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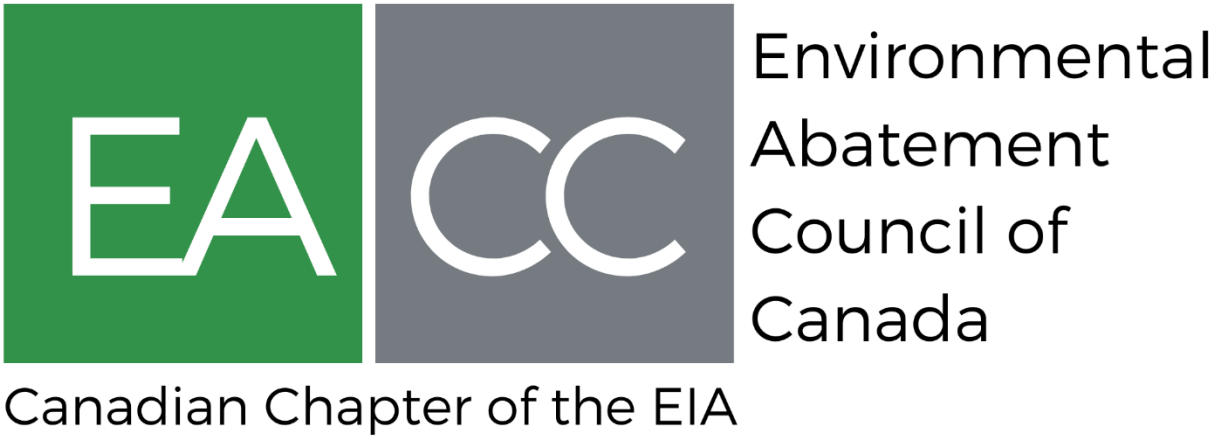
Pre-Construction Designated Substances and Hazardous Materials Assessments

Guideline for Construction, Renovation and Demolition Projects



FOREWORD

This guideline has been prepared to assist building owners, constructors, contractors, subcontractors and workers who have duties under the Occupational Health and Safety Act and its Regulations to understand their responsibilities when tendering or conducting work activities involving designated substances and/or hazardous materials.

We believe that this guideline will not only help employers fulfill their responsibilities and due diligence, under the Occupational Health and Safety Act, but will also assist them to better address the challenges involved with implementing proper work procedures during construction activities where designated substances or hazardous materials may be present.

DISCLAIMER

EACC disclaims any liability or risk resulting from the use of the work practices and recommendations discussed in the guideline. It is the user's responsibility to ensure that work practices and recommendations discussed in the guideline apply to specific workplaces and projects and to ensure compliance with all other applicable federal, provincial and local acts, codes and regulations.

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1 INTRODUCTION, GENERAL POINTS AND LIMITATIONS

1.1 INTRODUCTION

There is significant variability in the content, scope, methodology, application and quality of Pre-Construction Designated Substances (DS) and Hazardous Materials (HM) assessments in Ontario. The Environmental Abatement Council of Canada (EACC) also recognizes significant differences in the needs of industry sectors (e.g., abatement, construction/renovation, restoration and demolition) regarding the content and reporting of DSHM on projects prior to work taking place.

EACC has developed this document to provide a framework for building owners, project owners, architects, engineers, consultants, and contractors to foster consistency in discussing and determining the scope of pre-construction DSHM assessments and the required information that should be included in the reports produced. EACC believes this document will improve worker safety in the general construction, abatement and demolition sectors and will also assist in construction management and planning and building occupant health and safety.

Due to the lack of a standards for pre-construction DSHM assessments, the scope, content, quality and quantity of samples, level of invasive inspection and cost varies significantly, leaving building owners and contractors in unclear and in potentially liable situations.

EACC has developed this guideline to bridge the gaps between legislation, industry best practice, the most recent science and typical client directives. The information and procedures identified herein are based on current and relevant legislation, the state of the sciences, industry best practices and practical experience.

This guideline is intended to be used by:

- Building/project owners to define the scope of pre-construction DSHM assessments,
- The environmental abatement industry to identify materials requiring abatement,
- The construction industry to identify materials requiring special handling/disposal, and
- Design professionals (e.g. architects, engineers, project managers) to inform cost, schedule and disposal.

This document is not a step-by-step guide to preparing a pre-construction DSHM assessment, a competent person should be retained for that purpose, but this guide will explain the reasons for a pre-construction DSHM assessment and the information the pre-construction DSHM assessment should contain based on the type of project to be undertaken.

The information contained in pre-construction DSHM assessments are required by legislation to be presented prior to signing contracts when a project (e.g., construction, demolition, selective demolition, renovation) is planned, with no exemption for recent construction. Pre-construction DSHM assessments are not required for ongoing operation and maintenance, but Ontario Regulation (O. Reg). 278/05 does generally require that an asbestos survey be completed for most buildings.

When preparing the scope of work for a pre-construction DSHM assessment, the following considerations apply:

- What is the scope of the pre-construction DSHM assessment? The assessment typically includes the built environment but does not include conducting a Phase 1 or 2 Environmental Site Assessment (ESA), assessments for soil or groundwater contamination. Materials in processes used at the site are also typically not included.
- Is a Phased Approach appropriate, given project status and timelines?
- Is access to confined/restricted spaces required, based on the scope of the project (e.g., elevator shafts, pipe chases, subgrade utility areas)?
- Are there other access issues (e.g., structural collapse due to fire, known uncontrolled contamination, limited access due to material storage, sensitive building areas due to security requirements or energized systems)?
- Are specifications required to be prepared as part of the tender package for the project? The pre-construction DSHM assessment is not a specification or a scope of work for abatement and does not include procedures for worker protection when handling hazardous materials.
- Are drawings showing the location of samples/pre-construction DSHM required based on the scope of the project?
- Are historic reports available, and can they be relied on? Are they still relevant based on changes that have occurred since they were prepared?

1.2 LIMITATIONS

EACC is not responsible for the interpretation or use of the information contained within this document. It is the responsibility of the user to determine whether the information contained herein is appropriate to the user's specific activities. While EACC has attempted to identify and provide procedures for common scenarios where the assessment and reporting of DSHM may be required, not all situations can be anticipated in advance. Therefore, the information contained within this document may not be suitable for all applications, buildings, projects or work and caution should be used in applying the methods and procedures outlined in this document. Use your professional judgement and if in doubt, contact a professional with experience in pre-construction DSHM assessments and DSHM management.

2 REGULATIONS AND GUIDELINES

Section 30 of the Ontario Occupational Health and Safety Act, R.S.O., 1990, c. O.1 (the Act) requires that an owner determine whether any Designated Substances are present at the project site and prepare a list of all Designated Substances identified. The list of Designated Substances shall be provided to contractors as part of the tendering information so that they may comply with the Act.

2.1 PROHIBITION OF ASBESTOS AND PRODUCTS CONTAINING ASBESTOS REGULATIONS (SOR/2018-196)

In 2018, the Canadian Federal Government released new regulations prohibiting the use of asbestos-containing products in Canada. The Prohibition of Asbestos and Products Containing Asbestos Regulations and the related amendments to the Export of Substances on the Export Control List Regulations (ESECLR) were published in Canada Gazette, Part II on October 17, 2018. The Regulations and related amendments to the ESECLR took effect on December 30, 2018.

The Regulations prohibit the import, sale and use of asbestos, as well as the manufacture, import, sale and use of products containing asbestos, with a limited number of exclusions. The Regulations also contain permit provisions for specific applications.

2.2 ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT - SECTION 30:

Duty of Project Owners

(1) Before beginning a project, the owner shall determine whether any designated substances are present at the project site and shall prepare a list of all designated substances that are present at the site.

Tenders

(2) If any work on a project is tendered, the person issuing the tenders shall include, as part of the tendering information, a copy of the list referred to in subsection (1).

Idem

(3) An owner shall ensure that a prospective constructor of a project on the owner's property has received a copy of the list referred to in subsection (1) before entering into a binding contract with the constructor.

Duty of constructors

(4) The constructor for a project shall ensure that each prospective contractor and subcontractor for the project has received a copy of the list referred to in subsection (1) before the prospective contractor or subcontractor enters into a binding contract for the supply of work on the project.

Liability

(5) An owner who fails to comply with this section is liable to the constructor and every contractor and subcontractor who suffers any loss or damages as the result of the subsequent discovery on the project of a designated substance that the owner ought reasonably to have known of but that was not on the list prepared under subsection (1).

Idem

(6) A constructor who fails to comply with this section is liable to every contractor and subcontractor who suffers any loss or damages as the result of the subsequent discovery on the project of a designated substance that was on the list prepared under subsection (1). R.S.O. 1990, c. O.1, s. 30.

The following Sections of the Act are also noteworthy with respect to Designated Substances:

Section (s.) 23 (1)c – A constructor shall ensure, on a project undertaken by the constructor that, the health and safety of workers on the project is protected.

Section (s.) 25 (2)a, h – Without limiting the strict duties imposed, in s. 25 (1), an employer shall, provide information instruction and supervision to a worker to protect the health or safety of the worker; and, take every precaution reasonable in the circumstances for the protection of a worker.

Section (s.) 54 (1)e, f - An inspector may, for the purposes of carrying out his or her duties and powers under this Act and the regulations, conduct or take tests of any equipment, machine, device, article, thing, material or biological, chemical or physical agent in or about a workplace and for such purposes, take and carry away such samples as may be necessary; and, require in writing an employer to cause any tests described in clause (e) to be conducted or taken, at the expense of the employer, by a person possessing such special expert or professional knowledge or qualifications as are specified by the inspector and to provide, at the expense of the employer, a report or assessment by that person.

2.3 ONTARIO MINISTRY OF LABOUR, TRANING, SKILLS AND DEVELOPMENT (MLTSD)

The regulations noted below are the current regulations and numbering nomenclature published by the Government of Ontario in effect at the time of publication. The actual names and numbers of the regulations may change over time. It is the readers responsibility to confirm the current publication and content of the regulations for each project.

2.3.1 O. REG. 490/09: DESIGNATED SUBSTANCES

O. Reg. 490/09: *Designated Substances* under the Act lists/defines the Designated Substances and provides the associated exposure limits:

- Acrylonitrile,
- Arsenic,
- Asbestos,
- Benzene,
- Coke Oven Emissions,
- Ethylene Oxide,
- Isocyanates,
- Lead,
- Mercury,
- Silica, and
- Vinyl Chloride.

It should be noted that Section 14 of O. Reg. 490/09 indicates that the regulation does not apply to:

(a) to an employer who engages in construction; or

(b) to the workers of an employer described in clause (a) who are engaged in construction.

O. Reg. 490/09 does not apply to construction; however, it is frequently referenced as defining Designated Substances. The exposure limits presented in O. Reg. 490/09 are consistent with exposure limits presented in O. Reg. 833/90, which in recent amendments, no longer excludes construction.

Additional worker protection requirements are required under OHSA Section 25(2)h, and Revised Regulations of Ontario (RRO) 1990 Regs 347and 860, O. Regs. 213/91 and 278/05, which do apply to construction and worker protection.

2.3.2 O. REG. 833/90: CONTROL OF EXPOSURE TO BIOLOGICAL OR CHEMICAL AGENTS

O. Reg. 833 applies to workplaces and construction, and establishes exposure limits for chemical, biological and physical agents. This regulation lists exposure limits for Designated Substances (Acrylonitrile, Arsenic, Asbestos, Benzene, Coke Oven Emissions, Ethylene Oxide, Isocyanates, Lead, Mercury, Silica, and Vinyl Chloride) by including the exposure limits for Designated Substances.

2.3.3 O. REG. 860: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

O. Reg. 860. prescribes the dissemination of information related to the hazards of materials used in the workplace in the form of training, labelling, etc. This regulation uses and/or defines the terms "hazardous product" and "hazardous material". It is important to note that Hazardous Material for the purpose of the assessments prescribed in this guideline are not the "hazardous materials" defined by (O. Reg.) 860/90 *Workplace Hazardous Materials Information Systems (WHMIS)* or "hazardous products" as defined by SOR/2015-17 *Hazardous Products Regulations* made under the *Hazardous Products Act* (Canada) even if the Hazardous Materials assessed in this guideline are identified or listed by such legislation.

2.3.4 O. REG. 213/91: CONSTRUCTION PROJECTS

O. Reg 213/91 contains requirements for construction projects which include the disturbance of Designated Substances. This regulation specifies that a notice shall be filed and include a list of all Designated Substances that may be used, handled, or disturbed by the work (s. 6).

Section 214 (4) states that all toxic, flammable or explosive substances must be removed from a building structure that is to be demolished, dismantled or moved.

2.3.5 O. REG. 278/05: DESIGNATED SUBSTANCE – ASBESTOS ON CONSTRUCTION PROJECTS AND IN BUILDINGS AND REPAIR OPERATIONS

O. Reg. 278/05 sets specific requirements for the identification, abatement, and ongoing management of asbestos-containing materials.

- s. 6 (1) notes that *"the demolition of all or part of machinery, equipment, a building, aircraft, locomotive, railway car, vehicle or ship shall be carried out or continued only when any asbestos-containing material that may be disturbed during the work has been removed to the extent practicable."*
- s.8 requires an owner "*to prepare and keep on the premises an asbestos survey, and if asbestos is present, provide the information to building occupiers, contractors and employees, establish a training program for workers who may disturb asbestos, prepare a management plan and inspect known asbestos at least annually."*

O. Reg. 278/05 also sets specific requirements for Owner of the facility prior to requesting tender or arranging for work (s.10)

> "***10.*** *(1) An owner shall comply with subsections (2), (3), (4), (5) and (6) before,*
>
> *(a) requesting tenders for the demolition, alteration or repair of all or part of machinery, equipment, or a building, aircraft, locomotive, railway car, vehicle or ship; or*
>
> *(b) arranging or contracting for any work described in clause (a), if no tenders are requested. O. Reg. 278/05, s. 10 (1).*
>
> *(2) Unless clause (3) (a) or (b) applies, the owner shall have an examination carried out in accordance with section 3 to establish whether any material that is likely to be handled, dealt with, disturbed or removed, whether friable or non-friable, is asbestos-containing material. O. Reg. 278/05, s. 10 (2).*

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

(a) the owner,

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

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

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

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

(a) stating whether,

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

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

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

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

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

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

(a) a constructor and a prospective contractor; and

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

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

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

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

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

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

(b) the owner;

(c) the contractor; and

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

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

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

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

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

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

Furthermore, O. Reg 278/05 further states that "*demolition includes dismantling and breaking up*" and that "building" is defined as "*any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel."*

It is important to ensure areas requiring assessment are not omitted due to colloquial or conversational understanding or language.

O. Reg. 278/05 also sets specific requirements for the Constructor to notify the MLTSD prior to commencing any Type 3 work, or Glove Bag work where greater than one square meter is removed (s.11). This notification is independent of the required notifications under O. Reg. 213/91.

2.4 OTHER REGULATIONS AND GUIDANCE

2.4.1 ONTARIO MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS R.R.O 1990 REG. 347: GENERAL – WASTE MANAGEMENT

The general waste regulation provides guidance on the classification of all waste and should be reviewed prior to the start of projects. It is important to understand the general waste stream, components and characteristics of the waste generated from the site activities prior to finalizing abatement work. In many instances, this cannot be completed during a DSHM assessment as the material samples have not been analyzed and assumptions cannot be made.

Classifying waste should be performed following the completion of the pre-construction DSHM report and prior to tendering or finalizing abatement costing.

Asbestos Waste:

"Solid or liquid waste that contains asbestos in more than a trivial amount:

- Waste that results from the removal of asbestos-containing construction or insulation materials.
- Waste that results from the manufacture of asbestos-containing products.
- Waste that results from the removal of asbestos-containing components from a motor vehicle.
- Waste that results from the removal or handling of waste or materials described in paragraphs 1, 2 and 3, including personal protective equipment, tools that cannot be decontaminated and cleaning materials."

- Leachate Toxic Waste means a waste producing leachate containing any of the contaminants listed in Schedule 4 of Ontario Regulation 347, at a concentration equal to or in excess of the concentration specified for that contaminant in Schedule 4 using the Toxicity Characteristic Leaching Procedure.

2.4.2 INDUSTRY RESOURCES

Other regulations, standards, guidelines and best practice documents may be applicable to the project and should be reviewed and considered:

- EACC Vermiculite Guideline.
- EACC Lead Guideline for Construction, Renovation, Maintenance or Repair.
- MLTSD Lead on Construction Projects.
- MLTSD Silica on Construction Projects.
- EACC Mould Abatement Guidelines.
- EACC Guideline Construction Worker Hygiene Practices.
- Canadian Standards Association:
    - CSA Z317-13.12 Infection Control During Construction/Renovation of Health Care Facilities.
- NIOSH (National Institute of Occupational Safety and Health) 97-146 Histoplasmosis Protecting Workers at Risk.
- ODS:
    - Part VI of the Ozone Depleting Substances – General Regulation (R.R.O 1990, Reg. 356 amended to O. Reg. 351/93 made under the Ontario Environmental Protection Act (EPA).
    - Refrigerants Regulation (O. Reg. 189/94 amended to O. Reg. 519/97). Federal legislation pertaining to ODS include the Ozone-Depleting Substances Regulations 1998 SOR/99-7.
    - Federal Halocarbon Regulation 2003 (SOR/2003-289) made under the Canadian Environmental Protection Act (CEPA).
- PCB:
    - PCB Regulations SOR/2008-273 (the Regulations), made under the Canadian Environmental Protection Act (CEPA), 1999.
    - United Nations Environment Programme Guidelines for the Identification of PCBs and Materials Containing PCBs (UNEP, 1999).
- UFFI:
    - Item 34, Part I of Schedule I to the Hazardous Products Act.
- Radioactive Materials:
    - Nuclear Safety and Control Act -1997
    - Health Canada - Canadian NORM (Naturally Occurring Radioactive Material).

3 PRE-CONSTRUCTION DSHM ASSESSMENTS – INDUSTRY BEST PRACTICES

The following sections are EACC's determination of Industry Best Practices and do not represent a legal opinion. The Regulations noted in Section 2 of this document form the framework around the needs and requirements for preparing pre-construction DSHM assessments in the Province of Ontario. It is the readers responsibility to ensure they are complying with all applicable legislation prior to commencing a construction project.

A pre-construction DSHM assessment is required prior to starting construction work on a Project. Failure to complete a pre-construction DSHM assessment may place workers, building occupants and the public in danger and poses significant liabilities to the Project Owner. An assessment may be required for maintenance, repair, alteration, renovation, construction or demolition.

It should be noted that some Designated Substances and Hazardous Materials may still be installed in newly constructed buildings (e.g. silica, lead, and mercury).

A pre-construction DSHM assessment is required for all Projects, with no exemption for date of construction of the building as noted in **Section 2** of this guideline.

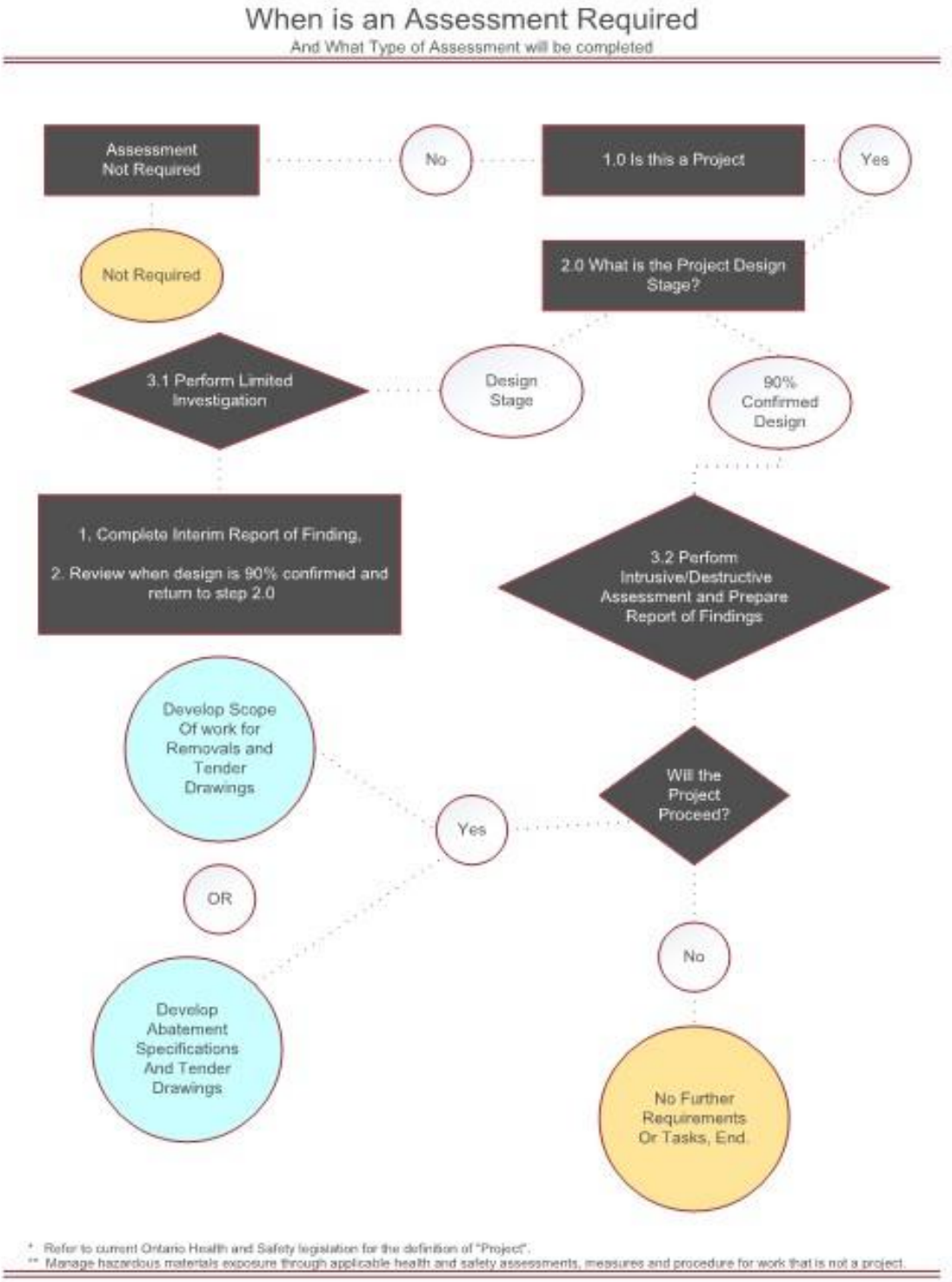
A list of some common building materials and locations in buildings where designated substances may be present is provided in **Appendix I.** The HM included in the pre-construction DSHM assessment should be based on knowledge of the building history and use and include items that may reasonably be present.

3.1 WHEN IS AN ASSESSMENT REQUIRED?

In order to comply with the requirements of the Ontario Occupational Health and Safety Act (s. 30) and the requirements of the Ontario Regulation 278/05 - Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations (s. 10) an assessment should be performed prior to the start of a project that could disturb building materials that contain a regulated substance. The duty to complete the pre-construction DSHM assessment is typically placed on the Project Owner who may not necessarily be the property or building owner but may be an agent acting on behalf of them.

In addition, the Project Owner should identify those materials that will be or are likely to be disturbed, handled, or removed as part of a project. Project Owners must disclose the list of designated substances as part of the tendering process. Constructors must also provide the list to all subcontractors at the time of tender.

A pre-construction DSHM assessment does not replace or supersede workplace control measures prescribed under OHSA and other regulations.


When is an Assessment Required
And What Type of Assessment will be completed
Assessment Not Required
No
1.0 Is this a Project
Yes
Not Required
2.0 What is the Project Design Stage?
3.1 Perform Limited Investigation
Design Stage
90% Confirmed Design
1. Complete Interim Report of Finding,
2. Review when design is 90% confirmed and return to step 2.0
3.2 Perform Intrusive/Destructive Assessment and Prepare Report of Findings
Develop Scope Of work for Removals and Tender Drawings
Will the Project Proceed?
Yes
OR
No
Develop Abatement Specifications And Tender Drawings
No Further Requirements Or Tasks, End
* Refer to current Ontario Health and Safety legislation for the definition of "Project".
** Manage hazardous materials exposure through applicable health and safety assessments, measures and procedure for work that is not a project.
February 19, 2021

3.2 WHEN IS AN ASSESSMENT NOT REQUIRED?

A pre-construction DSHM assessment is not required for routine non-intrusive maintenance tasks that do not meet the definition of a project. This may include activities such as:

- Picture Hanging.
- Small repairs to surfaces.
- Painting.
- Floor care.
- Etc.
- If there is a question on whether the task should be considered a project, refer to the definition of a project in the applicable legislation.

3.3 PROJECT COMPLEXITY

EACC understands that this guideline may be used for a wide variety of projects, ranging from small interior renovations to full building demolitions. The following sections describe several processes that may be used to assist the user in preparing reports for the different sizes of projects.

3.3.1 SMALL PROJECTS

A project may be very small in scope, but a pre-construction DSHM assessment is still required. These projects tend to be small in area and of short duration. Examples of small projects include:

- Carpet Replacement.
- Core Drilling.
- Cabling.
- Minor Drywall Modifications.
- Work above drop ceilings.
- Roof Replacements.
- Etc.

3.3.2 LARGE PROJECTS

Larger, projects may include an entire building or multiple buildings. Such projects typically undergo a tender process and benefit from detailed specifications and drawings. Examples of large projects include:

- Complete or partial building demolition.
- Back to base building renovations.
- Tenant fit-up modifications.
- Building envelope improvements.
- Etc.

3.3.3 THE TIERED APPROACH

For complex or less well-defined projects where it is difficult to complete the entire comprehensive pre-construction DSHM assessment in advance, due to design progress or building occupancy issues (education, healthcare food processing, secure facilities etc.) or if the building is not structurally sound; a tiered approach should be considered.

INITIAL ASSESSMENT

An initial assessment allows the assessor to assess the project areas and what building materials may be impacted by the project. Intrusive inspections (cutting holes in walls or solid ceilings) are unlikely to be conducted and assumptions about concealed or inaccessible materials will be made by the assessor. The information should be shared with the project team for the purpose of design, scope, approach, methodology and budget revisions. A data gap analysis should be performed to identify gaps and quantify cost implications, potential extras and the level of confidence in the assessment. A plan should be prepared to eliminate data gaps during the next stage of the pre-construction DSHM assessment.

INTERIM ASSESSMENTS

As the project evolves and becomes more defined or construction approaches, an updated pre-construction DSHM assessment should be completed. Intrusive or destructive inspections should be conducted at this stage to eliminate data gaps and clarify assumptions. Once complete the updated pre-construction DSHM assessment should inform budgetary estimates, project specifications and project schedules. Data gaps may still exist at this stage but should be well defined and identified in the pre-construction DSHM assessment report.

If data gaps exist or the scope of the project changes prior to the start of the project the pre-construction DSHM assessment should be reviewed for relevance and completeness. Additional site investigations may be required to close data gaps identified in interim assessments.

CONSTRUCTION READY ASSESSMENT

When the project scope is final, the previously identified data gaps should be closed by additional inspection and sampling. Once the DSHM at the site have been identified and there is confidence from the stakeholders, final documents can be prepared for tender.

Even a well constructed multi-stage pre-construction DSHM assessment may not account for all hidden DSHM at a Site (e.g., underground services, concealed structures, buried waste). Provisions should be included for ongoing contractor support as it relates to DSHM at the site.

3.4 EMERGENCY RESPONSE

Emergency response (e.g. fire, water, structural damage, or disaster requires a modified approach. Initial stages of controlling the work area should begin as soon as possible and may occur prior to competing a comprehensive pre-construction DSHM assessment. Owner compliance with asbestos survey reports, or management DSHM reports, significantly benefits the ability to commence initial emergency responses.

A visual review of the building materials in the project area that may be disturbed as part of the initial response should be completed to avoid or manage disturbance of suspected DSHM. Activities to prevent further damage (e.g., mould growth) or financial loss (e.g., business interference) can begin immediately, such as structural drying and water extraction, provided that suspected DSHM will not be disturbed, will be properly managed, and workers will be adequately protected.

Emergency response activities may follow a tiered approach, as indicated Section 3.3.3, where limited information is first collected with the intent to eliminate data gaps once the work area has been stabilized and/or the initial response activities have been completed.

While waiting for a pre-construction DSHM assessment to be completed, control measures should be put in place to protect workers from exposure to DSHM that may reasonably be present at the Site. Failure to mitigate against further loss (e.g., mould and bacterial amplification, structural collapse etc.) may pose safety hazards and increase project costs. Early interventions, such as water extraction, carpet removal, and drying activities that will not disturb DSHM should be implemented concurrent with the completion of the pre-construction DSHM assessment.

Prior to starting a construction or restoration project following the emergency response, a more detailed or comprehensive pre-construction DSHM assessment should be completed and provided to the contractor

If building materials which may contain DSHM are deteriorated to the point at which aggressive air movement could lead to worker exposure, immediate sampling should be completed, and measures put in place to protect workers and building mechanical systems servicing other portions of the building.

4 WHAT IS INCLUDED IN A PRE-CONSTRUCTION DSHM ASSESSMENT?

The pre-construction DSHM assessment should be completed in accordance with the requirements of the OHSA, other applicable Provincial and Federal regulations and this guideline.

The pre-construction DSHM assessment should include, as a minimum, the identification, quantification, and evaluation of the presence of the DSHM identified at the defined project site. The assessment should comply with the predetermined scope of work documents (if produced).

These types of assessments may not require intrusive investigations to reach the base building structure. The assessment may be completed at preliminary design phase and may be a non-intrusive or limited intrusive investigation and should be updated as the design progresses and the time to construction shortens if applicable. This is described by following the Tiered Approach as noted in Section 3.3.3 of this Guideline.

In some cases, these assessments may be required on a rush basis and time is of the essence. It is important to document all assumptions made during the assessment in the Pre-Construction DSHM report so that the project stakeholders are aware of the potential gaps in information before pricing or tendering is complete.

Reliable historic information should be incorporated into the pre-construction DSHM assessment. If historical reports are available, a site inspection to confirm that the information is accurate should be completed, while updating and assessing for other DSHM. Conducting a pre-construction DSHM assessment without a Site visit requires assuming that all materials which could potentially contain DSHM do contain DSHM which may have significant cost implications for the project. Additionally, without a site visit, significant quantities of concealed materials may be discovered, significantly impacting project costs and schedule.

4.1 PRE-CONSTRUCTION DSHM ASSESSMENT INTENT

Pre-construction DSHM assessments are generally categorized as either being a pre-construction assessments or pre-demolition assessments.

Pre-construction DSHM assessments are completed when a project involves renovations and additions to existing buildings that will remain in place. This level of investigation will assess materials that will or may be specifically disturbed during the renovation project. The assessment may not require the investigation to reach base building structure.

Where an additional level of detailed assessment is required, including where intrusive investigations and demolition ready pre-demolition DSHM assessment information needs to be gathered for projects where the buildings will be demolished, removed and the site re-developed, see **Section 5**.

4.2 SCOPE OF WORK

The pre-construction DSHM assessment Scope of Work generally consists of the following five elements:

1 Defined scope of work.

2 Records review.

3 Interviews.

4 Site inspections and material sampling and analysis.

5 Pre-construction DSHM assessment report.

4.2.1 DEFINED SCOPE OF WORK

Prior to commencing the pre-construction DSHM assessment, the project owner or their agent (e.g. architect, engineer) should prepare a scope of work related to the extent and degree of investigation that is required. Where no pre-construction DSHM assessment scope of work is prepared of the defined work area, the consultant should provide a summary of services to be provided and a description of the area to be assessed. The pre-construction DSHM assessment scope of work, as well as the limitations of the assessment, should be understood, and agreed to, by all stakeholders prior to commencing with the pre-construction DSHM assessment.

Limitations of a typical pre-construction DSHM assessment may include;

- Concealed areas that are not accessible.
- Facility owned or stored items such as furniture, appliances, etc.
- Internal components of electrical or mechanical systems (e.g. wiring, pipe gaskets, boilers, elevator equipment, etc.).
- Materials not associated with building construction, building materials or base building systems.
- Materials that may cause resultant damage to the building if sampled (e.g. roofing materials, caulking, glazing compounds, exterior cladding, ceramic tile grout mortar and adhesive etc.).
- Operations or process materials or products (e.g. chemicals, raw materials, etc.).
- Underground pipes, systems or items.

Additional consideration may be required for facilities where it may not be feasible (or necessary) to inspect, and collect samples from, all areas of a building. This situation typically arises where multiple areas of a building may be continually occupied and generally share the same building system and building finish characteristics (e.g. multi-residential unit buildings, multi-residential complexes, hotels, correctional facilities, etc.). In some circumstances, it may be acceptable to complete inspections and sampling from a representative number of visually similar units or areas. The percentage of units or areas inspected is based on project-specific and client-specific variables. Analysis of the variables is required to provide assurance that the number/percentage of units or areas inspected (e.g. 10%, 25%, 50%) provides information of enough quality and accuracy to meet project requirements. This should be reviewed on a case by case basis.

4.2.2 RECORDS REVIEW

Review of available site records should be undertaken to identify and evaluate potential for existing or historical DSHM at the site. The following records should be reviewed based on availability and applicability:

- Building construction information (age, materials of construction, renovations), from documents such as the following:
    - Drawings that indicate different dates and/or phases of building construction.
    - Information on drawings related to dates of major renovations. These should also include details of the renovation scope of work (e.g. renovation back to base building conditions versus superficial renovation work).
    - Documents included within a typical Phase I Environmental Site Assessments (ESAs) (e.g. historical aerial photos, fire insurance maps/sketches and inspection reports, etc.).
- With limited historical information, additional site investigations may be required to review differences in building materials or building finishes. Examples of changes that may be indicative of multiple construction dates and/or major renovations may include the following:
    - Change in base-building or structural wall sizes and/or wall types (e.g. poured concrete, concrete block, clay block, wood structure, steel structure, etc.).
    - Change in internal wall finishes or composition (e.g. plaster versus drywall).
    - Change in types of mechanical insulations.
    - Change in type or size of ceiling tiles installed.
    - Change in type or size of flooring materials installed.
    - Change in exterior brick or mortar type.
    - Change in window types, materials and installation design.
    - Change in a material's wear pattern or fading (of materials over time) where expansion joints exist within the building.
- Roof information (age, repairs, replacements, inspections).
- Architectural and structural drawings.
- Facility mechanical drawings.
- Historical DSHM assessments.
- Historical environmental, health and safety audits or reports.
- Historical DSHM abatement and/or management documentation.
- Project drawings (i.e. architectural, mechanical, electrical, etc.) and specifications of the proposed renovation / construction area:
    - Review of drawings should identify the precise area of work.
    - Consider demolition work as well as new construction work.
    - Consider mechanical, electrical, communication or security systems that will extend beyond the immediate area of work (i.e. to connect to base building systems).
    - Confirm which phase of design completion is represented in the drawings and specifications (e.g. concept phase, 30% design, 60% design, 90% design, issued for tender/permit, post tender, etc.).

Reasonable efforts should be made with site personnel to identify records that are available for review that are relevant to identifying and quantifying DSHM. The information from the records review should then be used to plan and/or refine pre-construction DSHM assessment tasks and be referenced in the pre-construction DSHM assessment report

NOTE: Not all historical information can be used. An assessment should be completed to determine the applicability, reliability and validity of relevant historical information provided. For example;

- Do historical investigations and sampling meet current regulatory requirements and Industry best-practice standards?
    - Have enough samples been collected for the quantity of material being assessed?
    - Does historical laboratory analysis meet current and required limits of quantitation / reporting limits / method detection limits?
- Was historical laboratory analysis of samples completed by a laboratory that was accredited (at the time of analysis) for the type of analysis performed?
    - Are laboratory certificates of analysis complete and legible?
    - Has reliance been provided for historical reports?
    - Are historical reports applicable to the current project work area?
- Are sample locations shown on a drawing or the location of the sampled material described in detail within the report?

4.2.3 INTERVIEWS

Past and present facility staff that are familiar with the building construction, renovations, facility management, maintenance, and chemicals/materials use at the site, and have more than 5 years of knowledge regarding the facility should be identified by the Project Team. The staff identified should be interviewed to obtain knowledge to supplement the site records review and related to the following:

- Roof information (age, repairs, replacements, inspections).
- Building age and construction materials.
- Renovations.
- Restricted areas, that may require special precautions to access including but not limited to the following:
    - Confined/Restricted spaces.
    - Height restrictions (e.g. to ceiling, to structure deck or underside of roof deck above ceilings).
    - Infection Control requirements for health care facilities.
    - Roof access.
    - Structural integrity of the building (i.e. assessment is needed of the building(s) to determine if there are site-conditions that may prevent typical inspections and testing for DSHM, such as; fire, flood or wind damaged; pest damaged; building systems or building materials that are damaged; damage because of building materials being used beyond their “life-expectancy”; building(s) that are purposefully moth-balled; and/or, condemned for any other reason; etc.).
- Presence of confirmed or assumed DSHM.

- Historical DSHM assessments or abatement activities.
- DSHM removals as part of maintenance (e.g., PCB light ballast replacement).
- Site-specific material knowledge (e.g., hidden lead shielding, encapsulated asbestos).
- DSHM generation and waste management activities.
- Status of building occupancy (e.g. full, partial, vacant, mixed, etc.).
- Type of occupancy in the building, to identify sensitive populations such as children, elderly, immunosuppressed individuals, etc.
- Type of building function, to identify sensitive operations such as medical practice, research and laboratory work, food preparation, etc.

4.2.4 PRE-CONSTRUCTION DSHM ASSESSMENT SITE INSPECTIONS

A pre-construction DSHM assessment cannot be completed without a site inspection, except in the case where all materials that may potentially contain designated substances or hazardous materials are going to be managed as if they do. This can result in delays and be a costly assumption, thus this approach is generally not recommended.

Where possible, site assessments should be conducted after the document review and the results of interviews with persons knowledgeable about the building construction, renovation and maintenance, use and history have occurred.

Competent persons conducting the pre-construction DSHM assessment should inspect the accessible areas of the project boundaries to determine the locations and approximate quantities of DSHM within these confines. At this time, samples of materials suspected to contain designated substances or hazardous materials, and which cannot be positively identified in the field should be collected. Sample collection, documentation and analysis is further detailed in **Section 6**.

Where possible, intrusive investigations should be completed to understand the building construction and to look for hidden materials. These intrusive assessments completely penetrate building finishes to reach base building structure and depending on the complexity of the project may include;

- Assessing multiple layers of flooring materials.
- Assessing multiple layers of wall finishes (e.g. drywall over plaster).
- Assessing multiple ceilings (e.g. drop ceiling below drywall or plaster ceiling).
- Assessing the complete profile of the building envelope (including exterior cladding, window assemblies, etc.).
- Assessing concealed shafts and pipe chases.
- Assessing wall profiles (e.g. concrete block cavities).
- Assessing roofing material profile from the surface to the structural deck.
- Assessing internal components of electrical or mechanical equipment (e.g. boilers).
- Assessing floor leveling compounds and/or base material used for stone flooring.
- Assessing below grade systems or items on the exterior of the building (e.g. caulking, mastics, water proofing, drainage pipes, etc.).
- Ceramic tile glazing, grout, thin set and leveling compounds.

QUANTIFICATION OF PRE-CONSTRUCTION DSHM:

- Quantification requirements and resolution, if applicable, should be predetermined and specified in the scope of work, prior to the start of pre-construction DSHM assessment activities. The resolution of quantification may be dependent upon the design phase and is dependent on how intrusive the pre-construction DSHM assessment is.
- Range of quantification options may include:
    - Absolute, specific and final quantities (e.g. for small projects and/or projects were limited DSHM are present in the work area). This level of quantification requires extensive investigations by qualified surveyors.
    - No specific quantities provided (i.e. generalization of abatement work will be sufficient for project-specific requirements).
    - Semi-quantification (i.e. within an agreed-to resolution, such as ± 10%, ±25%, ±50%, and/or within an order of magnitude for large projects).
- Quantification findings should be displayed on project drawings or tables with corresponding notations to indicate the level of quantification.
- Quantities may not be required at the time of assessment but are required when preparing abatement specifications for inclusion in abatement/construction/demolition contract documents.

4.3 DRAWINGS/FIGURES

The following information is useful for preparing drawings where required:

- Drawings should be project specific.
- Information on drawings may include the following, subject to project-specific requirements:
    - Sample locations;
    - Sample numbers;
    - Identification of sample type;
    - North arrow;
    - Key plan;
    - General drawing notes;
    - Hatching/symbols/notes for the findings of the DSHM;
    - Location of damaged materials;
    - Room names/numbers; and
    - Additional information that may be beneficial for the purposes of the assessment.
- Drawings should not be used as a stand-alone resource and should be read in conjunction with the report.
- Drawings may not be to scale.
- Drawings for pre-construction DSHM assessments are important and could range from a sketch showing approximate sampling locations to multiple CAD drawings for different building systems identifying every location of DSHM.
- Drawings are required for specifications and should include additional details.

4.4 VALIDITY OF PRE-CONSTRUCTION DSHM ASSESSMENT

Pre-construction DSHM assessments are valid for as long as there are no significant changes to the project area or changes to regulatory requirements (e.g. threshold limits) or regulatory requirements (e.g. asbestos surveys requiring updates at least annually or when new information becomes available). The pre-construction DSHM assessment should be project specific and should be reviewed immediately prior to the start of the construction if there have been delays in the construction project or a change in the project team.

5 PRE-DEMOLITION DSHM ASSESSMENT

Pre-demolition DSHM assessments are completed when a building or structure will be demolished. This level of investigation requires the assessment of all materials within the building or structure. Intrusive investigations are required to observe/inspect the building materials and building systems, including those behind finished surfaces.

This assessment may need to follow the tiered approach depending on building occupancy or client risk evaluation. Every effort should be made to identify DSHM that are present at the site before demolition work commences so that workers are not exposed to DSHM accidentally.

In addition to the information collected for a pre-construction DSHM assessment, a pre-demolition assessment should also include detailed intrusive investigations which completely penetrate the building finishes to reach base building structure. Intrusive investigations may include:

- Assessing multiple layers of flooring materials.
- Assessing multiple layers of wall finishes (e.g. drywall over plaster).
- Assessing multiple ceilings (e.g. drop ceiling below drywall or plaster ceiling).
- Assessing the complete profile of the building envelope (including exterior cladding, window assemblies, etc.).
- Assessing concealed shafts and pipe chases.
- Assessing wall profiles (e.g. concrete block cavities).
- Assessing roofing material profile from the surface to the structural deck.
- Assessing internal components of electrical or mechanical equipment (e.g. boilers).
- Assessing floor leveling compounds and/or base material used for stone flooring.
- Assessing below grade systems or items on the exterior of the building (e.g. caulking, mastics, water proofing, drainage pipes, etc.).
- Ceramic tile glazing, grout, thin set and leveling compounds.

Interviews with persons with knowledge about the building structure, construction and history of renovation are important to assist in determining where intrusive investigations will be most helpful, and where hidden materials may be located.

Since the building will be demolished, data gaps are undesirable and should be limited to those where the cost to obtain the information is greater than the cost to assume that the material contains DSHM. These assumptions need to be stated in the pre-construction DSHM assessment report.

5.1 ADDITIONAL DEMOLITION CONSIDERATIONS

Many items that are of concern during demolition are outside the scope of a pre-demolition DSHM assessment. Some of these items include:

- Additional sampling and analytical testing or assessment of DSHM exposed during demolition activities may be required.
- Structural assessments (of building to be demolished and neighbouring facilities).
- Construction waste audits/LEED certification.

- Historical contamination (e.g., Phase I Environmental Site Assessment).
- Subsurface Investigations (e.g., Phase II Environmental Site Assessment).
- Vibration assessments.
- Equipment inventory and status (e.g., in use, empty, cleaned, flushed).
- Additional expertise should be consulted, where needed, to review the above noted additional demolition considerations.

6 SAMPLING AND ANALYTICAL

6.1 WHAT TO SAMPLE?

Determining what to sample is at the discretion of the competent person(s) conducting the DSHM assessment in accordance with the agreed-to scope of work.

In general, physical samples of materials suspected to contain DSHM (generally asbestos, lead or mould) are to be collected by a competent person and analyzed by a laboratory accredited for the analytical method performed. Some DSHM (e.g. mercury, silica, PCB's) may be assessed on a visual basis (i.e., without sampling), however caution should be exercised, and rationale provided in the assessment report.

Typically, small quantities of the suspect DSHM material are collected and directly placed in a sealable container such as a polyethylene zipper sealed bag (for solid materials) or laboratory supplied containers (for liquid materials). Some materials such as vermiculite require larger sample volumes. Refer to **Section 6.4** below regarding vermiculite. For transportation and delivery of samples to the laboratory, all bulk or liquid samples should be placed into a clean larger bag (i.e., double-bagged).

Collection tools must be adequately cleaned between samples to prevent cross contamination.

For asbestos, enough samples should be collected to satisfy the bulk sampling frequency outlined in Table 1 below in accordance with O. Reg. 278/05. The potential exists that O. Reg. 278/05 may be updated or revised. The most recent version of the Ontario's asbestos sampling frequency should be used.

TABLE 1: BULK SAMPLING FREQUENCY

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

The competent person conducting the DSHM assessment may decide to use stop-positive analysis, where the analysis of the sample subset stops at the first positive identification of asbestos above the regulated

threshold. This approach should be discussed with the project stakeholders as assumptions made using this approach could significantly impact project budgets.

For DSHM other than asbestos, one sample of each homogeneous suspect material may be adequate, at the discretion of the competent person conducting the assessment referencing other applicable regulations, codes, standards, guidelines or industry best practice. Additional samples and/or analysis may be required if multiple layers are suspected and for each phase of construction and/or renovation of the facility.

Samples of suspect materials should be collected separately from each construction phase (homogeneous areas).

Sets of samples should be collected from original building components where possible such as perimeter walls, base building systems, etc. Separate sets of samples should be collected from areas that are suspected or known of being renovated since the time of the original construction.

Paints should be sampled and analyzed for lead and the results interpreted in accordance with the EACC Lead Guideline for Construction, Renovation, Maintenance or Repair and other applicable regulations.

Oils, especially older transformer oils where adequate labeling or testing information is not available, may require sampling to confirm PCB content. If included in the scope of work, sampling and analysis of oil should be conducted by competent persons and incorporate the assistance of licensed electricians to ensure that the equipment is not energized.

6.2 SAMPLE DESCRIPTION/LAYERS

A number of different types of building components consist of multiple phases/layers, such as roofing layers, plaster finish and base coat, flooring and mastic or pipe insulation and wrap. According to USA EPA/600/R-93/116 "*when a sample consists of two or more distinct layers or building materials, each should be treated as a separate sample, when possible. Thin coatings of paint, rust, mastic, etc., that cannot be separated from the sample without compromising the layer are an exception to this case and may be included with the layer to which they are attached.* USA EPA/600/R-93/116 further indicates *"For materials composed of distinct layers or two or more distinct building materials, each layer or distinct building material should be treated as a discrete sample. The layers or materials should then be separated and analyzed individually. Analysis results for each layer or distinct building material should be reported.*"

For additional clarity, it is EACC's interpretation that according to the analytical requirement of O. Reg 278/05 and EPA/600/R-93/116, intentional homogenization of sample layers is not permitted.

6.3 SAMPLE IDENTIFICATION

Each sample should be labeled to provide following information (at a minimum):

- Unique identification number that correlates to:
    - Building Name or Address.
    - Room/Location identifier.
    - Description of material.
    - Date of collection.

6.4 ANALYTICAL METHODS/SENSITIVITIES/LIMITATIONS

The following analytical methods are recommended when analyzing asbestos samples for determining asbestos content:

6.4.1 POLARIZED LIGHT MICROSCOPY (PLM)

Polarized Light Microscopy (PLM) is the industry standard and regulated analytical method used to identify asbestos in bulk samples of building materials in Ontario. PLM can be limited by the visibility of asbestos fibres under the microscope and some sample fibres may be so small that they cannot be identified by PLM which can result in false negatives. Vinyl floor tiles fall may in this category (Non-Friable Organically Bound - NOB) due to finely milled asbestos used during manufacturing as a strengthening/binding agent. The EPA/600/R-93/116 reference method considers these materials difficult to analyze and recommends additional analyses to confirm a non-asbestos containing material. Some organic matrix components of building materials, if not removed during the PLM analysis by chemical and heat sample reduction also limit the ability to identify asbestos by PLM and can result in false negatives.

In general, the more organic matrix material that can be removed (using appropriate solvents or by ashing) and tracked gravimetrically, the fewer interferences will remain. As a result, the analytical analysis should be more accurate and reliable.

6.4.2 TRANSMISSION ELECTRON MICROSCOPY (TEM)

Transmission Electron Microscopy (TEM) is capable of analyzing samples at magnification of 10,000x or higher, compared to PLM at 400x. TEM may allow for more accurate asbestos concentration estimations in samples that contain very small thin fibres unresolvable by PLM, as in vinyl floor tiles.

6.4.3 *VERMICULITE*

Vermiculite samples require larger sample volumes when collected for PLM and TEM analysis for asbestos. The vermiculite samples should include fine dust and particulates as this is where asbestos is often concentrated and most easily identified analytically. Refer to EACC Vermiculite Guideline (EACC, January 2015) for further details regarding the collection and analysis of this material.

6.4.4 REFERENCE ANALYTICAL METHODS

Reference Methods for asbestos analysis include the following:

- USA EPA/600/R-93/116.
- NIOSH 9002 Method.
- EPA/600/R-04/004 (January 2004).

6.4.5 LEAD

The following table is a summary of analytical methods for lead, applicable to a specific sample matrix (i.e. paint chips, solids, dust wipes, air), and an example of a limit of detection for each method. The Limit of Detection may be different for each accredited laboratory; therefore, the laboratory should be consulted if additional information or clarification is required.

TABLE 2: LEAD ANALYTICAL PROCEDURES

Method	Matrix	Limit of Detection (LOD)	Weight/Area/ Volume Required for the LOD
Flame Atomic Absorption Spectrometry			
SW846-7000B	Paint Chips	80 mg/Kg (0.010% wt.)	0.25 g
	Solids	40 mg/Kg (0.004% wt.)	0.5 g
	Dust (wipes)	10 µg/ft^2	144 in^2
NIOSH 7082	Air	0.004 mg/m^3	1000 L
Inductively Coupled Plasma Atomic Emission Spectrometry			
SW846-6010B/C	Solids	1 mg/Kg (0.0001% wt.)	0.5g
	Dust (wipes)	0.5 µg/ft^2	144 in^2
NIOSH 7300 modified	Air	0.0005 mg/m^3	1000 L
Graphite Furnace Atomic Absorption Spectrometry			
SW846-7010	Solids	0.3 mg/Kg (0.00003% wt.)	0.5 g
	Dust (wipes)	0.075 µg/ft^2	144 in^2
NIOSH 7105	Air	0.00003 mg/m^3	1000 L

For projects that will generate significant quantities of lead-contaminated waste, it is important to understand the waste stream and how the waste will be processed. Sampling of the waste stream will likely be necessary to classify the waste in accordance with Ministry of Environment, Conservation and Parks requirements as noted in **Section 8** of this document.

For additional information regarding Lead in Construction please refer to the EACC Lead Guideline for Construction, Renovation, Maintenance or Repair - October 2014.

7 REPORTING

The content and requirements of the DSHM assessment report may vary based on the design phase of the project and how intrusive the DSHM assessment has been.

7.1 LIMITED SCOPE/EMERGENCY RESPONSE PRE-CONSTRUCTION DSHM ASSESSMENT

For a pre-construction DSHM assessment of limited scope, a letter report may be prepared. The report should include a description of the scope of work, any historical documentation reviewed, or interviews conducted, definition of the project area, and results of sampling and inspection. The letter may provide recommendations for immediate activities to address DSHM or for further investigation.

7.2 REPORTING FORMAT AND INFORMATION

For detailed assessments that are not of limited scope as noted in **Section 7.1** above, the data collected in the assessments outlined in Section 4 and Section 5 should contain the following information:

- Title Page.
- Executive Summary:
  - List confirmed or suspected DSHM found during assessment.
  - Provide high level recommendations.
  - Limitation that executive summary should be read in conjunction with full report.
- Table of Contents.
- Introduction.
- Scope of Work/Methodology:
  - Purpose:
    - Reference to this Guideline may be included in this section,
  - Summary of regulatory requirements with further detail in referenced appendix.
  - Survey/Sampling Methodology:
    - Discuss access or assessment limitations including accessibility of areas, destructive limitation, materials investigated.
    - Laboratory information including accreditation information, analytical methods used and detection limits.
  - Historical Reports:
    - Reference historical designated substance assessments, hazardous materials assessments and/or hazardous materials abatement reports.
    - Include limitation on the reliability of the information.
- Site Overview:
  - Description of Building(s)/Facility/Work Areas.
  - Type, Age, Construction, Number of Levels.
  - Building Interior/Exterior Finishes.
  - Heating System.

- Type of insulation on mechanical supply and distribution systems.

- Discussions/Findings/Recommendations:
  - Separate sections for each DSHM identified during site reconnaissance. These sections should include:
    - Number of samples collected and analyzed.
    - A list of description of presumed or suspected DSHM within the work area.
    - Analytical results for the samples collected.
    - Approximate locations of confirmed DSHM within the work area.
    - Recommendations for remedial actions with consideration of planned site activities.
  - Other DS and/or HM not observed at the Site should be summarized.
- Limitations:
  - Include general limitations to the assessment.
- Appendices:
  - Regulatory Requirements.
  - Drawings (refer to **Section 4.3** above):
    - Small Project - drawings recommended but not required.
    - Large or Major Projects – Drawings required to show at least sample locations.
    - Drawings identifying all removals/abatement required or recommended.
- Tables:
  - Sampling and analytical results.
  - Confirmed asbestos-containing and lead-containing materials.
- Site Photographs.
- Laboratory Certificates of Analysis.
- Historical Reports, if applicable.

7.3 SPECIFICATIONS

Project specifications should be prepared for projects that are being tendered. The specifications should incorporate the information provided in the pre-construction DSHM assessment as well as outline the scope of work for the abatement and/or decommissioning of DSHM identified in the report.

Specifications should include quantities, at a minimum, for asbestos and lead-containing materials confirmed to be present within the work area. The specifications may be prepared in accordance with the “National Master Specifications" as per the National Research Council Canada, or other format as specified by the client.

8 WASTE

8.1 WASTE CLASSIFICATION AND HANDLING

Ontario Regulation 347 defines hazardous waste through a listing and testing approach. Generators of subject wastes are required to register all hazardous wastes by submitting a Generator Registration Report (GRR) every year between January 1 and February 15 and to pay an associated generator registration fee.

Under this regulation, waste generators are required to evaluate their wastes and, if the wastes are determined to be a subject waste, to submit a GRR to the Ontario Ministry of Environment, Conservation and Parks (MECP). Under Ontario law, it is a provincial offence to store, process, dispose or transport liquid industrial or hazardous wastes unless a generator registration document for the generator has been posted on the Hazardous Waste Information Network (HWIN).

The registration of subject wastes takes place in two steps:

Step 1: Determine whether or not you need to register your waste.

Step 2: Complete and submit the annual Generator Registration Report (GRR).

8.2 WHAT IS A WASTE?

Various wastes are defined and classified in Ontario Regulation (O. Reg.) 347. Waste includes all materials that are normally considered waste - such as ashes, garbage, domestic waste, industrial waste, commercial waste, construction debris and residues from industrial and commercial activities. The following section outlines the different types of hazardous wastes that may be encountered during a pre-construction DSHM assessment.

8.2.1 WHAT IS A HAZARDOUS WASTE?

Hazardous wastes are wastes that, when present in quantities and concentrations that are high enough, pose a threat to human health or the environment if they are improperly stored, transported, treated or disposed. Accordingly, hazardous wastes require special handling and management. To manage hazardous wastes appropriately, there should be systematic control of how they are collected, stored, transported, treated, recovered and disposed.

Hazardous wastes include:

LISTED WASTES:

Listed wastes include specific waste streams and wastes from industrial processes, waste chemicals and severely toxic wastes. A listed waste is defined in Regulation 347 as a hazardous waste that is: an acute hazardous waste chemical (Part A of Schedule 2); a hazardous industrial waste (Schedule 1); a hazardous waste chemical (Part B of Schedule 2); or, severely toxic waste (Schedule 3). These schedules of Regulation 347 identify the listed wastes and their associated treatment requirements.

CHARACTERISTIC WASTES:

Characteristic wastes are identified through testing. Characteristic waste is defined in Regulation 347 as hazardous waste that is: corrosive waste; ignitable waste; leachate toxic waste; or, reactive waste. Schedule 5 of Regulation 347 identifies the characteristic wastes and their associated treatment requirements.

PATHOLOGICAL WASTES:

Pathological wastes include human and animal remains and other non-anatomical waste that is infected with a communicable disease. Pathological wastes are included in the biomedical waste definition in Guideline C-4, Management of Biomedical Waste, which provides best management practices to generators, carriers and receivers of biomedical waste.

PCB WASTES:

PCB waste has the same meaning as in Regulation 362 and includes PCB equipment, PCB liquid or PCB material.

RADIOACTIVE WASTES:

Radioactive waste - except radioisotope wastes that are produced as part of the nuclear fuel cycle and are disposed of in a landfill site in accordance with the written instructions of the Canadian Nuclear Safety Commission, formerly the Atomic Energy Control Board - is considered to be hazardous waste. The Ministry of the Environment and Climate Change regulates radioactive waste that contains naturally occurring radioactive material on a case-by-case basis. Generators of radioactive waste should contact the Ministry for further information on the appropriate management of waste that contains naturally occurring radioactive material (NORM).

REMEDIATION WASTE

Industrial sites may become contaminated through spills of hazardous waste or product chemicals, or through historical management practices. Wastes that are generated when such sites are being de-contaminated are called remediation wastes.

WASTE THAT IS DEBRIS

Debris or a debris mixture can include glass, metal, plastic, brick, concrete, wood and other, similar materials that are produced during site remediation or building demolition. Debris or a debris mixture that is considered to be hazardous waste may be contaminated with either a listed waste or a characteristic waste. As with remediation waste, if debris or a debris mixture is known to have been contaminated by a listed waste, it should be managed in accordance with the rules for the listed waste with which it is contaminated. However, where the source of contamination is due to historical practices at a site, and debris or a debris mixture is not known to have been contaminated by a listed waste, the debris or debris

mixture is only considered to be hazardous if it exhibits a hazardous waste characterization other than the listed waste characterizations.

SMALL QUANTITIES EXEMPTION (SQE)

The regulation provides exemptions for some types of SQE waste under the definitions of LIW and hazardous waste. The exempted quantities vary, depending on the characterization of the specific waste. As a result, the exemption cannot be confirmed until the waste has been evaluated and the primary waste characterization established. Although small quantities of a waste may be considered non-hazardous, and thus exempt from generator registration and manifesting requirements, the small quantity is still considered to be waste, and should be transported by an appropriately approved waste carrier and disposed of at an approved facility.

ASBESTOS WASTE:

In Ontario Regulation 347, Asbestos Waste means the following solid or liquid waste that contains asbestos in more than a trivial amount:

- Waste that results from the removal of asbestos-containing construction or insulation materials.
- Waste that results from the manufacture of asbestos-containing products.
- Waste that results from the removal of asbestos-containing components from a motor vehicle.
- Waste that results from the removal or handling of waste or materials described in paragraphs 1, 2 and 3, including personal protective equipment, tools that cannot be decontaminated and cleaning materials;

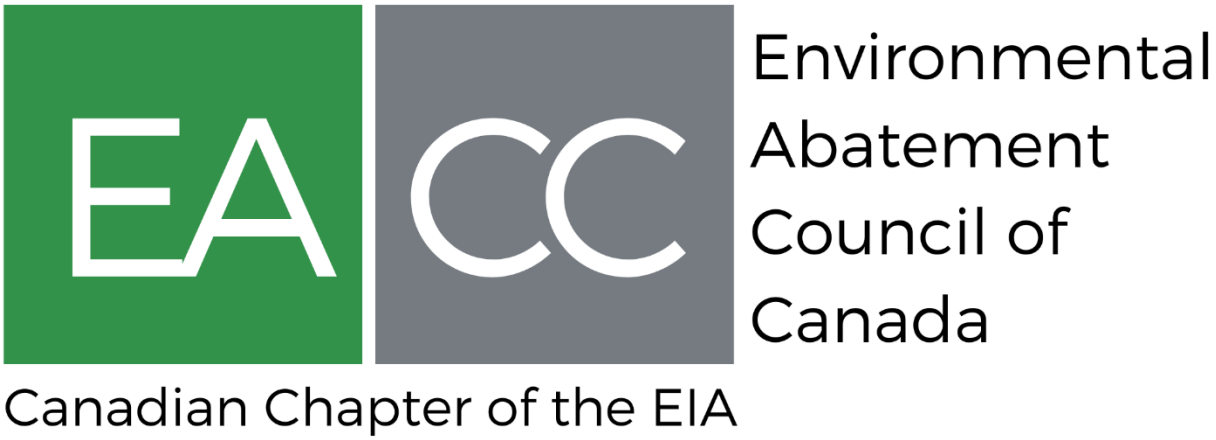
LEACHATE TOXIC WASTE:

“leachate toxic waste” means a waste producing leachate containing any of the contaminants listed in Schedule 4 of Ontario Regulation 347, at a concentration equal to or in excess of the concentration specified for that contaminant in Schedule 4 using the Toxicity Characteristic Leaching Procedure.

EACC

Pre-Construction Designated Substances and Hazardous Materials Assessments

Guideline for Construction, Renovation and Demolition Projects



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Appendix 1

APPENDIX I **COMMON MATERIALS CONTAINING DESIGNATED SUBSTANCES**		
Acrylonitrile	Acrylonitrile (ACN) is used mainly as a monomer or comonomer in the production of synthetic fibres, plastics and elastomers. It is not generally found in building materials but may be a component of ABS plastics and other plastic-based items.	
Arsenic	Wood Preservatives Smelters Glass Production Pesticides	
Asbestos (Actinolite, Amosite, Anthophyllite, Chrysotile, Crocidolite, Tremolite),	Acoustical Plaster Asphalt, Floor Tile Base Flashing Blown-in (Loose fill) Insulation Boiler and Breaching Insulation Caulking/Putties/Sealants Ceiling Tiles and Lay-in Panels Cement Pipes or Siding (Transite) Construction Adhesives and Mastics Decorative Plaster Ductwork Fabric Connections Electrical Cloth Electrical Panel Partitions Electrical Wiring Insulation Elevator Brake Shoes Elevator Equipment Panels Fireproofing Materials Firestop	Glazing compounds Heating and Electrical Ducts High Temperature Gaskets HVAC Duct Insulation Joint Compounds Mortar/adhesives Levelling compounds Pipe Insulation Roofing Felt, tars and mastics Roofing Shingles Spackling Compounds Sprayed-on Insulation Paints/Coatings Thermal Taping Compounds Thermal Paper Products Vinyl Floor Tile Vinyl Sheet Flooring Vinyl Wall Coverings Wallboard
Benzene	Gasoline, intermediate in chemical/polymer production, often used in stable form in paints and adhesives.	
Coke Oven Emissions	The benzene soluble fraction of total particulate matter (BSFTPM) of the substances emitted into the atmosphere from metallurgical coke ovens including condensed vapours and solid particulates. Not found in building mateirals.	

APPENDIX I **COMMON MATERIALS CONTAINING DESIGNATED SUBSTANCES**	
Ethylene Oxide	Ethylene oxide is a flammable, colorless gas used to make other chemicals that are used in making a range of products, including antifreeze, textiles, plastics, detergents and adhesives. Ethylene oxide also is used to sterilize equipment and plastic devices that cannot be sterilized by steam, such as medical equipment. Not generally found in building materials.
Isocyanates	Isocyanates may be found in paint finishes, varnishes, polyurethane plastics, synthetic rubbers, foams and adhesives.
Lead	Paints Water Pipes Mortar Radiation Shielding Batteries Solder
Mercury	Light Bulbs and Tubes Switches Laboratory drains Gauges Electrodes Thermometers/Thermostats
Silica	Concrete materials (Poured, Brick, Block) Granite Blasting Abrasives Mortar Cement
Vinyl Chloride	Generally used in stable form in pipes, conduits and interior finishes.