

PART 1: GENERAL

1.1 SUMMARY

- .1 As part of the reconstruction project for the Grande Allée Armoury in Québec, we present the safe work procedures and specific requirements pertaining to the execution of work with asbestos containing materials.
- .2 The description and scope of work to be conducted under this project are defined below. Work areas and the list of work to be done have been determined based on existing conditions found during our inspection, as well as information and. The description and scope of work herein are provided for information only and do not necessarily constitute an exact and full scope of the work and interventions to be perform. Interventions, tasks, and work to be performed are more precisely defined on the demolition plans and the specifications. During the site visit, the Contractor has the responsibility for assessing the tasks and work to be performed and for bidding based on the conditions encountered.
- .3 Work areas for decontamination and stabilization of hazardous materials will be defined for three distinct sectors: the east portion, the west portion, and the central portion of the Grande Allée Armoury in Québec. Typical work involving presence of asbestos includes, without limitation:

EAST PORTION

The rooms and sectors covered by this phase of work are defined by all rooms, stairwells, service spaces and areas of level 0, 1, 2, 3 and 4 (Attic). Information and notes defining the scope of work are presented on the demolition plans and the specifications. The Contractor on site will assess and quantify all affected spaces and areas.

In this respect and in as many areas of work as needed and where needed, the Contractor shall define high-risk work areas to carry out the demolition, brushing, curettage, surface cleaning and stabilization of materials (cement, plaster) covering the walls. This work shall be performed in accordance with high risk indoor work requirements presented in this document.

WEST PORTION

The rooms and sectors covered by this phase of work are defined by all rooms, stairwells, service spaces and areas of level 0, 1, 2, and 3 (Attic). Information and notes defining the scope of work are presented on the demolition plans and specifications. The Contractor on site will assess and quantify all affected spaces and areas.

In this respect and in as many areas of work as needed and where needed, the Contractor shall define high-risk work areas to carry out the demolition, brushing, curettage, surface cleaning and stabilization of materials (cement, plaster) covering the walls. This work shall be performed in accordance with high risk indoor work requirements presented in this document.

CENTRAL PORTION

The rooms and sectors covered by this phase of work are defined by all rooms, stairwells, towers, walls and structures present in the central portion of the Grande Allée Armoury in Québec. Information and notes defining the scope of work are presented on the demolition plans and specifications. The Contractor on site will assess and quantify all affected spaces and areas.

In this respect and in as many areas of work as needed and where needed, the Contractor shall define high-risk work areas to carry out the demolition, brushing, curettage, surface cleaning and stabilization of materials (cement, plaster) covering the walls. This work shall be performed in accordance with high risk outdoor work requirements presented in this document.

- .1 The implementation of interventions with asbestos containing materials will aim to eliminate or stabilize them to ensure safe places and allow the progress of the reconstruction of the Armoury Grande Allée in Québec to occur.
- .2 The purpose of this protocol is to outline the specific requirements of tasks such as cleaning, stabilization, decontamination, removal and disposal of asbestos containing materials. The work, therefore, will aim, among other things, to ensure, eliminate or stabilize certain materials and to clean the sectors in order to restore normal conditions of occupancy and thereby allow the reconstruction of the building to continue.

1.2 RELATED REQUIREMENTS

- .1 This section should be read in conjunction with other sections of the specifications, plans and all clauses and instructions. The related sections are as follows:
 1. Section 040306: Historic - Cleaning masonry
 2. Section 090120: Plaster or sealer repairs
 3. Section 090351: Historic - Plaster coating
 4. Section 060315: Historic - Splicing of wood components
- .2 The Contractor will be required to ensure that the foreman in charge of decontamination is present at all times during the execution of this work, for both supervision operations with its own employees as well as with other parties.
- .3 For the entire duration of the work, the Contractor shall see to the integrity of the owner's equipment and, in case of breakage (e.g.: water leak), the Contractor will assume the repair work. In the event that repairs are not made within the time frame deemed reasonable by the owner, the owner will assume the repair work and costs shall be borne by the Contractor responsible for damages.
- .4 The Contractor and his workers must comply with any other rules (e.g.: access to the site...) required by the departmental Representative.
- .5 The Contractor shall provide and make available a street-clothes locker room with two complete new sets of protective clothing and respirators (including HEPA filter cartridges).

Masks and protective clothing shall be used only for this purpose and shall be available at all times.

- .6 The Contractor shall take into consideration that some of the work will need to be performed at an elevation.
- .7 The Contractor shall provide for the installation of additional lighting.
- .8 Other than the ones appointed by the Contractor to work with asbestos containing materials, every worker who requires access to contaminated sites must have received prior training on work methods and procedures on entering and exiting the work site, as well as on measures and means of dust control.

1.3 REFERENCES

- .1 Determination of asbestos containing materials, of their scope and of the condition of the materials was carried out in May and June 2010 with the mandate entrusted to MHV Services d'hygiène industrielle inc. An initial phase of rehabilitation work was then carried out from October 2010 to April 2011 to remove and stabilize some of the asbestos containing materials found in the building.
- .2 All work performed in the presence of asbestos must be accomplished in accordance with the most recent laws, regulations, codes and ordinances applicable and in force at the time of performance of the contract. The following standards and recommendations shall be observed for any work involving the handling of materials containing these products:
 - Act Respecting Occupational Health and Safety (LSST, Chapter S-2.1)
 - Occupational Health and Safety Regulations (S-2.1, r.13)
 - Safety Code for the Construction Industry (S-2.1, r.4)
 - Canada Labour Code, Part II, X and XIV
 - PWGSC Departmental policy (DP057) - Asbestos management
 - Hazardous Materials Regulations (R.Q. c. Q-2, r.32)
 - Transportation of Dangerous Goods Regulations
 - Workplace Hazardous Materials Information System (WHMIS) / Health Canada
- .3 More specifically for asbestos and according to Article 2.4.1 of the *Safety Code for the Construction Industry*, the Contractor shall submit to the Commission de la santé et de la sécurité du travail (CSST) a written notice about the opening of the construction site at least 10 days before the commencement of operations on the site. The Contractor shall also submit to the CSST a written notice of the closing of the site at least 10 days before the scheduled end of the work on the site, unless the site is open for less than one month, in which case the notice must be sent at least 10 days before the commencement of operations on the site.

The Safety Code for the Construction Industry specifies that the information which must be provided in this notice, including the nature of the project, the methods, and processes used, as well as proof of the existence of a training program are in compliance with Article 3.23.7 of the Safety Code.

1.4 DEFINITIONS

- .1 WORK AREA: area where asbestos containing materials are removed. Area completely isolated from surrounding sections.

- .2 DECONSTRUCTION: thorough and systematic dismantling of the elements of a structure for preservation purposes. These elements must be identified and stored on site at the location indicated by the Departmental Representative, in preparation for their possible relocation.
- 3 DISMANTLING: removal of elements to provide access (usually finishing trims) and to preserve other elements that are near or behind, mainly being the building structure. The removed elements are considered waste and should be treated as such (transport and off-site disposal).
- .4 DEMOLITION: demolish elements with or without prior removal of hazardous materials they contain, but with no other special precautions. These elements are considered hazardous waste and must be treated as such (transport and off-site disposal).
- .5 DEPRESSION: negative pressure in a work area in which the air is extracted and then evacuated to the outside via a series of high efficiency filters (HEPA). The vacuum system must maintain a pressure difference of at least 5 Pa between the work area and adjacent areas. The system must be equipped with a malfunction alarm (gauge) and a device for the continuous monitoring and automatic recording of pressure differences.
- .6 BREATHABLE ASBESTOS FIBER: asbestos fiber with a diameter of less than 3 microns and a length to diameter ratio greater than 3:1. Only fibers longer than 5 microns will be taken into account for measurement purposes.
- .7 ASBESTOS CONTAINING MATERIAL: material where the concentration in asbestos is of at least 0.1%.
- .8 BRITTLE MATERIAL: material that can be crumbled, pulverized, or reduced to powder by hand when dry or that is crumbled, pulverized, or reduced to powder.
- .9 PCM: Phase Contract Microscopy analysis performed in order to count total breathable fibers.
- .10 TEM: Transmission Electron Microscopy performed to determine the presence of breathable fibers.
- .11 PLM: Polarizing Light Microscopy analysis to determine the type and level of asbestos.
- .12 ASBESTOS DUST: airborne asbestos particles or particles that are deposited and susceptible of becoming airborne in ambient air.
- .13 AIR LOCK: construction, usually consisting of two doors installed at 2 meters of one another, allowing the entry and exit of personnel, of material and equipment between a contaminated area and an uncontaminated area, without any trace of air exchange or movement between the two areas.
- .14 DOP TEST: verification of the efficiency of a HEPA filter using dioctyl phthalate.
- .15 AUTHORIZED VISITOR: owner, PWGSC technical advisor or Departmental Representative and any official government agency representative.

- .16 DECONTAMINATION AREA: site where decontamination, removal and disposal of hazardous material work is performed.

1.5 SUBMISSIONS

- .1 The Contractor shall provide the documents and information referred to in this section in addition to responding to those listed in other sections in the specification.
- .2 At least 10 days before the commencement of work, the Contractor specializing in asbestos management must submit a notice of commencement of construction work involving the presence of asbestos in accordance with Article 2.4.1. of the Safety Code for the Construction Industry of Québec.
- .3 Licenses or permits necessary to perform the work.
- .4 Program of accident prevention.
- .5 Provide evidence of training and the list of workers who will be designated as first responders on site.
- .6 Certification of attendance of a Health and Safety course on construction sites for each worker.
- .7 Proof of WHMIS Certification for each worker.
- .8 A certificate stating that workers have received adequate training about risks, and safe work practices when working with asbestos containing materials.
- .9 Evidence that workers were instructed on the use of respirators.
- .10 Evidence of experience of the foreman on site and evidence that workers under its jurisdiction have obtained a job number issued by the Commission de la Construction du Québec to work on a construction site.
- .11 Presentation of the design and construction plans for the decontamination air-lock areas and vacuum systems for each work area provided for assessment and approval by the Departmental Representative as well as by the firm responsible for overseeing the work.
- .12 Material Safety Data Sheets and/or technical sheets of products used on site such as sealant, fungicide and any other chemical or potentially hazardous product used on site.
- .13 Certificates of DOP leakage tests for vacuum units and vacuum cleaners used on site. Testing and certification shall be carried out on site after receipt of the equipment.

- .14 A record of all persons entering the work area should be maintained by the Contractor. These records should include:
 - Name and signature of the employee;
 - Log in and log out time and date;
 - Type of respirator used.
- .15 Submit a clear timetable for decontamination work including the execution order for demolition, cleaning and inspection.
- .16 Steps to take in case of an emergency, which should include, the location of emergency exits in the work area as well as exits for evacuation of the building.
- .17 All these documents must be included in the adapted prevention program for the Contractor and at all times be available on site for consultation and verification purposes.

1.6 QUALITY ASSURANCE

- .1 All work performed in the presence of asbestos must be in accordance with the most recent laws, regulations, codes and ordinances applicable and in force at the time of performance of the contract. Where there is discrepancy between this section and other sections of these specifications or regulatory agencies, the most stringent requirements apply.

1.7 HEALTH AND SAFETY

- .1 Respiratory protection
 1. Workers will be provided with a respirator appropriate to the level of asbestos exposure in the work area.
 - Respiratory protection must be a powered air purifying full-face mask equipped with a high-efficiency filter (HEPA).
 2. All masks must be approved by the National Institute for Occupational Safety and Health (NIOSH) for protection against asbestos. Filters used must be of high-efficiency grade. A new filter must be supplied to workers on a daily basis. Filters in sufficient quantity should be placed in the clean-clothes locker room. This equipment shall be selected, fitted, used and maintained in accordance with CSA Z94.4-93 “Selection, Care and Use of Respirators.”
 3. Respirator must be tightly fitted to the face of the person. When it is provided for the use of a single worker, the respirator must be cleaned, disinfected, and inspected after each shift (or more frequently if necessary); this must occur after each use when the respirator is used by more than one worker. Any part of the respirator that is damaged or deteriorated should be replaced before usage by a worker. When the respirator is not used, it should be stored in a clean, sanitary, and convenient location. No worker shall be assigned to a task requiring the use of a respirator if he does not have the physical ability to perform the task.

4. Long beards, sideburns, or mustaches are prohibited. The Contractor will be responsible for ensuring that each worker meets this requirement before entering the work area. Any worker who does not meet this requirement will be denied access to the site.
 5. Before commencing the work, give workers the necessary instructions on proper use of protective respiratory equipment and protective clothing, the procedures for entering and exiting the work area, as well as any other information pertaining to safe work practices.
- .2 Protective clothing
1. Protective clothing must be worn by each person entering the work area. It must consist of material that does not easily retain asbestos fibers and that does not allow their penetration. Disposable coveralls must be disposed of in the same way as asbestos waste. The Contractor shall provide clean protective clothing to every worker for every shift.

The clothing must cover the entire body, including the head, be tight at the wrists and ankles and cover the neck. In case of ripping, it must be replaced.
 2. Waterproof disposable gloves must be worn by each person entering the work area.
 3. Safety boots should be of rubber and equipped with non-slip soles. Other parts of the body will be protected in accordance with the requirements of the Safety Code for the Construction (S-2.1, r. 4).
- .3 Protection of visitors
1. Anyone visiting the work area (or decontamination spaces) must be provided with a protective suit and an approved respirator.
 2. For the entire duration of the work, the Contractor shall have two complete new sets of protective wear and respiratory protection (including HEPA filter cartridges) for the owner and departmental representatives as well as those of the Engineers and Architects Consortium.
 3. Authorized visitors will be given the necessary instructions on proper use of protective respiratory equipment, protective clothing and on procedures for entering and exiting the work area, as well as any other information pertaining to safe work practices.
- .4 Procedures for entering and exiting a work site
1. Entering

First, the worker will remove all his or her clothing in the locker room dedicated to street clothes. A locker will be provided for each worker. They must then put on protective clothing and safety boots, inspect their respirator and put it in place to check the fit and finally slip on the safety helmet. The cap of the protective clothing must be placed over the straps of the mask. The helmet must be worn over the cap. Once the mask installed, the worker will head towards the work-clothes locker room via the shower stalls. During the entering procedure, the showers are not in operation. In the work-clothes locker room, the worker will need to pull on his boots (equipped with non-slip soles) and gloves.

2. Exiting

Before exiting the work area, the employee must perform a preliminary decontamination of the protective clothing, including the boots*, helmet, and mask exterior using a vacuum cleaner equipped with a high-efficiency filter or using a damp cloth. Thereafter, the worker must enter the work-clothes locker room, take off all his protective clothing except his protective mask, which needs to be removed in the shower.

Disposable protective clothing shall be placed in containers dedicated to storage of asbestos waste. If reusable protective clothing are used, these should be placed in containers filled with water immediately after removal.

Still wearing his or her mask, the worker must head to the shower naked, where he or she will clean the outside of the mask with water while showering. If the mask contains cartridges that need replacement, they should be removed, moistened thoroughly and then placed in a container provided for this purpose. After showering, the worker may enter the street-clothes locker and put on his street clothes.

* Please note that safety boots used in the work area should be left in the work-clothes locker room. These boots can be reused at the end of the work duration if they are properly cleaned.

.5 Prohibitions

During work, it is strictly forbidden:

1. To use compressed air in a place where asbestos is handled or removed, except for the breathing air required for operation of a respirator;
2. To smoke, drink, eat, or chew gum in the work area;
- 3.
4. To wear a beard or long sideburns with a respirator.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Management, recovery, processing and disposal of contaminated residues and waste must be carried out in accordance with the procedures and methods defined below.
- .2 All contaminated residues, debris and waste must be removed quickly from the work area. The Contractor shall proceed by bagging residues or using a vacuum equipped with a HEPA filter.
- .3 Wastes will be carefully packed in bags with a minimum thickness of 6 mils. This waste includes scrap of asbestos containing materials, disposable coveralls, rags and sponges used for cleaning, used mask cartridges, in short, any contaminated material except for the tools that should be cleaned after use.
- .4 Each garbage bag or sealed barrel should be washed thoroughly with a damp cloth, a water spray or a HEPA vacuum, and each bag must be doubled in a second pre-identified bag with a minimum thickness of 6 mils before being removed from the work area.

- .5 Waste must be stored in marked containers as indicated below:

Asbestos containing material Toxic by inhalation Keep container tightly closed Do not breathe dust

(Reference to the Safety Code for the Construction Industry: S-2.1, r.4, art.3.23.13).

- .6 Whenever possible, try to avoid overloading containers, especially bags.
- .7 Waste should be disposed of in a landfill under the responsibility of the Contractor specialized in decontamination. The Contractor shall handle and dispose of waste in compliance with the CEPA, the TDGA as well as the regulations prescribed by the Government of Québec and the cities concerned.
- .8 The Contractor shall notify the company that manages the authorized site that unloaded materials contain asbestos fibers and ensure that all the handling personnel has received the necessary instructions concerning waste management after landfilling.
- .9 The Contractor shall specify how the waste should be removed from the work area and site.
- .10 The Contractor shall provide the Customer with a hazardous waste manifest for the waste transported to the authorized site. The Contractor must also hand in the slips provided by the transport company. The word “asbestos” must be stated on the slips.

1.8 EXISTING CONDITIONS

- .1 Determination of asbestos containing materials, their scope and their condition was carried out within the mandate entrusted to MHV Services d’hygiène industrielle inc. in May and June 2010. An initial phase of rehabilitation work was then carried out from October 2010 to April 2011 to remove and stabilize some of the asbestos containing materials found in the building. These results should be used only as a general guide and are not necessarily representative of all asbestos containing materials covered by the present work.
- .2 Inform the Departmental Representative of the discovery of any material that may contain asbestos during the work but that was not shown in the drawings, specifications, or reports related to this work. Do not remove these materials before having been instructed by the Departmental Representative.

1.9 SCHEDULING

- .1 At least [ten (10)] days before the commencement of the work covered by this contract, notify in writing the following individuals and organizations:

The Regional Director of the Medical Services Branch, Health Canada
The regional office of Labour Canada
The Provincial/Territorial Ministry of Labour
The Commission de la santé et de la sécurité du travail (CSST)
The competent authorities for the disposal of asbestos waste

- .2 Inform all trades of the presence of asbestos containing materials, according to article on existing conditions.
- .3 Submit to Departmental Representative a copy of any notice given before the commencement of the work.

1.10 STAFF TRAINING

- .1 A certificate stating that workers have received adequate training about risks and safe work practices when working with asbestos containing materials. The requirements for training are specified in article 3.23.7 of the Safety Code for the Construction Industry. The training program, therefore, must at least contain information on:
1. General obligations of the Contractor;
 2. The effects of asbestos on health;
 3. Applicable standards and sampling to perform;
 4. The rights and obligations of workers;
 5. Collective and personal protection equipment and means;
 6. Tasks to perform and equipment or tools necessary;
 7. Safe work practices and procedures;
 8. Prevention and control methods.
- 2 Knowledge of employees about asbestos, more specifically relating to work practices, protective equipment and methods, procedures for entering and exiting the construction site as well as the effects of asbestos on health, need to be reviewed before commencement of the work. Workers will then become familiar with the site and the work they will performed will be explained to them. The Contractor shall be responsible for these information sessions.
- .3 Information and training on respirators must include at least the following:
1. Proper fitting of equipment;
 2. Inspection and maintenance of equipment;
 3. Disinfection of equipment;
 4. Restrictions concerning the use of equipment.
- .4 Relevant information and training must be given by a qualified and competent person.
- .5 Supervision staff must also receive appropriate training.

PART 2: PRODUCT

2.1 MATERIAL AND EQUIPMENT

- .1 **WETTING AGENT**: A solution consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether—or any other product approved by the Departmental Representative—mixed with water in a concentration sufficient to ensure adequate penetration and wetting of asbestos containing materials.
- .2 **HEPA VACUUM**: A vacuum equipped with all the necessary fittings, tools, and accessories. Air intake must pass through the HEPA filter before discharge.
- .3 **WASTE CONTAINER**: A bag, with a minimum thickness of 0.15 mm, or a tight and puncture resistant barrel, labelled in accordance with Article 3.23.13 of the Safety Code for the Construction Industry.
- .4 **WATERPROOF TARP**: A plastic waterproofing membrane (i.e.: polyethylene) that does not retain fibers, fastened with tape in order to: protect any item present in the work area, isolate the work area, prevent leakage of water, and facilitate cleaning of certain surfaces. These tarps must be of a thickness of at least 0.15 mm and of a width that minimizes the number of joints.
- .5 **TREATED WATER**: Water mixed with a non-ionic surfactant wetting agent to reduce the surface tension that favours permeation of asbestos fibers.
- .6 **WASTE LABELS**: A French-language warning label indicating the hazards associated with asbestos. The containers must be labelled in accordance with the Controlled Products Regulations. The label must include, in a permanent and legible manner, the following statements and representations:

Asbestos containing material
Toxic by inhalation
Keep container tightly closed
Do not breathe dust
- .7 **HIGH EFFICIENCY FILTER (HEPA)**: A filter capable of filtering 0.3 micron particles with an efficiency rate of at least 99.97%.
- .8 **CONTINUOUS PRESSURE GAUGE**: An instrument designed to continuously monitor and automatically record the pressure difference between the inside and outside of the work area.
- .9 **DIFFERENTIAL CIRCUIT BREAKER PANEL**: An electrical distribution panel equipped with a circuit breaker for protection against ground fault. It should be of sufficient capacity to supply all electrical equipment and lighting in the work area. All switches must have a protection of 3 mA. Panels shall be provided with all necessary accessories, including a power-outage warning light, a switch for checking proper operation of panel, and a reset switch. These must be installed by an electrician.
- .10 **POLYETHYLENE**: A sheet of 0.15 mm minimum thickness.

- .11 TEARPROOF POLYETHYLENE: A sheet of 0.23 mm (8 mils) thickness composed of a 0.13 mm (5 mils) woven layer and two non-woven layers of 0.05 mm (1.5 mils) of rolled polyethylene.
- .12 ROLL-UP DOOR: A door consisting of two superimposed plastic membranes, one being attached at the top left side, the other, at the top right side. These shall be equipped with weights at the bottom so that the doors always shut close when in use. This minimizes infiltration of dust into occupied areas.
- .13 ENCAPSULATION PRODUCT: A type-2 product, Class A water-based, in compliance with CAN/CGSB-1205 standard, approved by the Fire Commissioner of Canada.
- .14 SLOW-DRYING FILLER PRODUCT: A non-stain transparent product that disperses in water, remains tacky for at least eight (8) hours after application, and is designed to trap residual asbestos fibers. The filler product shall have a flame-spread rating and a smoke developed classification not exceeding 50.
- .15 SPRAYER: A garden sprayer or airless sprayer capable of producing a spray mist or fine droplets. Sprayer capacity used must be adapted to meet the requirements of the work to be perform.
- .16 DUCT TAPE: A glass-fiber reinforced duct tape, capable of sealing polyethylene, whether wet or dry.
- .17 VACUUM UNIT: A system capable of maintaining a negative pressure in a work area from which the air is extracted and then evacuated to the outside through a series of high-efficiency filters (HEPA). The vacuum system must provide at least four air changes per hour and should be able to maintain a differential pressure of between 0.001 and 0.004 kPa between the work area and adjacent areas. The system must be equipped with a malfunction alarm (gauge) and a continuous monitoring device.
- .18 PROTECTIVE CLOTHING: Work coveralls of "TYVEK" type that cover full body and head and are fitted with elastic wrists and ankles.

PART 3: EXECUTION

3.1 PREPARATION

- .1 High-risk indoor work areas
 - .1 Access to work areas shall be limited to authorized persons only.
 - .2 Before commencing the work, ventilation and air conditioning systems must be shut down. The Contractor will coordinate this with the owner.

- .3 Openings in ventilation system, in masonry walls, or in any areas communicating with the outside of the work area should be cleaned with a vacuum cleaner equipped with a high-efficiency filter or with a wet sponge and then covered from the work area side with a 0.26 mm thick polyethylene tarp and a layer of tearproof polyethylene. All joints must be sealed with the specified tape. Fixtures and fittings, electrical/mechanical equipment and fittings, junction boxes, etc. will be covered with a 0.15 mm polyethylene tarp and all joints should be sealed with the specified tape.
- .4 Clean the various surfaces of deposition in the work area with a HEPA vacuum or using wet cleaning prior to covering with polyethylene tarps. Do not use methods susceptible of raising dust, such as sweeping or vacuuming with a non-HEPA vacuum.
- .5 Coordinate and make necessary arrangements to ensure the supply of electricity, water, and heating equipment are used when performing decontamination work.
- .6 Install vacuum systems equipped with high-efficiency filters (HEPA filter). The filtered air is discharged to the outside of the building. The work area should be maintained under negative pressure of between 1 and 4 pascals. The vacuum unit must provide a minimum of 4 air changes per hour.
- .7 Install, for the entire duration of the work, a gauge for continuous monitoring of the negative pressure inside the contaminated site.
- .8 Install signs in accordance with Article 3.23.15 9 of the Safety Code for the Construction Industry at the entrance to the work area.
- .9 Emergency and fire exits of work areas must be kept in good condition and free of obstructions; if this is not the case, other emergency exits must be provided to the satisfaction of the Fire Commissioner of Canada.
- .10 Use a temporary lighting system and maintain a lighting level of at least 400 lux. Use additional lighting when required.
- .11 The Contractor shall ensure the following materials are available in the shower stalls:
 - Mild and non-irritating soap and shampoo in dispenser pumps.
- .12 Fresh air supply, if necessary, is the responsibility of the Contractor including any modification to existing systems.
- .13 Additional protection measures may be required by the Departmental Representative based on existing conditions.
- .14 All equipment necessary for the performance of all work will be provided by the Contractor.

- .2 High-risk outdoor work areas
 - .1 Access to work areas shall be limited to authorized persons only. The Contractor shall define a work perimeter for the construction of the work area.
 - .2 Adequate lighting must be installed in the work area and the Contractor shall provide battery-powered emergency lighting in case of failure.
 - .3 Install scaffolding around the perimeter or use existing structures to create a work area and cover these with a tearproof polyethylene membrane to limit the spread of dust and debris of asbestos containing materials. Scaffold sections will define the perimeter of structures covered by the work and exceed the building walls by at least 1.5 meters (5 feet).
 - .4 Ensure protection of floor with a tearproof polyethylene membrane that will also facilitate the recovery of demolition debris.
 - .5 Install signs in accordance with Article 3.23.15 9 of the Safety Code for the Construction Industry at the entrance to the work area.
 - .6 Some additional protection measures may be required by the Departmental Representative or his representative based on existing conditions.
- .3 Construction of worker and waste decontamination spaces in high-risk indoor work areas.
 - .1 Worker and waste decontamination spaces must be located outside of the premises affected by the work and be built in areas that have been approved by the Departmental Representative and the owner.
 - .2 Decontamination spaces must be built with 2 x 4 inch beams, 24 inches apart as well as plywood panels, and then covered on the inside and outside using an opaque tearproof polyethylene membrane (orange) with joints taped with reinforced duct tape. Decontamination space floors must be covered with two independently sealed layers of polyethylene membrane. The first membrane will be of polyethylene with a thickness of 10 mils and the second membrane on top should be of the tearproof type. Membranes will cover all floors and up to a height of about 12 inches from the bottom of the walls. Membranes must be installed so as to minimize the number of joints. In addition, the Contractor shall see to the disparity of joints between different thicknesses of polyethylene.
 - .3 The Contractor shall be responsible for drainage and shower water connections as well as those of the work site. Connections must be coordinated and approved by the Departmental Representative.
 - .4 All entries and exits of the space must be equipped with roll-up doors so as to minimize the circulation and dispersion of asbestos fibers from one section to another of the space.

.5 Worker's entry and exit space

The design of the space must comply with article 3.2.13 of the Safety Code for the Construction Industry. The Space must include three (3) sections and be the only means of entry and exit for workers on site.

The Contractor shall provide for the installation of two spaces of entry and exit of workers (one for women, one for men).

STREET-CLOTHES LOCKER ROOM

The locker room dedicated to street clothing must be set up according to Article 3.23.16. 8° of the Regulations. (Reference to the Safety Code for the Construction Industry).

SHOWER STALLS

The showers stalls must be set up between the street-clothes locker room and the work-clothes locker room, so that every worker passes through the shower stalls to access the street-clothes locker room. One shower stall for every six workers shall be provided as well as cold and hot water supply. Soap and shampoo must be available at all times inside the shower stalls.

WORK-CLOTHES LOCKER ROOM

Room used to store contaminated equipment that may remain inside the work site. This room is considered contaminated and workers must keep their respiratory protection when inside this room. A container or bag to dispose of workers' contaminated overalls when these leave the site must be provided in this sector.

.6 Exit space for waste

The transition space for containers of asbestos waste includes three compartments separated from one another and from the work area by roll-up doors. This space allows for elimination of waste with no risk of contamination of adjacent sectors.

CLEANING ROOM

The cleaning room serves as a cleaning compartment for containers carrying contaminated waste. It should be noted that this room is part of the site's contaminated area.

STORAGE ROOM

The storage room is used as a compartment where doubling the bags or containers takes place before leaving the site. It should be noted that this room is also considered contaminated.

WASTE TRANSFER ROOM

This room is where doubled and decontaminated containers are kept. Access to this room is possible only from the outside and it is considered non-contaminated.

NOTE: The transition area for waste containers can also be used for the entering and exit of work tools and equipment as well as for their storage.

- .4 Construction of worker and waste decontamination spaces for high-risk outdoor work areas:
- .1 The decontamination trailer for workers shall be located outside the work area. The decontamination trailer for workers must include a street-clothes locker room, shower stalls, and work-clothes locker room. The work-clothes locker room shall be under negative pressure compared to the shower stalls and street-clothes locker room. Because the decontamination trailer is located outside the work area, it must be linked to the work area by an alley taped off with caution tape.

The Contractor shall provide for the installation of two decontamination spaces for workers (one for women, one for men).

- .2 Connections for water supply shall be coordinated or performed by the Contractor.
- .3 Workers' entry and exit space (double locker room)

The set-up of the space must comply with article 3.2.13 of the Safety Code for the Construction Industry. The Space must include three (3) sections and be the only means of entry and exit of workers on site.

STREET-CLOTHES LOCKER ROOMS

The street-clothes locker room must be set up according to Article 3.2.11 of the Safety Code for the Construction Industry.

SHOWER STALLS

The showers stalls must be set up between the street-clothes locker room and the work-clothes locker room, so that every worker passes through the shower stalls to access the street-clothes locker room. Set up must comply with article 3.2.15 of the Safety Code for the Construction Industry.

WORK-CLOTHES LOCKER ROOMS

Room used to store contaminated equipment that may remain inside the work site. This room is considered contaminated and workers must keep their respiratory protection when inside this room. A container or bag to dispose of workers contaminated overalls when these articles leave the site must be provided in this sector. The work-clothes locker room must be set up according to Article 3.2.11 of the Safety Code for the Construction Industry.

.4 Waste exit space

The transition space for containers of asbestos waste includes three compartments separated from one another and from the work area by roll-up doors. This space allows for elimination of waste with no risk of contamination to adjacent sectors.

CLEANING ROOM

The cleaning room serves as a cleaning compartment for containers carrying contaminated waste. It should be noted that this room is part of the site's contaminated area.

STORAGE ROOM

The storage room is used as a compartment for doubling the bags or containers before they leave the site. It should be noted that this room is also considered contaminated.

WASTE TRANSFER ROOM

This room is where doubled and decontaminated containers are kept. Access to this room is possible only from the outside and it is considered non-contaminated.

NOTE: The transition area for waste containers can also be used for the entering and exit of work tools and equipment as well as for their storage.

.5 Maintenance of contained spaces:

- .1 Keep spaces clean and in good condition.
- .2 Ensure that walls and the polyethylene tarps are sealed with tape and properly close off any possible openings. Repair damaged walls and correct defects without delay.
- .3 Perform a visual inspection of spaces at the beginning of each work shift.
- .4 At the Departmental Representative's request, run smoke tests to verify the effectiveness of the containment achieved.

.6 Asbestos removal work must not commence before:

- .1 Provisions concerning the elimination of waste have been taken.
- .2 Provisions concerning the storage, filtration, and the disposal of sewage have been taken to prevent stripping after permeation of asbestos containing materials.
- .3 Work areas and decontamination spaces have been effectively isolated from each other.
- .4 Tools, equipment, materials, and waste containers are on site.

- .5 Arrangements have been taken to preserve the security of the building.
- .6 Warning signs have been installed at all access points of contaminated areas.
- .7 The Departmental Representative has authorized the work.

3.2 SUPERVISION

- .1 At least one supervisor must be designated for each group of ten workers or less.
- .2 An authorized supervisor must at all times remain on site during any movement, removal, or other form of handling of asbestos containing materials.

3.3 ASBESTOS REMOVAL

- .1 Proposed sequence of high-risk decontamination work:
 - .1 The Contractor is fully responsible for all execution and construction activities and must ensure the stability of all structural and architectural components at any time.
 - .2 Other activities than those described in the sequence below can be performed separately or concurrently.
 - .3 The Contractor is responsible for his sequence of execution of the work and the sequence below is provided as an example. In no circumstances, will the PWGSC or any professionals assume the responsibility for the sequence described below. The Contractor may propose a different or substitute sequence for the execution of work. In this case, he will need to advise the Departmental Representative for approval.

EAST AND WEST PORTIONS

- .2 Work in presence of asbestos in the different sectors of the East and West parts shall be carried out by a contractor specialized in decontamination and according to, but not limited to the following steps:
 - 1. Mobilization of the work site and equipment;
 - 2. Site preparation: protection and sealing of openings, ventilation system, and other equipment that must remain on site (installation of polyethylene membranes);
 - 3. Design and construction of airtight work and decontamination spaces dedicated to workers and waste;
 - 4. Installation of a temporary heating system (minimum 15 degrees Celsius) in the work section. The heating must be stabilized and operational 2 weeks before commencement of the plaster and remain constant up until the end of the work with a positive and/or negative variance of 3 degrees Celsius maximum;
 - 5. Installation of vacuum units fitted with a high-efficiency filter in order to create a sufficient negative pressure on the inside of the work space;

6. Demolition of pipes, structures, and other items identified in demolition plans;
7. Demolition and removal of cement and plaster type construction materials present on exterior walls, including or not, the wood frame;
8. Sampling the curettage work of non-demolished plasters for safekeeping that are destabilized and weakened to be approved by the Departmental Representative (work carried out by plasterers and according to sections 090120 and 090351). These samplings of the work shall be subject to approval by the Departmental Representative before the Contractor can proceed;
9. Curettage of areas of non-demolished plaster for safekeeping that are destabilized and made fragile (work carried out by plasterers and according to sections 090120 and 090351). Work performed in close supervision by the Departmental Representative. This type of curettage must be performed with surgical precision because the plaster on the interior walls must be preserved in as authentic condition as possible;
10. Light sandblasting of the surface of all residual curretted plasters to be kept safe (work carried out by the plasterers and according to sections 090120 and 090351);
11. Sampling of removal of the original wood panelling work of the second floor meeting room of the annex (work carried out by the cabinetmakers and according to section 060315). These samplings of the work shall be subject to approval by the Departmental Representative before the Contractor can proceed;
12. Removal of the original wood panelling of the second floor meeting room of the annex (work performed by cabinetmakers and according to section 060315). Work performed in close supervision by the Departmental Representative. The removal of panelling must be performed with surgical precision, because the original wood paneling is very dry and brittle. They are to be preserved in as authentic condition as possible for their reinstallation;
13. Removal and disposal of cement type materials (including those behind the panelling removed in the meeting room) and plaster present on the masonry walls identified in the plans and specifications;
14. Demolition and removal of certain doors, windows, and frames identified in the plans and specifications;
15. Demolition and removal of the plank flooring including full cleaning of all surfaces as well as the top of the wood joists (structure, joists etc.);
16. Construction of new floor and peripheral structural diaphragm system (work performed by carpenters: see structure);
17. Brushing, sandblasting, and curettage of all wall, window, frame, stair, and structure surfaces (work performed according to specification section 028312);

18. Sampling of the soot cleaning work (work performed by the plasterers and according to sections 090120 and 090351). These samplings of the work shall be subject to approval by the Departmental Representative before the Contractor can proceed;
19. Brushing and cleaning of surfaces covered with soot using an approved degreasing product (work performed by a company specialized in cleaning masonry and according to section 040306);
20. Sandblasting, cleaning, and brushing of materials showing traces of fungal growth;
21. Recovery of contaminated debris and waste in waste bags or sealed barrels, decontamination and evacuation of containers according to procedures set forth in part 1.7 of this document;
22. Cleaning of the work area, surfaces, equipment, and structures in order to obtain the approval of the Departmental Representative assigned to apply a slow drying sealing filler;
23. Monitoring and sampling of the ambient air by the departmental representative;
24. Dismantling of airtight work spaces;
25. Complementary inspection and cleaning of surfaces following the dismantling of airtight work spaces.

CENTRAL PORTION

- .3 Work in presence of asbestos performed in the different sectors of the central portion shall be carried out by a contractor specialized in decontamination and according to but not limited to the following steps:
 1. Mobilization of the work site and equipment;
 2. Site preparation: protection and sealing of openings,
 3. Design and construction of airtight work and decontamination spaces dedicated to workers and waste;
 4. Installation of vacuum units fitted with a high-efficiency filter in order to create a sufficient negative pressure on the inside of the work space;
 5. Before commencing any work of demolition, cleaning, stabilization, and disposal of hazardous materials under high-risk site conditions, an inspection of the work area will be carried out by the Departmental Representative in order to authorize the start of operations under high-risk site conditions. In the case of any corrective action requests, they shall be performed by the Contractor prior to the commencement of the work;
 6. Sampling of demolition work and removal of cement and plaster type materials on the south facade of the exterior side and other surfaces. These samplings of the work shall be subject to approval by the Departmental Representative before the Contractor can proceed;

7. Demolition and removal of cement and plaster-type materials on the south facade of the exterior side and other surfaces. Work performed in close supervision by the Departmental Representative. This type of curettage must be performed with surgical precision. The demolition of the plaster must not damage the original brick behind;
 8. Sampling of the cleaning work of the brick surfaces with residues of paint and soot on the inside of the two towers (work performed by a company specialized in cleaning masonry and according to specification section 040306). These samplings of the work shall be subject to approval by the Departmental Representative before the Contractor can proceed;
 9. Cleaning work of brick surfaces with residues of paint and soot on the inside of the two towers (work performed by a company specialized in cleaning masonry and according to section 040306);
 10. Demolition and removal of doors, windows, and frames identified in the demolition plans;
 11. During the Contractor's work period, complementary systematic audits of materials that need to be safe kept will be carried out by the Departmental Representative in order to ensure that the materials are free of fungal growth. In the case of presence of fungal growth or favorable conditions for fungal growth on internal structures, the Contractor shall notify the Departmental Representative in order to obtain an appropriate method of decontamination. Following the obtaining of approval and new instructions from the Departmental Representative, the Contractor may proceed with the decontamination work;
 12. Light brushing, sandblasting, and curettage of all wall, window, frame, stair, and structure surfaces (work performed according to specification section 028312);
 13. Sandblasting, cleaning, and brushing of materials showing traces of fungal growth;
 14. Recovery of contaminated debris and waste in waste bags or sealed barrels, and decontamination and evacuation of containers according to procedures set forth in part 6 of this document;
 15. Cleaning of the work area, surfaces, equipment, and structures in order to obtain the approval of the Departmental Representative assigned to apply a slow drying sealing filler;
 16. Monitoring and sampling of the ambient air by the departmental representative;
 17. Dismantling of airtight work spaces;
 18. Complementary inspection and cleaning of surfaces following the dismantling of airtight work spaces.
- .4 Execution of works of demolition, cleaning, stabilization, and disposal of asbestos containing materials:
- .1 Before commencing any work of demolition, cleaning, stabilization, and disposal of hazardous materials under high-risk site conditions, an inspection of the work area will be carried out by the Departmental Representative in order to authorize the start of operations under high-risk site conditions. If corrective actions are required, they shall be performed by the Contractor prior to the commencement of the work;

- .2 All work involving asbestos containing materials shall be performed in a contained work area. Only workers who have been identified and authorized at the start of the work will be admitted to the work area;
- .3 Perform the demolition work of materials, structures, and other elements identified on the demolition plans;
- .4 Perform the inspection and removal of cement and plaster-type materials present on the walls that present a delamination or weakness is to be kept safe;
- .5 Demolition and removal of certain doors, windows, and frames;
- .6 Demolition and removal of the plank flooring including full cleaning of all surfaces including the top of wood joists (structure, joists etc.);
- .7 Perform the brushing, sandblasting, and curettage of all surfaces of walls, doors, windows, framing, stairs, and structures;
- .8 During the Contractor's work period, complementary systematic audits of materials that need to be kept safe including walls, floors, interior structures, (walls, floors and ceilings) will be carried out in order to ensure that the work was completed to the satisfaction of the Departmental Representative;

3.4 FINAL CLEANUP

- .1 The Contractor shall maintain the site in good condition and free of scrap materials, accumulated debris, and dust. The travel lanes and access to the building must remain clean and free of any debris.
- .2 All residues of contaminated materials will have to be put in bags quickly, sealed and cleaned to prevent the accumulation of waste at the work-area level. Debris must be evacuated from the site at the end of each work day.
- .3 Visually inspect the space at the start and at the end of each work shift. Ensure that the walls remain in good condition for the entire duration of the work and that the polythene protection membranes remain impervious. When necessary, perform repairs immediately.
- .4 During the removal of materials and demolition works, the Contractor shall ensure that the settling of particles will be reduced to a minimum so as to reduce the dispersion of particles to as few as possible.
- .5 Lower at ground level and handle with care sections of materials removed. Do not throw or drop them.
- .6 The Contractor shall detail any other measure that he intends to take to minimize the suspension of dust in the air.
- .7 At the end of each work shift, in the sector where the work was performed, the Contractor shall clean all surfaces using a vacuum cleaner equipped with a HEPA filter. At this stage, all residues and presence of dust should be eliminated in order to ensure the effectiveness of surface treatments.

- .8 Subsequently, the Contractor may, following the approval of the visual inspection conducted by the Departmental Representative, proceed to the application of the sealing filler to seal the residual asbestos fibers. Finally, the Departmental Representative will verify the concentration of total breathable fibers in the air at least 12 hours after applying the sealing filler in the work sector for high-risk indoor sites as well as in the work-clothes locker room sector for high-risk outdoor sites. For the dismantling to be allowed, the concentration must be less than 0.01 fiber per cubic centimeter. The authorization to dismantle the site will be given by the Departmental Representative.
- .9 When the test demonstrates that such a concentration is reached, the procedure of dismantling can begin. Otherwise, the Contractor shall perform another complete cleaning of the work space and apply sealing filler. The concentration of total fibers in the ambient air will be evaluated again after application of the sealing filler. The reading of the concentration of breathable fibers of asbestos must be carried out in accordance with article 44 of the Occupational Health and Safety Regulations S-2.1, r.13.
- .10 During the dismantling operations of the work space, complementary visual inspections will be carried out to ensure that no dust, debris, or waste remain on the surfaces due to the dismantling operations on site. In addition, an audit will be performed to confirm that the removal work is fully completed as per the specifications.
- .11 The operations on site may be suspended if the requirements are not met. Operations may resume only when the changes will have been made and validated.
- .12 The handling and management of waste shall be executed according to the requirements of Part 1.7 of this document entitled “Waste management and disposal.”

3.5 RESTORATION OF ELEMENTS AND REINSTATEMENT OF SERVICES

- .1 Once the dismantling of the work area completed, perform the following:
 - .1 Restore to their original positions the different objects, devices, and furniture items that have been moved for the purposes of the execution of the work.
 - .2 Reinstate to their original functions the different objects, devices, and stationary equipment that have been moved for the purposes of the execution of the work.
 - .3 Restore to proper working order the various appliances and electrical and mechanical facilities. Replace all material filters with new filters.
 - .4 Repair or replace objects, devices, or appliances damaged in the course of the work, according to the directives of the departmental representative.

3.6 AIR ANALYSIS

- .1 The work of the Contractor specialized in decontamination will be inspected by the Departmental Representative and air samples will be collected in the work sector as well as in the areas adjacent to the sites in order to check the levels of total fibers in ambient air and confirm the effectiveness of the dust control means employed by the Contractor. The employees of the Contractor will be asked to collaborate for the collection of personal air samples. The sampling equipment will be worn by some workers for specific periods of time during the execution of their tasks.
- .2 Use the results of the air analysis performed inside the work areas to determine the type of respirator required:
 - .1 Suspend the asbestos removal work if the fiber concentrations measured exceed the safety factor of the respirators used, which is 50 fibers per ml (cm^3) in the case of chrysotile asbestos and 10 fibers per ml (cm^3) in the case of amosite asbestos. Use an appropriate method for elimination of dust and ensure that workers performing work inside the spaces are wearing a respirator that has a higher safety factor.
 - .2 If the air analysis indicates that the areas that are located outside of the decontamination spaces are contaminated, confine the areas in question and see to the cleaning and maintenance in accordance with the same requirements as those applicable to the work areas.
- .3 The final air analyses must be performed according to the following indications. Once the areas of asbestos removal have been visually inspected and approved, and a layer of proper fixing agent has been applied on the interior surfaces of the spaces and, finally, that a sufficient waiting period has been respected for the settling of dust, the Departmental Representative will analyze the air inside the areas of asbestos removal.
 - .1 Final air analyses must indicate concentrations of fibers in suspension lower than 0.01 fiber per ml (cm^3).
 - .2 If the air analyses indicate concentrations of fibers greater than 0.01 fiber per ml (cm^3), clean work areas again and apply a second layer of proper fixing agent on the interior surfaces of the spaces.
 - .3 Repeat these operations until concentrations of fibers in suspension drop to under 0.01 fiber per ml (cm^3).
- .4 An inspection report will be prepared and provided to the Customer representative during these inspections. The Departmental Representative may issue recommendations following an inspection. These recommendations should be followed by the Contractor.
- .5 The sampling and analysis of samples will be carried out by the Departmental Representative in compliance with the Occupational Health and Safety Regulations, S-2.1, r.13.

3.7 INSPECTION

- .1 Inspect areas of asbestos removal work in order to check their compliance with the requirements of the specifications and of competent authorities. Any deviation from these requirements that has not been approved in writing by the Departmental Representative may lead to work stoppage.
- .2 The Departmental Representative will inspect the work in order to ensure compliance with following conditions:
 - .1 Compliance of steps to follow and specific requirements relative to various equipment and materials.
 - .2 The level of completion of work and cleanliness of the premises.
 - .3 The provision, without additional costs, of the workforce, materials, and additional devices necessary to ensure the execution of the work according to the specified requirements.
- .3 The departmental representative will suspend the work in case of a leak or a risk of leakage of asbestos particles or asbestos materials outside the work areas:
 - .1 The provision, without additional costs, of the workforce, materials and additional devices necessary to ensure the execution of the work according to the specified requirements must be supplied at no additional cost.

END OF SECTION