abatement are based on airborne lead concentrations greater than 1.25 milligrams per cubic meter of air within Work Area.
 - .9 Competent person: Departmental Representative capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.
 - .10 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
 - .11 Lead in Dust: wipe sampling on the vertical and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.
 - .12 Negative Air Pressure Machine: extracts air directly from work area and filters extracted air through a HEPA filter, discharge air to exterior of building.
 - .13 Maintain pressure differential of 5 to 7 Pa relative to adjacent areas outside of work areas. Machine to be equipped with alarm to warn of system breakdown, and equipped with instrument to continuously monitor and automatically record pressure differences.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Sections 01 11 01, 01 11 06 and 01 33 00.
- .2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead-based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide: Provincial and local requirements for Notice of Project Form.

- .4 Provide proof of Contractor's General and Environmental Liability Insurance.
- .5 Quality Control:
 - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead-based paint waste and proof it has been received and properly disposed.
 - .2 Provide proof satisfactory to Departmental Representative that employees had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.
 - .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Departmental Representative. Minimum of one supervisor for every ten workers.
- .6 Product data:
 - .1 Provide documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
 - .1 Encapsulants.
 - .2 Amended water.
 - .3 Slow-drying sealer

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead, in case of conflict among those requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Require construction work to be in compliance with the occupational health and safety regulations and **Section 01 35 29.06**.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers while in Lead Work Area includes:
 - .1 Lead removal using power tool: respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters

- following disposal of used filters and before re-entering contaminated areas.
- .2 Abrasive blasting of lead paint: NIOSH approved and equipped with filter cartridges with assigned protection factor of 1000, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Respirator to be equivalent Type CE abrasive blast supplied air respirator operated in a pressure demand or positive pressure mode with a tight-fitting full-face-piece. Compressed air used to supply supplied air respirators to meet breathing air purity requirements of CAN/CSA-Z180.1. Where an oil-lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor/alarm to be provided.
 - .3 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .2 Requirements for workers:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
 - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using

soap and water before removing from work area or from Equipment and Access Room.

.3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not use this system as means to leave or enter Work Area.

.3 Eating, drinking, chewing, and smoking are not permitted in Work Area.

.4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.

.5 Ensure workers wash hands and face when leaving Lead Work Area.

.6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.

.7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.

.8 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01 and 01 74 20.

.2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, and Municipal regulations. Dispose of lead waste in sealed double thickness 0.15 mm thick bags or leak proof drums. Label containers with appropriate warning labels.

.4 Provide manifests describing and listing waste created. Transport containers by approved means to

licensed landfill for burial.

1.7 EXISTING CONDITIONS

- .1 Information pertaining to lead-based paints to be handled, removed, or otherwise disturbed and disposed of during this project, including the report entitled "*Designated Substances and Hazardous Materials Survey - Port Severn Main Dam and Lock 45, Port Severn, ON (PSPC Project R.076951.033), WSP Canada Inc., October 2018*", is bound into this specification.
- .2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

1.8 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify the following in writing; where appropriate.
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

1.9 OWNER'S INSTRUCTIONS

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Proper fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel to complete required training.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Polyethylene 0.15 mm unless otherwise specified; in sheet size minimize joints.

- .2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass-reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Slow-drying sealer: non-staining, clear, water-dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.
- .5 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

PART 3 - EXECUTION

3.1 SUPERVISION

- .1 Approved Supervisor must remain within Work Area during disturbance, removal, or handling of lead-based paints.

3.2 PREPARATION

- .1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Departmental Representative.
- .2 Work Area:
 - .1 Shut off and isolate HVAC system to prevent lead dust and particulate dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
 - .2 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
 - .3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.
 - .4 Install negative pressure machine system and operate continuously from installation of polyethylene sheeting until completion of final cleanup. Provide automatic continuous monitoring and recording instrument of pressure difference.
 - .5 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.
 - .6 Cover floor surfaces in work area from wall

- to wall with FR polyethylene drop sheets to protect existing floor during removal.
- .7 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.
- .8 At point of access to work areas install warning signs in both official languages in upper case "Helvetica Medium" letters reading as follows where number in parentheses indicates font size to be used:
 - .1 CAUTION LEAD HAZARD AREA (25 mm).
 - .2 NO UNAUTHORIZED ENTRY (19 mm).
 - .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).
 - .4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).
- .9 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.
- .10 Where water application is required for wetting lead-containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.
- .11 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.
- .3 Worker Decontamination Enclosure System:
 - .1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:
 - .1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of the suite, and one to work area. Install waste receptor and storage facilities for workers' shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.
 - .2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and

respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.

- .4 Construction of Decontamination Enclosures:
 - .1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.
 - .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closure comprising doorway always remains closed.
 - .3 Shower room in decontamination facility to be provided with the following:
 - .1 Hot and cold water or water of constant temperature not less than 40 degrees Celsius or more than 50 degrees Celsius.
 - .2 Individual controls inside to regulate water flow and temperature.
 - .4 Prior to each shift in which a decontamination facility is being used, a competent person should inspect the facility to ensure that there are no defects that would allow lead-containing dust to escape. Defects should be repaired before the facility is used. The decontamination facility should be maintained in a clean and sanitary condition.
- .5 Separation of Work Areas from Occupied Areas:
 - .1 Barriers between Work Area and occupied area to be constructed as follows:
 - .1 Construct floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
 - .2 Cover plywood with polyethylene sheeting and sealed with duct tape.
- .6 Maintenance of Enclosures:
 - .1 Maintain enclosures in tidy condition.
 - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
 - .3 Visually inspect enclosures at beginning of each working day.
 - .4 Use smoke test method to test effectiveness of barriers as directed by Departmental Representative.

3.3 LEAD-BASED PAINT
ABATEMENT

- .1 Removal of lead-based paint to be performed using power tools that are attached to dust-collecting vacuums with HEPA filters.
- .2 Remove lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Wet method to be used to reduce dust generation. Examples of wet methods include wetting surfaces, wet scraping, and wet shoveling. Wet method not be used if it creates a hazard or cause damage to equipment or to project. Power tools to be equipped with a shroud, and to be kept flush with surface.
- .4 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove immediate from working area to staging area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .5 After completion of stripping work, wire brush and wet sponge surface to remove visible material. During this work keep surfaces wet. After wire brushing and wet sponging, wet clean and HEPA vacuum entire work area including Equipment and Access Room. Compressed air or dry sweeping not be used to clean up lead-containing dust or waste. After inspection and approval by Departmental Representative apply continuous coat of slow drying sealer to surfaces. Do not disturb work area for 8 hours, no entry, activity, or ventilation other than operation negative air machine during this period.
- .6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from requirements not been approved in writing by Departmental Representative will result in Work shutdown, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
 - .1 Adherence to specific procedures and

materials.

- .2 Final cleanliness and completion.
- .3 No additional costs will be allowed for additional labour or materials required to provide specified performance level.

- .3 When lead dust leakage from Work Area occurs Departmental Representative will order Work shutdown.

- .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.5 LEAD SURFACE SAMPLING
- WORK AREAS

- .1 Final lead surface sampling conducted as follows:

- .1 After Work Area has passed a visual inspection for cleanliness approved by Departmental Representative and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period of 8 hours has passed, Departmental Representative will perform lead wipe sampling in Work Area.

- .1 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples collected and analyzed in accordance with EPA 747-R-95-007.
- .2 If wipe sampling results show levels of lead dust in excess of 40 micrograms per square foot, re-clean work area at contractor's expense and apply another acceptable coat of lock-down agent to surfaces.
- .3 Repeat as necessary until lead dust levels are less than 40 micrograms per square foot.

3.6 FINAL CLEANUP

- .1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead-containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Clean up Work areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Remove sealed waste containers and equipment used

in Work and remove from work areas at appropriate time in cleaning sequence.

- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

3.7 RE ESTABLISHMENT OF
OBJECTS AND SYSTEMS

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Procedures and materials required for the safe handling, management and decommissioning of mercury-containing equipment.
- .2 Comply with requirements of this Section when performing the following Work:
 - .1 Decommissioning, removal, and disposal of mercury-containing equipment, including thermostats, thermometers, switches, and lamps (fluorescent light tubes).
 - .2 The report identified in the site conditions identifies the locations and condition of all known materials and equipment containing mercury.
 - .3 Unless otherwise shown or specified it is the intent that work performed under this Section will result in the removal and disposal of mercury.

1.2 REFERENCES

- .1 Occupational Health and Safety and Act, R.S.O. 1990, c. O.1.
- .2 Ontario Regulation 490/09, Designated Substances
- .3 Canadian Council of Ministers of the Environment (CCME) "*Canada-Wide Standard for Mercury Containing Lamps*", 2001
- .4 Ontario Environmental Protection Act, General - Waste Management, R.R.O. 1990, Regulation 347.

1.3 DEFINITIONS

- .1 Authorized Visitors: Departmental Representatives, Engineers, Consultants or designated representatives, and representatives of regulatory agencies.
- .2 Disposal: transportation of specified disposal facility for temporary storage and subsequent transportation to the specified permanent disposal facility.
- .3 Recycling: collection of materials or equipment for processing by an approved system without loss to the environment. System may be used on or off-site with collected materials recycled or disposed of according to Provincial and Federal regulations.
- .4 Removal: detachment or removal of equipment from applicable fixtures, including preparation for disposal as described in this Section.

- 1.4 SUBMITTALS
- .1 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of mercury waste in accordance with requirements of authority having jurisdiction.
 - .2 Provide proof of Contractor's General and Environmental Liability Insurance.
 - .3 Submit proof satisfactory to Departmental Representative that the Certified Technician have received appropriate training and education by a competent person in the hazards of mercury exposure, good personal hygiene, aspects of work procedures and protective measures while working with mercury-containing equipment.
 - .4 Submit Worker's Compensation Board status and transcript of insurance.
- 1.5 QUALITY ASSURANCE
- .1 Instruct personnel on dangers of mercury exposure, respirator use, decontamination and applicable Federal, Provincial and Municipal Regulations.
- 1.6 SUPERVISION
- .1 Provide a minimum of one Supervisor for every ten workers is required.
- 1.7 EXISTING CONDITIONS
- .1 Information pertaining to mercury-containing equipment to be handled, removed, or otherwise disturbed and disposed of during this project, including the report entitled "*Designated Substances and Hazardous Materials Survey - Port Severn Main Dam and Lock 45, Port Severn, ON (PSPC Project R.076951.033), WSP Canada Inc., October 2018*", is bound into this specification.
 - .2 Notify Departmental Representative of material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.
- 1.8 DELIVERY, STORAGE AND HANDLING
- .1 Place mercury-containing materials/products in designated impervious containers.
 - .2 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
 - .3 Ensure personnel are familiar with and understand current mercury waste management procedures and use of personal protection equipment and clean-up techniques.
 - .4 Disposal of mercury waste generated by removal

activities must comply with Federal, Provincial, Territorial and Municipal regulations.

- .1 Dispose of mercury waste in impervious containers.
- .2 Containers must be labelled with appropriate warning labels.

1.9 PERSONAL PROTECTION

- .1 Before handling mercury-containing materials, instruct workers and visitors in all aspects of prescribed work procedures and protective measures including appropriate awareness and/or abatement training. A competent person, as defined by Ontario Occupational Health and Safety Act (OHSA), shall provide instruction.
- .2 Require workers to wear mercury-impervious gloves in addition to normal work clothing where exposure risk is low.
- .3 Provide workers with additional protective clothing and equipment where contact with liquid mercury or mercury vapour may occur. Provide clothing and equipment appropriate for the potential level of exposure.
- .4 Establish a spill response plan to mitigate the release of mercury should any breakage of mercury-containing equipment occur.
- .5 Persons employed for the removal of mercury-containing electrical equipment, including thermostats and fluorescent lighting, shall be overseen by a qualified electrician.
- .6 Do not eat, drink, smoke or chew gum or tobacco in designated work areas.
- .7 Personnel must be fully protected at all times when possibility of disturbance of hazardous materials exists.
- .8 Use hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- .1 Absorbent Material: Mercury absorbent material. Proof of suitability of the absorbent material as a mercury absorbent must be provided to Departmental Representative upon request.
- .2 Impervious Container: An airtight, leak proof

container suitable for the storage and transportation of mercury-containing materials/equipment, which meets Transportation of Dangerous Goods Regulations and applicable Provincial/Territorial requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Before commencing any work involving mechanical or electrical equipment, ensure that the power supply to the designated work area has been isolated and locked out to prevent re-energizing of electrical circuits.
- .2 Inspect all suspect equipment to identify possible mercury content. All suspect mercury-containing equipment shall be considered as hazardous material unless proven otherwise.
- .3 All fluorescent lamps or bulbs shall be considered mercury-containing unless proven otherwise.
- .4 Erect appropriate worker and waste decontamination facilities, as appropriate, at locations approved by the Departmental Representative.
- .5 Provide emergency spill containment supplies in work area in accordance with approved emergency spill response plan.
- .6 Establish a storage area for all mercury-containing equipment until the materials can be safely transported off-site, recycled or decommissioned.

3.2 MERCURY REMOVAL OR RECYCLING

- .1 Do not commence work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment and waste material receptors are on hand.
- .3 Locate all mercury-containing equipment.
- .4 Wear personal protection at all times when disturbing lamps, equipment and items that contain mercury.
- .5 Place all mercury-containing equipment into an impervious container packed with absorbent material.
- .6 Place mercury-contaminated materials, if any, into plastic bags. Close bags securely using ties. Handle bags containing contaminated materials

- carefully to prevent bag puncture.
- .7 Place absorbent material in bottom of container.
 - .8 Package any mercury-contaminated gloves, work clothes and rags in plastic bags and place in container.
 - .9 Fill voids between mercury waste with absorbent material. Once container is full, cover materials with absorbent material.
 - .10 Seal container and store in designated storage area pending transportation and disposal.
 - .11 Each container must be marked in accordance with the Dangerous Goods Transportation and Handling Act, showing the shipping name (mercury), the product identification number and proper waste class and hazard labels.
 - .12 Fluorescent lamps and bulbs shall be collected for disposal in accordance with disposal site requirements or recycled by a means approved by the Departmental Representative.
 - .13 Dispose of non-hazardous materials as construction waste.
 - .14 Any re-use or re-sale of mercury-containing equipment must be in compliance with all appropriate regulations.
 - .15 In the event of a spill or release, isolate the work area, absorb any liquid materials with an appropriate absorbent material and ventilate area immediately.
 - .16 Handle, store, transport and recycle mercury in accordance with Ontario and Federal legislative requirements.
 - .17 The facility used to process and recycle mercury shall be approved by the Ministry of Environment, or local the jurisdiction having authority, and shall have valid Certificates of Approval to carry out the work outlined herein.

PART 4 - INSPECTION

4.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for

cleanliness and completion both inside and outside work areas.

- .2 The Departmental Representative is empowered to shut down all work activities when leakage of mercury from the work area has occurred or is likely to occur. The Contractor shall provide access for the Departmental Representative and make good on any work disturbed by the inspections at no cost to the Departmental Representative.
- .3 If work is found unacceptable in accordance with standards specified or required by authorities having jurisdiction, such deficiencies shall be corrected at no cost to the Departmental Representative.

END OF SECTION