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**PART A – GENERAL**

**1.1 General Conditions and Related Work**

- 1.1.1 This specification was prepared based on the results of two Pre-Demolition DSS Reports, prepared by Fisher Engineering Limited; 55 John Street (North Side), Toronto, Project No. FE 23-13156 Revised, dated August 4, 2023.
- 1.1.2 Before commencing the abatement activities, educate the contract workers to look out for black caulking on drywall above ceilings, refer to photo included as an attachment, when encountered and expected to be disturbed during the project works, abatement procedures outlined in this specification must be followed.
- 1.1.3 This section forms a part of the Contract Document and should be read in conjunction with all other Sections and Divisions in order to comply with the requirements of the General Conditions of the Contract.
- 1.1.4 It is the intent that work performed as outlined in this section will result in the complete removal and disposal of all asbestos-containing, and materials that become contaminated by asbestos as a result of the work specified by this Section.
- 1.1.5 Dispose of all waste as specified in applicable sections of the specifications document.
- 1.1.6 The Environmental Consultant will perform area and personal air monitoring to verify the effectiveness of dust suppression methods and the adequacy of the respirators used by the Contractor. The Contractor's personnel shall cooperate with the Environmental Consultant in collecting air samples.
- 1.1.7 This project and all work associated with it is regulated by The Occupational Health and Safety Act, the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations, Ontario Regulation 278/05; the Designated Substances Regulation, Ontario Regulation 490/09; and the Regulation for Construction Projects-Ontario Regulation 213/91.
- 1.1.8 In cases of conflict between procedures outlined in this document, the more stringent requirement will apply.

**1.2 Description of Work**

- 1.2.1 Before submitting a bid, confirm the scope of work for the project by visiting the site and reading the entire survey report and specification documents. Information presented in this document should not be used as the only basis for submitting a bid. It is the abatement contractor's responsibility to confirm all quantities and measurements.
- 1.2.2 **Work Area – New Daycare:** Work in this area shall be carried out following the Type 1 asbestos abatement procedure (Section A1000, Sub-Section 3.1) as follows:
  - 1.2.2.1 **The asbestos-containing materials in this Work Area, include black caulking along the joints of drywall above ceiling.**
  - 1.2.2.2 The work area should be separated by marking with caution tape and a clearly visible warning sign advising of the hazards of asbestos dust and that entry is restricted to authorized trained personnel wearing personal protective equipment.
  - 1.2.2.3 Pre-clean and remove all movable objects and items present in the work area.
  - 1.2.2.4 Protect the floor in the vicinity of the work area, using rip-proof poly drop-sheets.
  - 1.2.2.5 Seal all ventilation duct vents around the work area (if any) with application of one layer of 6 mil (0.15mm) thick clear polyethylene with tape.

- 1.2.2.6 The abatement contractor shall removal and disposal of all asbestos-containing black caulking, and materials that become contaminated with the asbestos-containing black caulking, when encountered and expected to be disturbed.
- 1.2.2.7 All the waste generated in the work area shall be double bagged using asbestos labelled yellow bags and disposed as asbestos waste.
- 1.2.2.8 Maintain the fire alarm and other life/safety systems in operation. Immediately advise the City of Toronto in case the systems are damaged during the execution of the work.

### **1.3 Definitions**

- 1.3.1 Abatement: Procedures to control fibre release from asbestos containing building materials. Includes encapsulation, enclosure, and removal.
- 1.3.2 Amended Water: Water containing a wetting agent or surfactant that is added for the purpose of reducing water surface tension to allow proper wetting of asbestos material.
- 1.3.3 Asbestos: The term includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, and any of these that have been chemically treated and/or altered.
- 1.3.4 Airlock: A system for ingress or egress without permitting air movement between a contaminated area and an uncontaminated area, consisting of two curtained doorways at least 6 feet apart.
- 1.3.5 Area Monitoring: Sampling of asbestos fibre concentrations within the asbestos control area and outside the asbestos control area which is representative of the airborne concentrations of asbestos fibers which may reach the breathing zone.
- 1.3.6 Asbestos Work Area: An area where asbestos removal operations are performed which is isolated by physical boundaries to prevent the spread of asbestos dust, fibers, or debris.
- 1.3.7 Air Monitoring: The process of measuring the asbestos fibre content of a specific volume of air in a stated period of time.
- 1.3.8 Asbestos Containing Material (ACM): Any material analyzed and found to contain 0.5 percent more asbestos either alone or mixed with other fibrous or non-fibrous materials.
- 1.3.9 Asbestos Fibers: For this specification, asbestos fibers are those fibers 5 microns or longer having an aspect ratio of at least 3:1.
- 1.3.10 Authorized Visitor: The building Owner or their representative, persons of any regulatory or other agency having jurisdiction over the project and the asbestos abatement Consultant or their representative.
- 1.3.11 Barrier: Any surface that closes the work area to prevent the movement of fibres.
- 1.3.12 Critical Barrier: One or more layers of plastic sealed over all openings into a regulated area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a regulated area from migrating to an adjacent area.
- 1.3.13 Contractor/Supervisor: An individual who supervises asbestos abatement work and has the proper qualifications and training as specified in this document.
- 1.3.14 Control Area: An area which is considered uncontaminated and is suitable for regular occupancy.
- 1.3.15 Disposal: Procedures necessary to transport and deposit the asbestos contaminated material stripped and removed from the building to an approved waste disposal site in compliance with the applicable environmental regulations.

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- 1.3.16 Demolition: The razing, removing, or wrecking of any building component, assembly, or system together with any associated handling operations.
- 1.3.17 Decontamination Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.
- 1.3.18 Dioctylphthalate (DOP) Test: A test method that uses Dioctylphthalate aerosol to challenge a HEPA filter-equipped negative pressure unit to determine its integrity and effectiveness to filter out asbestos fibres.
- 1.3.19 Dirty Room: A contaminated area or room which is part of the worker decontamination enclosure system, with storage for contaminated clothing and equipment.
- 1.3.20 Encapsulant: A liquid material which can be applied to asbestos containing material and which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant). A third type of encapsulant (removal encapsulant) is a penetrating encapsulant and is designed to be applied during the removal of asbestos-containing materials to minimize the release of fibres.
- 1.3.21 Disposal Bag: A 0.15 mm 6 mil thick, leak-tight plastic bag, pre-labeled as containing asbestos waste and used for transporting asbestos waste from containment to disposal site.
- 1.3.22 Disturbance: Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM.
- 1.3.23 Encapsulation: Procedures necessary to coat all asbestos-containing materials with an encapsulant to control the possible release of asbestos fibers into the ambient air.
- 1.3.24 Enclosure: All herein specified procedures necessary to complete enclosure of all hazardous materials behind airtight, impermeable, permanent barriers.
- 1.3.25 Equipment Room: A contaminated area which is part of the worker decontamination enclosure system, with storage for contaminated clothing and equipment.
- 1.3.26 Friable Asbestos Material: Material that when dry can be crumbled, pulverized, or powdered by hand pressure or includes material that is crumbled, pulverized, or powdered.
- 1.3.27 Glove Bag System: A portable asbestos abatement system designed for the isolation of an object from which materials containing asbestos are to be removed.
- 1.3.28 HEPA Filter Equipment: High efficiency particulate air filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be capable of trapping and retaining at least 99.97 percent of 0.3 micrometer diameter particles.

#### **1.4 Work Schedule**

- 1.4.1 It is the responsibility of the contractor to provide the necessary manpower and work shifts to meet the schedule.
- 1.4.2 The start date for the project is to be determined by the Owner (City of Toronto)
- 1.4.3 The Contractor shall, at no extra cost to the Owner, be responsible for the completion of work required or scheduled to be performed on weekends, holidays and after regular hours and shall be carried out as required to meet the schedule specified.

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**1.5 Submittals**

- 1.5.1 The Contractor shall submit the following:
- 1.5.2 Proof that the Contractor has made arrangement for the transport and disposal of asbestos waste. The proof shall be satisfactory to the Consultant.
- 1.5.3 Proof satisfactory to the Consultant that each Supervisor scheduled to work on the project has successfully completed an approved asbestos abatement course and can provide an up-to-date training certificate issued by a competent entity.
- 1.5.4 At least one supervisor shall remain on site while asbestos removal or cleanup is being carried out.
- 1.5.5 Copies of Insurance certificates and Workplace Safety and Insurance Board status.
- 1.5.6 D.O.P test results and performance data for negative air unit systems.
- 1.5.7 Proposed work schedule.
- 1.5.8 Work force expected to be present on site daily or according to the schedule.
- 1.5.9 Proposed number of shifts.
- 1.5.10 Proof that all workers have received Workplace Hazardous Material Information System (WHMIS) training.
- 1.5.11 A copy of the weight scale or waste manifest/bill of lading (once received).

**1.5 Quality Assurance**

- 1.5.1 Ensure that work progresses according to schedule.
- 1.5.2 Ensure that work complies with all the requirements of the applicable regulations, guidelines, and manuals.
- 1.5.3 Ensure that no water runoff or airborne asbestos material contaminates areas outside the asbestos removal work area enclosures. The Consultant has been given authorization by the City of Toronto to stop any work where contamination of areas outside enclosures are suspected. The Contractor shall be responsible for all costs to rectify the problem.
- 1.5.4 Only the asbestos abatement Contractor, and never the Consultant, is responsible for the following:
  - 1.5.4.1 Safety programs and precautions required by applicable regulations for the work being performed.
  - 1.5.4.2 Control over the acts and omissions of the Contractor's workers, agents, subcontractors, and other employees of the Contractor required to perform work on the project.
  - 1.5.4.3 Control over construction techniques, methods, means, or procedures.

**1.6 Regulations**

- 1.7.1 The Contractor shall comply with all local, provincial, and federal requirements relating to asbestos, hazardous building materials, and other work being carried out.
- 1.7.2 In case of conflict among the above-mentioned requirements or with these specifications, the more stringent requirements shall apply.
- 1.7.3 Perform work following the requirements of the various regulations in effect at the time the work is being carried out.

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- 1.7.4 The regulations shall include, but are not limited to:
- 1.7.4.1 Ontario Occupational Health and Safety Act.
  - 1.7.4.2 Ontario Regulation 278/05, Regulation Respecting Asbestos on Construction Projects and in Building and Repair Operations.
  - 1.7.4.3 The Designated Substances Regulation, Ontario Regulation 490/09.
  - 1.7.4.4 Ontario Ministry of Environment Regulation 347 (as amended) for the disposal of asbestos waste made under the Environmental Protection Act.
  - 1.7.4.5 Regulations respecting the Handling, Offering for Transport and Transportation of Dangerous Goods.
  - 1.7.4.6 WHMIS Regulations.

**1.8            *Notifications***

- 1.8.1 The Contractor shall be responsible for immediately notifying the following, orally and in writing, prior to any work on this project commencing:
- 1.8.1.1 Ontario Ministry of Labour, Construction Health & Safety branch closest to the location of the project.
  - 1.8.1.2 The Fire Marshall, in cases where the execution of the work will result in blocking building exists or when turning off, removing, or temporarily altering fire alarms.

**1.9            *Proscriptions***

- 1.9.1 The use of compressed air for removal or clean up of asbestos dust and debris from any surface is not allowed.
- 1.9.2 Smoking, eating, drinking, or chewing is not allowed in the work area.
- 1.9.3 Unauthorized persons or persons not using proper personal protective equipment shall not be allowed to enter the work area.
- 1.9.4 No entry into the work area shall be permitted to any person who has facial hair growth that prevents the establishment of a proper seal between the respirator and the skin.
- 1.9.5 The use of torches, propane-fired heaters and other open flames shall not be permitted in the abatement work area.

**1.10          *Worker and Visitor Protection***

- 1.10.1 Instruct all personnel (workers and visitors) in all aspects of work procedures and protective equipment before allowing entry into the asbestos abatement work areas.
- 1.10.2 A competent person (as defined by An Act Respecting Occupational Health and Safety, shall provide all the training and instructions.
- 1.10.3 Instructions and training shall include, but shall not be limited to, the following:
- 1.10.3.1 Entry and exit from asbestos abatement work areas.
  - 1.10.3.2 Work practices and personal hygiene.
  - 1.10.3.3 The use, cleaning and care of respirators and protective clothing.
  - 1.10.3.4 Protective measures and work procedures.

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- 1.10.4 Asbestos work area entry and exit procedures shall be posted in the clean room of the decontamination unit.
- 1.10.5 Respiratory Protection:
- 1.10.5.1 All personnel required to wear respirators shall be fit tested either by a qualitative or quantitative fit testing method.
  - 1.10.5.2 Each worker or visitor required to enter an asbestos abatement work area shall be provided with a personally issued respirator that is:
    - 1.10.5.3 Appropriate for the work that is being carried out.
    - 1.10.5.4 The worker shall be responsible for wearing a respirator that is issued by the Contractor.
    - 1.10.5.5 The criteria, as outlined in Table 2 of Ontario Regulation 278/05, shall be followed when selecting an appropriate respirator.
    - 1.10.5.6 Respirator shall be stored in a clean location.
    - 1.10.5.7 The procedures specified by the equipment manufacturer shall be followed while using and maintaining the respirators.
    - 1.10.5.8 Respirators shall be cleaned and inspected at the end of each shift. All damaged and deteriorated parts found during the inspection shall be replaced before the respirator is used again.
    - 1.10.5.9 Appropriate combination cartridges shall be used if substances other than asbestos are to be handled inside the asbestos removal work area.
    - 1.10.5.10 Used filters shall be tested and replaced as specified by the manufacturer.
    - 1.10.5.11 Cartridges shall be treated as asbestos waste and shall be disposed of accordingly after usage inside an asbestos removal work area.
- 1.10.6 Protective Clothing:
- 1.10.6.1 The Contractor shall provide every worker and authorized visitor with full body disposable coveralls.
  - 1.10.6.2 All personnel shall wear the protective coveralls before they are allowed to enter the asbestos removal work area.
  - 1.10.6.3 Coveralls shall be equipped with head covering (hood), foot covering and tight-fitting cuffs at the neck, ankles, and wrists.
  - 1.10.6.4 The disposable coveralls shall be made up of materials that does not readily permit the penetration of asbestos fibers.
  - 1.10.6.5 Disposable coveralls shall be immediately repaired (using duct tape) or replaced once torn.
  - 1.10.6.6 Coveralls shall be disposed of as asbestos waste once they are worn inside an asbestos abatement area.
  - 1.10.6.7 Workers are allowed to wear reusable protective clothing provided that the clothing is left in the equipment room until the end of the asbestos abatement project. The clothing shall then be disposed of as asbestos waste.
  - 1.10.6.8 Safety shoes, hard hats and additional body protection equipment shall be used as necessary to meet the requirements of applicable safety regulations.



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**1.11            *Inspections***

- 1.11.1            The Environmental Consultant will be present on site to carry out quality control inspections for the entire duration of the project. The inspections will be performed inside and outside the work areas.
- 1.11.2            The purpose of the inspections is to ensure that the work is being carried out following the requirements and procedures outlined in the specification documents and applicable regulations.
- 1.11.3            The Consultant will issue written instructions to the asbestos abatement Contractor throughout the duration of the project. The instructions will authorize the Contractor to proceed to next work area. The general phases of work will consist of the following: Pre-cleaning, set-up and preparation of the work area, removal of specified materials, clean-up of work area and tear down of containment.
- 1.11.4            The Contractor shall not proceed to the next phase of work without obtaining authorization from the Consultant.
- 1.11.5            The Consultant has been given authorization by the City of Toronto to order a shutdown of work in case contamination of areas adjacent to controlled work areas has occurred.
- 1.11.6            In all non-controlled areas where it is determined by the Consultant (through visual inspection or air monitoring) that contamination has leaked, the Contractor shall be responsible to the complete isolation and cleaning of such areas under the direction of the Consultant and at no extra charge to the Owner.
- 1.11.7            The Consultant has been given authorization by the Owner to ensure that the Contractor adheres to specified procedures and materials and to inspect for completion and final cleanliness. Any additional work (including labour and material charges) specified by the Consultant to achieve completion of work to the level specified shall be carried out by the Contractor at no additional charge to the Owner.
- 1.11.8            The Contractor shall ensure that all equipment and materials to be used on the project are acceptable to the Consultant. Unacceptable materials and equipment shall be replaced by the Contractor at no additional charge to the Owner.
- 1.11.9            The Contractor shall be responsible for all additional inspection charges which are carried out as a result of a failure by the Contractor to meet set criteria relating to schedule, health and safety and quality.

**1.12            *Air Monitoring***

- 1.12.1            Air samples may be collected by the Environmental Consultant during the removal of asbestos-containing materials.
- 1.12.2            The objective of air monitoring is to detect defects in the containment of controlled areas and to ensure that any contamination of building spaces beyond the controlled areas is discovered and rectified immediately.
- 1.12.3            Any contamination of areas outside the limits of the controlled work areas (as determined by air monitoring) shall be contained and shall be thoroughly cleaned to the Consultant's satisfaction. The Contractor shall be responsible for all additional charges associated with such work.
- 1.12.4            Air monitoring will be carried out following procedures specified in the latest edition of the National Institute for Occupational Safety and Health (NIOSH). The samples will be analyzed by the Phase Contrast Microscopy (PCM) technique as specified in NIOSH method 7400A.
- 1.12.5            The Contractor shall cooperate with the Environmental Consultant during air monitoring.

- 1.12.6 Ensure that the workers exercise care and avoid damaging the Consultant's equipment.
- 1.12.7 Ensure that the samples and equipment are not tampered with.
- 1.12.8 The Contractor shall be responsible for charges associated with re-sampling due to tampering with the air samples.
- 1.12.9 The Contractor shall be responsible for repair or replacement charges of testing equipment that become damaged due to the actions of the Contractor forces.
- 1.12.10 PCM results equal to or greater than the specified level will indicate asbestos contamination of these perimeter areas.
- 1.12.11 The contaminated areas shall be isolated, contained and cleaned to the satisfaction of the Consultant.
- 1.12.12 Clearance air samples will be collected inside the work area after it is visually inspected by the Consultant, authorization is given to spray a lock-down agent and the lock-down agent is allowed to completely dry.
- 1.12.13 Air samples will be analyzed by the PCM method. The area will be considered clean and clear for public occupancy only if the fibre levels are less than 0.01 fibres/cc.
- 1.12.14 In case the fibre levels are equal to or greater than 0.01 fibres/cc, the Contractor shall be responsible for re-cleaning the asbestos work area and re-applying the lock-down agent. This process will have to be repeated until the fibre levels are below the specified limit.

### **1.13 Waste Transport and Disposal**

- 1.13.1 All asbestos-containing and asbestos-contaminated materials shall be disposed following the Safety Code for the Construction Industry and the Regulation Respecting the Quality of the Work Environment under the Act Respecting Occupational Health and Safety, as well as the Regulations Respecting the Handling and Offering for Transport and Transporting of Dangerous Goods, as amended. All wash water generated from decontamination activities shall be treated as asbestos waste and shall be disposed of accordingly.
- 1.13.2 All non-asbestos containing waste generated during abatement activities inside an asbestos work area shall be treated as asbestos waste.
- 1.13.3 Non-porous materials that can be washed and properly cleaned can be disposed of as clean waste.
- 1.13.4 The waste must be stored and transported in an enclosed, lockable waste bin.
- 1.13.5 Every vehicle used for the transportation of asbestos waste shall display a Class 9 Label.
- 1.13.6 Both sides of the vehicle used for the transportation of asbestos waste and every waste bag and container shall display the word CAUTION in letters not less than 10 cm in height and the words:

#### **CONTAINS ASBESTOS FIBRES**

Avoid Creating Dust

Asbestos May Be Harmful to Your Health

Wear Approved Protective Equipment



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| 1.13.7  | The transport vehicle must be properly equipped to deal with asbestos waste spills. Equipment shall include, but not limited to, respiratory protective equipment, disposable protective clothing, 6 mil polyethylene bags, shovel and broom and wetting agent. |
| 1.13.8  | For asbestos waste of unknown material or an asbestos type other than Chrysotile, the words Asbestos, Blue, Product Identification Number 2212 must be displayed on every waste container.  |
| 1.13.9  | For Chrysotile asbestos, the words Asbestos, White, Product Identification Number 2590 must be displayed on every waste container.  |
| 1.13.10 | The Contractor shall submit to the Consultant a copy of the shipping document and weight receipt for every shipment of asbestos waste.  |

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## PART B - FACILITIES AND PRODUCTS

### 2.1 *Equipment*

- 2.1.1 Provide equipment that is suitable for intended use as specified by the proper standards. All equipment used on the project shall be clean and in good state of repair.
- 2.1.2 Airless Sprayer: Equipment used for the application of amended water to saturate asbestos-containing materials before removal.
- 2.1.3 Electrical Components and Equipment: supplied by the Contractor for performance of work on this project shall meet the requirements of the Canadian Standards Association (CSA) for use as installed.
- 2.1.4 Electrical Power Cords: Use single length power cords. If single length will not reach work area, use waterproof connectors to connect separate lengths. Use heavy duty cords in high traffic areas or in areas where abrasion of cords is expected. Only grounded electrical cords will be allowed.
- 2.1.5 Ground Fault Panel: use an electrical panel that is installed by a licensed electrician and is equipped with the following:
  - 2.1.5.1 Ground fault circuit interrupts (breaker type) of sufficient capacity to supply all lights and equipment to be used in the work area.
  - 2.1.5.2 Breakers shall have 5mA ground fault protection.
  - 2.1.5.3 Main switch disconnects, test buttons and reset switches and circuit breaker lights.
  - 2.1.5.4 Proper enclosure to prevent the penetration of moisture, dust, and debris.
- 2.1.6 Temporary Lighting: Provide illumination as required in all work areas to perform the work safely and adequately. Illumination can be achieved by the use incandescent or fluorescent lamps. All lamps shall be protected by grounded guard cages or tempered glass enclosures.
- 2.1.7 Fine Atomizing Spray Nozzle: an airless sprayer nozzle that is designed to deliver no less than 1 gallon per minute of fine spray of water or lock-down agent.
- 2.1.8 Flexible Ducting: Tubing used for the exhaust of negative air units. The tubing is made up of plastic with metal reinforcement and is of a diameter that is equal to the exhaust port of a negative air unit.
- 2.1.9 Garden Sprayer: a metal or plastic pressure-can hand pump equipped with a hose and a metal wand. The pump is used to spray a fine mist of liquid on surfaces in a work area.
- 2.1.10 Glove Bag: In Ontario, the glove bag shall meet the following requirements:
  - 2.1.10.1 Shall be a Safety-T-Strip trade product with a configuration suitable to fit the work at hand.
  - 2.1.10.2 Shall have an internal ziplock feature for sealing the waste at the bottom of the bag.
  - 2.1.10.3 Shall be secured around the material being removed using the securing device supplied with the bag. The securing device consists of a 1-inch reusable nylon straps with a metal tightening buckle for sealing the ends of the bag.
  - 2.1.10.4 Shall be made of polyvinyl chloride (10 mil) minimum thickness with integral gloves and valve ports.
  - 2.1.10.5 Shall be equipped with reversible double pull zipper with protective flaps to facilitate installation and progressive movement on pipes.
  - 2.1.10.6 In other provinces, the glove bag shall meet the following requirements:

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- 2.1.10.6.1 Shall be made of polyvinyl chloride or equivalent plastic bag with a minimum thickness of 6 mil.
- 2.1.10.6.2 Shall be equipped with two gloves projecting inward and valves for attaching a vacuum hose or a metal wand.
- 2.1.10.6.3 Shall have a pouch for storing tools and enough space to accommodate the storage of removed materials and to allow for proper sealing of the bag. The bag shall also be labelled with warning signs to identify the content of the bag.
- 2.1.11 HEPA Filtered Negative Air Unit: A portable air handling system which is used to create negative air pressure differential by the extracting the air directly from the work area and discharging it to the exterior of the area. The unit shall be equipped as follows: Fan, HEPA filter, pre-filters, pressure differential gauge, cabinet, high/low switch, on/off switch.
- 2.1.11.1 The fan shall have a capacity of 1500 cubic feet per minute. The fan shall be considered to have 80% of the rated of air flow unless tested and certified by a company specializing in such measurements and subject to the approval of the Consultant.
- 2.1.11.2 Each unit shall have a HEPA filter installed as a final filter in the unit. A tight seal shall be established between the filter and the filter housing through the use of a rubber gasket. Each filter shall be clearly marked with the serial number, direction of air flow, efficiency, air flow rating, name of manufacturer and resistance and shall bear UL586 label.
- 2.1.11.3 Each unit shall have an on/off switched located on the exterior of the cabinet. The unit shall also be equipped with overload protection and components such as cabinet, fan, motor, etc. shall be grounded.
- 2.1.11.4 Each unit shall have a pressure differential gauge to monitor the filter loading and to indicate when the filters need to be changed. The unit shall also have a time meter to indicate the total accumulated hours of operation.
- 2.1.11.5 Each unit shall have the following warning and safety devices: a means for preventing the unit from operating without a HEPA filter; auto shutoff system to stop the fan in case of HEPA filter failure such as rupture of the filter or blockage of air flow through the filter.
- 2.1.11.6 Provide units with pre and intermediate filters installed at the intake of the unit and secured in place with clamps or special filter housings. Two pre-filters are required: the first pre-filter shall be of the low efficiency type and shall be 98% efficient for particles 100 microns and larger; the second pre-filter shall be of the medium efficiency type and shall be 95% efficient for particles down to 5 microns.
- 2.1.11.7 The cabinet of the unit shall be constructed of durable material able to withstand rough handling during removal work. The cabinet shall have wheels and shall be designed to allow access to the inside of the unit from the intake side for maintenance and replacement of filters. The unit shall be factory sealed to prevent the escape of dust and debris during transport and use.
- 2.1.12 HEPA Vacuum: A vacuum unit equipped with HEPA filter and designed so that all discharged air passes through the filter. Shall be equipped with all attachments, tools and fittings to facilitate the performance of the work.
- 2.1.13 Pressure Differential Monitoring Unit: An instrument designed to measure the difference in pressure between the interior and exterior of a work area. As a minimum, the instrument shall consist of the following: a continuous recoding wheel chart or tape; a gauge with a range from 0 to 0.1 inches water; sensor tubing and wall clamps; wall mounting devices, low limit and high limit audible alarm; and auto reset.

- 2.1.14 Power Washer: A piece of equipment capable of delivering an airless stream of liquid (water) at a pressure between 1200 and 2500 psi. Typically used for cleaning of work area surfaces and equipment and for saturating materials scheduled for removal before work start to reduce the creation of dust.
- 2.1.15 Scaffolding: Select, erect and use scaffolding in a manner that is in compliance with all applicable occupational health and safety regulations.
- 2.1.15.1 Types of scaffolding allowed consist of suspension or standing types such as cantilever, metal tube and coupler, pole or outrigger or tubular welded frame.
- 2.1.15.2 Provide non-skid surfaces and/or foot boards on all scaffolds where foot traffic is anticipated.
- 2.1.15.3 Provide an abrasive non-slip surfaces on rungs of metal ladders.
- 2.1.16 Water Service Components and Equipment: supplied by the Contractor for performance of work on this project shall be temperature and pressure rated for operation of the temperature and pressure encountered.
- 2.1.16.1 Hot water heater to be used for supplying water to the shower shall be:
- 2.1.16.1.1 ULC rated electric hot water heater.
- 2.1.16.1.2 Appropriately sized for the project.
- 2.1.16.1.3 Powered from the ground fault panel.
- 2.1.16.1.4 Equipped with a relief valve that is piped to a drip pan secured to the water heater.
- 2.1.16.2 Supply water to each working area and decontamination unit using pipes having a pressure rating greater than the pressure of the water distribution system. Provide fittings as necessary to allow connecting to existing systems and other temporary facilities.
- 2.1.16.3 The shower provided for the decontamination facility shall be of the walk-through type. The shower pan shall be a waterproof, one piece pan constructed from stainless or galvanized steel with welded seams, copper or lead with soldered seams or fibreglass reinforced with wood. The shower head shall be adjustable for spray size and intensity. The shower shall be supplied with separate hot and cold water. The control for water temperature, flow and shut off shall be located inside the shower.
- 2.1.16.4 Multi-stage cascade filter units shall be provided on drain lines from any water source carrying asbestos-contaminated water from the work area including the shower. The units shall be provided with a primary and a secondary disposal filter element. The primary filter shall allow the passage of particles that are 20 microns and smaller. The secondary shall allow the passage of particles that are 5 microns and smaller. The units shall be connected so that the water passes the primary filter first and the discharge of the primary filter passes through the secondary filter.

## 2.2 **Materials**

- 2.2.1 Materials destined for use on this project shall be undamaged, shall comply with the requirements of the contract and specifications and shall be unused at the time of installation unless otherwise indicated.
- 2.2.2 Asbestos Waste Container: An impermeable container that is dust-tight and impervious to asbestos waste. Shall be made of new material only and shall be labelled as required by applicable regulations with a pre-printed cautionary asbestos warning label. The container shall (depending on the nature of the waste material) be comprised of the following:

- 2.2.2.1 A 6 mil thick leak-tight polyethylene bag labelled as required and placed inside another 6 mil sealed polyethylene bag (in case the waste does not contain any sharp objects).
- 2.2.2.2 A 6 mil sealed polyethylene bag positioned inside or outside a heavy duty leak tight solid sealed container of sufficient strength to prevent perforation of the container during handling (in case the waste contains sharp objects).
- 2.2.3 Caulking: Acrylic polymer sealant that is non-staining.
- 2.2.4 Drop Sheets: Sheets made up of polyethylene of size and type appropriate to the work. To be placed under an area where work is being carried out.
- 2.2.5 Encapsulant: Type 1 penetrating Class A water based encapsulant conforming to CGSB 1-GP-205M and approved by the Fire Marshall and having a flame spread and smoke development ratings both less than fifty.
- 2.2.6 Felts: 1/16" thick and 36" to 72" wide non-coated, standard cellulose building felt.
- 2.2.7 Rip-Proof (Fibre Re-enforced) Polyethylene Sheeting: 8 mil fibre re-enforced fabric (bonded on both sides with polyethylene sheeting) made up from 5 mil weave and 2 layers of 1.5 mil poly laminate. Provide new material only in maximum size sheets (to fit work) to minimize joints.
- 2.2.8 Fire Extinguisher: Provide type "ABC" dry chemical fire extinguishers of a combination of extinguishers suitable for the type of exposure in each case.
- 2.2.9 First Aid Supplies: Provide and maintain first aid supplies on the project site as required by applicable regulations and construction industry recommendations.
- 2.2.10 Flame Resistant Polyethylene Sheeting: a layer of polyethylene sheeting that conforms to the requirements of the NFPA Standard 701, Small Scale Fire Test for Flame-Resistant Textiles and Films. Provide new material only in 6 mil thickness and in maximum size sheets (to fit work) to minimize joints.
- 2.2.11 Foam: Polyurethane expanding foam of low density.
- 2.2.12 Lock Down Sealant: a clear, non-staining, water dispersible type, slow drying sealant that is used for the purpose of trapping residual dust. The sealer shall remain sticky on the surface for an 8-hour period as a minimum. The product shall have flame spread and smoke development ratings of less than 50 for both. The sealant shall be compatible with replacement insulation or fireproofing and shall be capable of withstanding service temperature of substrate.
- 2.2.13 Polyethylene Sheeting: A 6 mil minimum (unless otherwise specified) thickness polyethylene film in maximum sheet size to minimize seems and black, frosted, or clear as required to meet specifications.
- 2.2.14 Protective Coveralls: Full body coveralls complete with hoods and shoe coverings, made up of a material which does not permit penetration of asbestos fibres and is disposable.
- 2.2.15 Spray Cement: Specifically formulated spray adhesive in spray cans devised to stick to polyethylene sheets.
- 2.2.16 Tape: 2" to 3" widths reinforced tape (cloth or fibreglass reinforced) appropriate for sealing polyethylene sheets under dry and wet conditions.
- 2.2.17 Wetting Agent: A mixture of water and a surfactant used for wetting asbestos-containing materials before removal to minimize the release of fibres during disturbance of the material.

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**PART C - EXECUTION**

**ASBESTOS**

**3.1      *Type 1 Removal Operation***

3.1.1      Initial Preparation and Isolation of Work Areas: Unless otherwise specified, work carried out as part of this phase shall proceed as follows:

3.1.1.1      Carry out a survey of the work areas to compile an inventory of existing damages and provide a copy to the Consultant.

3.1.1.2      The Contractor is responsible for moving materials and objects which are present in the work areas.

3.1.1.3      Prevent the spread of dust from the work area using measures appropriate to the work to be done.

3.1.1.3.1      Shut off, lock out and seal all ventilation duct vents with the application of one layer of 6 mil (0.15mm) thick clear polyethylene sheet sealed with tape.

3.1.1.3.2      Use FR polyethylene drop sheets over all flooring in work areas where dust and contamination cannot otherwise be thoroughly cleaned. This does not apply if work involves the removal of asbestos-containing floor tiles.

3.1.1.3.3      Use one layer of 6 mil (0.15 mm) thick clear polyethylene sheets to cover walls.

3.1.1.3.4      Separate parts of the building required to remain in use from the work area by polyethylene drop sheets at the perimeter of the work area.

3.1.1.3.5      Separate the work area with clearly visible warning signs advising of the hazards of asbestos dust and that entry is restricted to authorized trained personnel wearing personal protective equipment.

3.1.1.3.6      Erect scaffolding or platforms where necessary to perform the removal work. All platforms that exceed 25 feet in height will require the submission of a shop drawing stamped by a professional engineer for approval by the inspector within a minimum of 5 days prior to commencing the work. Guard rails shall be provided around all platforms or scaffolding where practicable. Cover the floor area of the scaffold or platform with one layer of FR polyethylene. Extend the floor of scaffolding or platform under an item being removed to act as a receptacle. Polyethylene sheeting shall be suitably braced and/or restrained so that billowing or failure of the polyethylene sheeting or taped joints does not occur.

3.1.2      Entry and Exit Procedures from Asbestos Removal Work Areas: the following general procedures shall be adhered to when entering into and exiting from asbestos abatement work areas:

3.1.2.1      Work Area Entry Procedures:

3.1.2.1.1      Every worker and visitor planning to enter the work area should remove all street clothing and should store them in a designated clean change room.

3.1.2.1.2      The person shall then put on disposal coverall with head covering, respirators with clean filters and foot covering and shall proceed to the work area.

3.1.2.2      Work Area Exit Procedures:

3.1.2.2.1      Each worker shall decontaminate their protective clothing, boots, and respirator by first HEPA vacuuming and then by damp wiping using soap and water.

3.1.2.2.2      The removed disposable coveralls shall be disposed of as asbestos waste in a 0.15 mm (6 mil) labelled waste bag. Respirator filter inlets shall be sealed in tape or disposed of as asbestos waste.



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3.1.3      Asbestos Removal Procedures

3.1.3.1      Asbestos Removal shall not commence until:

3.1.3.1.1      The work area is effectively separated from clean areas of the building.

3.1.3.1.2      Warning signs are posted outside the removal work areas.

3.1.3.1.3      All surfaces which are not possible to clean are sealed with polyethylene sheeting and tape.

3.1.3.1.4      Arrangements have been made for waste disposal, landfill site operator has been contacted and storage bin is on site.

3.1.3.1.5      Tools equipment and materials are on hand and in the work area.

3.1.3.1.6      Facilities for the washing of hands and face are available for workers leaving the work area.

3.1.3.2      Before beginning work remove visible dust from surfaces in the work area where dust is likely to be disturbed during the work. Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate. Do not use compressed air to clean up or remove dust from any surface.

3.1.3.3      Wet materials containing asbestos to be cut, ground, abraded, drilled, or otherwise disturbed with amended water. Use garden type low velocity fine mist sprayer. Perform work in a manner to reduce dust creation to lowest levels practicable. Spray asbestos material repeatedly during the work process to minimize asbestos fibre release.

3.1.3.4      Remove material in sections as intact as possible.

3.1.3.5      Frequently during the work and immediately after completion of the work, clean up dust and waste containing asbestos using a HEPA vacuum or by damp wiping.

3.1.4      Final Clean

3.1.4.1      When removal is complete, clean the entire work area by HEPA vacuuming and wet wiping.

3.1.4.2      The work area shall be deemed clean by the Inspector when there is no visible residue, dirt, film, stain, or discolouration resulting from either asbestos removal or cleaning activities.

3.1.4.3      After completion of the initial cleaning and after the Inspector has passed the visual inspection, spray sealant on all surfaces in the work area, including, but not limited to:

3.1.4.3.1      Where asbestos material has been removed.

3.1.4.3.2      Polyethylene sheeting used on walls, floors, and ceilings.

3.1.4.4      Sealant should be sprayed using a garden reservoir type low velocity fine mist sprayer. The sprayer cannot be used if the nozzle is partially obstructed, or if a uniform fine mist spray cannot be obtained.

3.1.4.5      After the area is declared clean and written approval to proceed has been received from the Inspector:

3.1.4.5.1      Dismantle boundaries and isolating barriers as asbestos waste. Drop sheets shall be wetted and folded to contain dust and then placed in waste bags.

3.1.4.5.2      Immediately before their removal from the work area, and disposal, clean each filled labelled waste bag using damp cloths or HEPA vacuum and place in second clean clear polyethylene waste bag.

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| 3.1.4.5.3 | Dispose of waste as per procedures specified in subsection 1.13 Waste Transport and Disposal.   |
| 3.1.4.6   | Repair or replace objects damaged in the course of the work. Re-establish objects moved to temporary locations in the course of the work, in their proper positions. Re-secure mounted objects removed in the course of the work in their former positions. |

**END OF SECTION**

## Attachment A – Photo of black caulking

