HAZARDOUS BUILDING MATERIALS REMOVAL SPECIFICATIONS

Project:

HVAC Upgrades Project
126 Pape Avenue, Toronto, Ontario

Sections:

Section 02 82 13.2 – Type 2 Asbestos Abatement
Section 02 82 13.3 – Type 3 Asbestos Abatement
Section 02 83 13 – Lead Disturbance Precautions
Section 02 84 16 – Handling of Mercury Containing Equipment
Section 02 87 13 – Silica Disturbance Precautions

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Part 1 General

1.1 GENERAL REQUIREMENTS

1. Conform to Sections of Division 1 as applicable.

1.2 RELATED SECTIONS

1. Section 02 82 13.3 – Type 3 Asbestos Abatement
2. Section 02 83 13 – Lead Disturbance Precautions
3. Section 02 84 16 – Handling of Mercury Containing Equipment
4. Section 02 87 13 – Silica Disturbance Precautions

1.3 SITE CONDITIONS

1. Types of asbestos present: Chrysotile present within, within but not limited to textured ceiling finish, 12x12 red vinyl floor tiles, and 12x12 yellow with white streak vinyl floor tiles. Vinyl floor tiles are not expected to be are not expected to be disturbed during the HVAC Upgrade Project.
2. Materials identified to contain Asbestos can be found within the Safetech Environmental Limited report titled “Designated Substances and Hazardous Materials Assessment Report, HVAC Upgrades Project, 126 Pape Avenue, Toronto, Ontario” issued on August 15, 2025.
3. Removal or disturbance of asbestos-containing materials must be conducted in accordance with Ontario Regulation 278/05 (O. Reg. 278/05), “Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations” as made under the Occupational Health and Safety Act.

1.4 DESCRIPTION OF WORK

1. The following are classified as **Type 2 operations** under O. Reg. 278/05:
    1. Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.
    2. The removal or disturbance of one square metre or less of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of machinery or equipment or a building, aircraft, locomotive, railway car, vehicle or ship.
    3. Enclosing friable asbestos-containing material.
    4. Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.
    5. Installing or removing ceiling tiles that are asbestos-containing material, if the tiles cover an area of 7.5 square metres or more and are installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
    6. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,

1. the material is not wetted to control the spread of dust or fibres, and
2. the work is done only by means of non-powered hand-held tools.

7. Removing one square metre or more of drywall in which joint filling compounds that are asbestos-containing material have been used.
8. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
9. Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.
10. Cleaning or removing filters used in air handling equipment in a building that has sprayed fireproofing that is asbestos-containing material.
11. An operation that,
    1. is not mentioned in 1.41.1 through 1.41.10,
    2. may expose a worker to asbestos, and
    3. is not classified as a Type 1 or Type 3 operation.

2. If removing 1.0m^2 or less of asbestos-containing texture coat finish, perform all work in accordance with Section 02 82 13.2 (Type 2 Asbestos Abatement).
3. Maintain electrical and mechanical services passing through asbestos work area.
4. Seal all surfaces from which asbestos has been cleaned or removed with slow drying sealer.
5. Dispose of temporary enclosures, disposable equipment and any asbestos-containing or contaminated materials removed, as asbestos waste.
6. All work will be subject to inspection and air monitoring both inside and outside asbestos work area by Owner's Consultant. Any contamination of surrounding areas (indicated by visual inspection or air monitoring) shall necessitate complete enclosure and clean-up of affected areas.

1.5 DEFINITIONS

1. **Asbestos Work Area(s)**: Area(s) where work takes place which will, or may disturb asbestos-containing material, including overspray and fallen material, or settled dust that may contain asbestos.
2. **Airlock**: 2 curtained doorways spaced minimum of 2 m (6') apart.
3. **Authorized Visitor(s)**: Construction Manager or person(s) representing regulatory agencies, and person(s) authorized by them.
4. **Curtained Doorway**: Device to allow ingress or egress from enclosure while permitting minimal air movement, typically constructed by placing 2 overlapping flaps of polyethylene sheeting (2 sheets of polyethylene per flap) attached to head and 1 jamb of existing or temporarily constructed door frame. Secure vertical edge of 1 flap along 1 vertical side of door frame, and vertical edge of other flap along opposite vertical side of door frame. Reinforce free edges of polyethylene with duct tape.
5. **Friable Material**: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

6. **HEPA Filter**: High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in collecting 0.3 micrometer aerosol.

7. **Negative Pressure**: Reduced pressure within asbestos work area(s) established by extracting air directly from work area, and discharging directly to exterior of building. Discharged air first passes through HEPA filter. Extract sufficient air to ensure constant reduced pressure at perimeter of work area with respect to surrounding areas.

8. **Polyethylene Sheeting**: Polyethylene sheeting 0.15 mm (6 mil) minimum thickness; with tape seals along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane protection.

1.6 QUALITY ASSURANCE

1. Ensure work proceeds to Schedule and meets all requirements of this Section. Perform work so airborne asbestos, asbestos waste or water run off does not contaminate areas outside asbestos work enclosure.

2. Pay cost to Owner of inspection and air monitoring performed as result of failure to perform work satisfactorily.

3. Use only skilled and qualified workers for all trades required for this work.

1.7 REGULATIONS

1. Comply with Ontario Regulation 278/05, "Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations" made under Occupational Health and Safety Act (as amended) and local requirements pertaining to asbestos. In case of conflict with these specifications, the most stringent requirements shall apply.

2. Handle and dispose of contaminated waste as required by R.R.O. 1990, "General – Waste Management" made under The Environmental Protection Act (as amended).

1.8 SUBMITTALS

1. Before Commencing Work:

    1. Obtain and submit all necessary permits for transporting and disposal of asbestos waste.
    2. Submit names of supervisory personnel who will be responsible for asbestos work area(s). One of supervisors must remain on Site at all times while asbestos removal or clean-up is occurring. Submit proof that supervisory personnel have attended training course on asbestos control (two-day minimum duration) and have performed supervisory function on at least two other asbestos control projects.
    3. Submit proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.
    4. Submit list of existing damage for acceptance.

1.9 WORKER AND VISITOR PROTECTION

1. Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators, entry and exit procedures, and all aspects of work procedures and protective measures. Instruction shall be provided by competent person as defined by Occupational Health and Safety Act.

2. **Respiratory Protection**

    1. Provide appropriate respiratory equipment for all persons within asbestos work area including authorized visitors. Type of respirator (full-face or half-face APR) depends on the classification of Type 2 operation.

        1. **Half-Face Air-Purifying Respirator** (APR)

            1. Half-face APR is required for asbestos operations not specified in specified in 1.92.1.2 below.

        2. **Full Face Air-Purifying Respirator** (APR)

            1. Full-face APR is required for the following Type 2 operations

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

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

        3. **Filters**: acceptable filters include N-, R-, or P-100 filters.

            1. Replace filters daily or test according to manufacturer's specifications and replace as indicated.

    2. Respirators shall be acceptable to Occupational Health Branch of Ministry of Labour, Immigration, Training and Skills Development.

    3. Provide proper instruction to workers and visitors on use of respirators, including qualitative fit testing.

    4. No supervisor, worker or authorized visitor shall wear facial hair which affects seal between respirator and face.

    5. Maintain respiratory protection equipment in proper functioning and clean condition, or remove from site

3. **Protective Clothing**: Provide workers and visitors in asbestos work area with full body coveralls with integral hoods. Once coveralls are worn in asbestos work area, treat and dispose of as asbestos contaminated waste. Workers and visitors shall also wear other protective apparel required by Ministry of Labour, Immigration, Training and Skills Development construction regulations.

4. Before entering asbestos work area, put on respirator with new or tested filters, clean coveralls and head covers. Wear coveralls with hoods up at all times.

5. Workers may leave asbestos work area, only after all disturbance of asbestos-containing materials is complete and work area has been cleaned-up. When leaving asbestos work area, workers and visitors must use HEPA vacuum to clean exterior of respirator to remove visible contamination, and remove gross contamination from coveralls and other protective equipment. Immediately upon leaving asbestos work area, workers and visitors shall remove coveralls, wash face and hands thoroughly with soap and water, and wet clean inside of respirator. Remove filters and dispose of or test filters according to manufacturer's specifications. Place coveralls and used filters in receptacles for disposal with other asbestos contaminated materials. Coveralls can be reused, to maximum of 8 hours wear, if coveralls remain inside work area.

6. Do not eat, drink, smoke or chew gum or tobacco in asbestos work area.
7. Workers and visitors shall be fully protected as specified herein whenever possibility of disturbance of asbestos exists.

Part 2 Products

2.1 MATERIALS

1. Polyethylene Sheeting: 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.
2. Rip-Proof Polyethylene: 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.
3. Tape: Tape suitable for sealing polyethylene to surface encountered under both wet conditions using amended water, and dry conditions.
4. Wetting Agent: Non-sudsing surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Asbestos-Wet, distributed by Asbetec Distributors, Richmond Hill, Ontario.
5. Amended Water: Water with wetting agent added.
6. Asbestos Waste Receptors: 2 separate containers of which 1 shall consist of 0.15 mm (6 mil) minimum thickness polyethylene bag. Other container may be 0.15 mm (6 mil) minimum thickness polyethylene bag or rigid sealable container such as metal or cardboard, fibre drum or wood box. Other container shall be adequate to prevent perforating rips, or tears in first container during filling, transport or disposal. Containers must be acceptable to disposal Site selected and Ministry of the Environment, Conservation and Parks.
7. Sealer: Sealer for purpose of trapping residual fibre debris. Product must have flame spread and smoke development ratings both less than 25. Product shall leave no stain when dry: TC-55 (clear), A/D Fire Protection Systems Inc., Scarborough, Ontario. For mechanical equipment, pipes, boilers, etc. use high temperature sealer only: Chil-Abate CP210, Childers Products Company, Mississauga, Ontario.
8. Sprayer: Garden-type portable manual sprayer, low velocity, capable of producing mist or fine spray.
9. HEPA Vacuum: Vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.

Part 3 Execution

3.1 ASBESTOS WORK AREA(S) – FULL ENCLOSURE

1. Full enclosures must be constructed for Type 2 operations mentioned in 1.41.2 and 1.3 in Section 02 82 13.2 (Type 2 Asbestos Abatement).
2. Move equipment, tools, and stored materials which can be moved without disturbing asbestos-containing materials.
3. Remove elements which can be removed without disturbing asbestos-containing materials.

4. If working from within building, request building personnel to shut off air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
5. Erect wood or metal framing between asbestos work area and remaining building area, as necessary to support polyethylene sheeting enclosures. Free standing enclosure shall have completely sealed polyethylene top.
6. Use sufficient layers to provide adequate protection. Protect floors with at least one layer of polyethylene sheeting. Where walls are protected with sheeting, cover floors first so that wall polyethylene overlaps floor layer by at least 300 mm (12").
7. Where applicable clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
8. If enclosure is used for more than 1 shift, construct airlock for entry to and exit from enclosure. Clean enclosure prior to exiting at completion of each shift.
9. Establish negative pressure in asbestos work area. Operate negative pressure units or HEPA vacuums continuously from this time until completion of contaminated work.
10. Provide soap, water and towels for washing of worker's face and hands when exiting enclosure.
11. Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
12. Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remainder of building.

3.2 ASBESTOS WORK AREA(S) [NO ENCLOSURE]

1. Establish asbestos work area with appropriate hoarding (partial enclosure, caution tape, fencing, etc.) to prevent unauthorized access to the asbestos work area.
2. Move equipment, tools, and stored materials which can be moved without disturbing asbestos-containing materials.
3. Remove elements which can be removed without disturbing asbestos material.
4. Request building personnel to shut off air handling and ventilation systems supplying or exhausting from asbestos work area(s). Ensure air-handling systems remain shut off for duration of work.
5. Use sufficient layers to provide adequate protection. Protect floors with at least one (1) layer of polyethylene sheeting.
6. Where applicable, clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
7. Provide soap, water and towels for washing of worker's face and hands when exiting enclosure.
8. Ensure existing power supply to asbestos work area is isolated and disconnected where necessary.

3.3 MAINTENANCE OF ASBESTOS WORK AREA(S)

1. Maintain asbestos work area in tidy condition.

2. Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

3. Visually inspect asbestos work area(s) at beginning of each working period.

3.4 COMMENCE ASBESTOS REMOVAL OR CLEANUP WORK WHEN

1. Arrangements have been made for disposal of waste.

2. Asbestos work area(s) and parts of building required to remain in use are effectively segregated.

3. Tools, equipment and materials waste receptors are inside asbestos work area(s).

4. Signs are displayed in all areas where access to sealed asbestos work areas possible. Signs shall read:

CAUTION
Asbestos Hazard Area
No Unauthorized Entry
Wear assigned protective equipment
Breathing asbestos dust may cause serious bodily harm.

5. Owner's Consultant has been notified of intention to proceed and has reviewed asbestos work area(s) and equipment.

3.5 REMOVAL OF FRIABLE MATERIALS (≤1.0M²)

1. Before commencing work, prepare asbestos work area as described in 3.1 (full enclosure), 3.3, and 3.4.

2. Seal opening to enclosure with tape after entry of worker. Worker shall remain inside enclosure until disturbed asbestos-containing materials are removed and enclosure has been effectively cleaned.

3. Perform work required inside enclosure.

4. When cleaning or removing asbestos-containing material within enclosure, spray asbestos-containing material with amended water. Saturate asbestos to prevent release of airborne fibres during removal. Place fully saturated asbestos directly into waste containers.

5. Treat materials removed including used polyethylene sheeting as asbestos contaminated waste and dispose of as such.

6. Carefully place asbestos waste in inner bag of asbestos waste receptor. Clean inner bag surface of gross contamination and place in clean 6 mil outer bag. If waste is likely to tear inner bag, then instead of outer bag, use fibre or metal drum, cardboard or wood box, or other suitably sturdy container

7. Following completion of work, clean surfaces from which asbestos has been disturbed with HEPA vacuum, or wet-sponge if appropriate to remove all visible material.

8. After wet-sponging or vacuuming to remove visible asbestos, wet clean entire enclosure. Apply coat of sealer to all surfaces from which asbestos has been disturbed. Apply thinned coat (sufficient to coat all surfaces) to interior of polyethylene enclosure prior to tear down.

3.6 TEAR DOWN OF PROTECTION

1. When dismantling enclosure, carefully roll polyethylene toward centre of enclosure. As polyethylene is rolled away, immediately remove any visible debris with HEPA vacuum.
2. Place polyethylene sheeting seals, tape, cleaning material, coveralls, and other contaminated waste in asbestos waste receptors for transport. Remove any debris fallen behind plastic with HEPA vacuum.
3. Clean up asbestos waste receptors and equipment used in work, and remove from asbestos work area(s) via drum and equipment decontamination enclosure systems, at appropriate time in sequence. Double bag waste immediately prior to transport from site to disposal bin.
4. Final review may be carried out by Owner's Consultant to ensure no dust or debris remains.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

1. When clean-up is complete reinstall items removed to facilitate asbestos related operation, in their proper positions. Reconstruction and reinstallation shall be by tradesmen qualified in work being reinstalled or reconstructed.
2. At completion of work make good all damage not identified in pre-removal survey referred to in para. 1.81.4.

3.8 INSPECTION

1. From commencement of work until completion of clean-up operations, Clients Consultant may be present.
2. If visual inspection indicates that areas outside current asbestos work area enclosures are contaminated these areas are to be cleaned in same manner as that applicable to asbestos work areas, at no cost to Client.
3. Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

3.9 WASTE TRANSPORT AND DISPOSAL

1. Conform to requirements of Regulation 347 (as amended) made under Environmental Protection Act for Waste Management, transporting and disposal of hazardous waste.
2. Obtain Certificate of Approval from Ministry of the Environment, Conservation and Parks for waste management disposal system for asbestos.
3. Check with dump operator to determine type of waste containers acceptable.
4. Ensure shipment of containers to dump is taken by waste hauler licensed to transport asbestos waste.
5. Each load requires completion of bill of lading showing type and weight of hazardous waste being transported.
6. Co-operate with Ministry of the Environment, Conservation and Parks inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to Owner.
7. Ensure dump operator is fully aware of hazardous material being dumped.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

1. Conform to Sections of Division 1 as applicable.

1.2 RELATED SECTIONS

1. Section 02 82 13.2 – Type 2 Asbestos Abatement
2. Section 02 83 13 – Lead Disturbance Precautions
3. Section 02 84 16 – Handling of Mercury Containing Equipment
4. Section 02 87 13 – Silica Disturbance Precautions

1.3 SITE CONDITIONS

1. Types of asbestos present: Chrysotile present within, but not limited to textured ceiling finish, 12x12 red vinyl floor tiles, and 12x12 yellow with white streak vinyl floor tiles. Vinyl floor tiles are not expected to be are not expected to be disturbed during the HVAC Upgrade Project.
2. Materials identified to contain Asbestos can be found in the following Safetech Environmental Limited report, "Designated Substances and Hazardous Materials Assessment Report, HVAC Upgrades Project, 126 Pape Avenue, Toronto, Ontario" issued on August 15, 2025.

1.4 DESCRIPTION OF WORK

1. The following are classified as **Type 3 operations** under O. Reg. 278/05:
    1. The removal or disturbance of more than one square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of all or part of a building, aircraft, ship, locomotive, railway car or vehicle or any machinery or equipment.
    2. The spray application of a sealant to friable asbestos-containing material.
    3. Cleaning or removing air handling equipment, including rigid ducting but not including filters, in a building that has sprayed fireproofing that is asbestos-containing material.
    4. Repairing, altering or demolishing all or part of a kiln, metallurgical furnace or similar structure that is made in part of refractory materials that are asbestos-containing materials.
    5. Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.
    6. Repairing, altering or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before March 16, 1986.
2. If removing more than 1.0m^2 of asbestos-containing texture coat finish perform all work in accordance with Section 02 82 13.3 (Type 3 Asbestos Abatement).

3. Dispose of temporary enclosures, disposable equipment and any asbestos-containing or contaminated materials removed, as asbestos waste.
4. HEPA-filtered construction air handling units must be DOP-tested on-site.
5. Abatement contractor must provide a bill of lading for the disposal of asbestos waste.
6. Seal surfaces from which asbestos has been removed and surfaces potentially contaminated with asbestos, with sealer.
7. Maintain only emergency electrical and mechanical services passing through asbestos work area. All other services must be deactivated during abatement work.
8. All work will be subject to inspection and air monitoring inside and outside asbestos work area by the Owner's Consultant. Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate complete cleanup of affected areas at no additional cost to the Owner.
9. Protect surfaces remaining within asbestos work area.

1.5 REFERENCES

1. Canadian Standards Association (CSA): CSA Z180.1-19 Compressed breathing air and systems.
2. Canadian Standards Association (CSA): CSA-Z94.4-18 Selection, use, and care of respirators.

1.6 DEFINITIONS

1. **Authorized Visitor(s):** Owner's Consultant, person(s) representing regulatory agencies, or other authorized persons.
2. **Competent Person or Supervisor:** A person who is qualified because of knowledge, training and experience, to organize the work and its performance; is familiar with the Occupational Health and Safety Act and the regulations that apply to the work; and has knowledge of any potential or actual danger to health or safety in the workplace.
3. **Contractor:** Asbestos abatement contractor providing demolition, removal and cleaning services as defined in these specifications.
4. **Critical Barrier or Enclosure:** Minimum of two separate layers rip-proof polyethylene sheeting taped securely and separately over windows, doorways, diffusers, grilles and any other openings between Work Area and areas outside of the Work Area, including outside of the building.
5. **Curtained Doorway:** Device to allow ingress or egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two (2) overlapping sheets of polyethylene sheeting (two sheets of polyethylene sheeting per flap) attached to head and one jamb of existing or temporarily constructed door frame. Secure vertical edge of one flap along one vertical side of doorframe and vertical edge of other flap along opposite vertical side of doorframe. Reinforce free edges of polyethylene sheeting with duct tape.
6. **DOP Test**: A testing method employing dioctyl phthalate aerosol for purpose of leak testing negative air units.

7. **Friable Material**: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled pulverized or powdered.

8. **HEPA Filter**: High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in collecting 0.3-micrometer aerosol.

9. **HVAC**: Heating, ventilating and air-conditioning system(s) which serve occupied areas. Includes, but is not limited to, air handling units, ductwork, terminal boxes and grilles.

10. **Polyethylene Sheeting:** Polyethylene sheeting of 0.15 mm (6 mil) minimum thickness with tape seals along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous membrane protection

11. **Negative Pressure**: Reduced pressure within asbestos work area(s) established by extracting air directly from work area, and discharging it directly to exterior of building or to an adjacent area within the building outside of the Work Area. Discharged air first passes through HEPA filter. Extract sufficient air to ensure constant reduced pressure at perimeter of work area with respect to surrounding areas.

12. **Occupied Area:** Areas of the building or work site that are outside of the Work Area.

13. **Owner:** Toronto Community Housing and its representatives.

14. **Owner's Consultant:** Safetech Environmental Limited, the environmental consultant overseeing asbestos abatement.

15. **PPE:** Personal protective equipment.

16. **Work Area:** Specific area or location where actual asbestos abatement work is being performed or such other area of the building which it has been determine may be hazardous to public health as a result of asbestos abatement.

1.7 REGULATIONS

1. Comply with applicable Federal, Provincial, and Local laws and regulations in effect at time work is performed. In case of conflict among these requirements or with these specifications the more stringent requirement applies. Contractor shall observe all such laws and regulations and shall obtain and/or pay all permits, notices, fees, taxes, duties as may be required. If no regulations exist, follow guidelines most widely accepted by recognized professional organizations such as occupational hygienists, health professionals and environmental consultants as listed in paragraph 1.5 References.

2. Contractor shall ensure that the measures and procedures prescribed under the Occupational Health & Safety Act (the Act) are carried out and that every employee and worker on the project complies with applicable regulations (as amended) made under the Act, including (but not limited to):

    1. Ontario Regulation 213/91 – Construction Projects
    2. Ontario Regulation 278/05 – Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations
    3. Ontario Regulation 297/13 – Occupational Health and Safety Awareness and Training
    4. Ontario Regulation 490/09 – Designated Substances
    5. Ontario Regulation 632/05 – Confined Spaces

6. R.R.O. 1990, Regulation 860 – Workplace Hazardous Materials Information System (WHMIS)

3. Asbestos-containing waste or contaminated waste to be handled and disposed of in accordance with R.R.O. 1990, Regulation 347/90, "General – Waste Management" made under The Environmental Protection Act.

1.8 QUALITY ASSURANCE

1. Ensure work proceeds to schedule, and meets all requirements of this Section. Perform work so that airborne asbestos, asbestos waste, or water runoff do not contaminate areas outside asbestos work enclosure.

2. Pay cost to the Owner of inspection and air monitoring performed as result of failure to perform work satisfactorily regarding quality, safety, or schedule.

3. Use only skilled and qualified workers for all trades required for this work.

4. Contractor shall ensure that:

    1. Measures and procedures prescribed under the Occupational Health & Safety Act and regulations are carried out.
    2. Every employee and every worker on project complies with applicable act and regulations.
    3. Health & safety of workers and public is protected.
    4. All material handling, and associated equipment conform to and are operated in accordance with "Workplace Hazardous Materials Information System" (WHMIS).
    5. Advise the Owner whenever work is expected to be hazardous to employees and/or public.

5. Contractor may be requested to provide information on their health & safety record.

1.9 SUBMITTALS

1. Submit proof that all workers conducting abatement activities have successfully completed the **Asbestos Abatement Worker** Training Program approved by the Ministry of Labour, Immigration, Training and Skills Development and supervisors conducting abatement activities have successfully completed the **Asbestos Abatement Supervisor** Training Program approved by the Ministry of Labour, Immigration, Training and Skills Development as outlined in Section 20 of Ontario Regulation 278/05.

2. Submit names of supervisory personnel who will be responsible for asbestos work area(s). One of supervisors must remain on Site at all times while asbestos removal or clean-up is occurring. Submit proof that supervisory personnel have attended training course on asbestos control (2-day minimum duration) and have performed supervisory function on at least two other asbestos control projects.

3. Submit proof satisfactory to Owner's Consultant that workers have had instruction and training related to care and use of respirators in accordance with and have been fit-tested for the type(s) of respirator(s) to be used.

4. Submit Notice of Project [Form 0175] to the Ministry of Labour, Immigration, Training and Skills Development. Print and sign a copy of the Notice of Project and post or make it available at the project site.

1. Not later than ten days before commencing asbestos work on this project, notify in writing Ontario Ministry of Labour, Immigration, Training and Skills Development, Construction Health and Safety Branch located nearest to the area the abatement is being conducted. The information provided to the Ontario Ministry of Labour, Immigration, Training and Skills Development must comply with the requirements outlined in Section 11, subsection 3 of O. Reg. Orally notify them before commencing work.

5. Submit Material Safety Data Sheets (MSDSs) for all products to be used during asbestos abatement.

6. Obtain and submit all necessary permits for transporting and disposal of asbestos waste.

    1. Notify sanitary landfill site in accordance with requirements of Reg. 347.

7. Submit proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.

8. Submit list of existing damage for acceptance.

9. Submit proof that abatement contractor is a member of and in good standing with the Environmental Abatement Council of Ontario (EACO).

10. Submit proof of Contractors Liability Insurance for dealing with hazardous materials, specifically stating that asbestos is not excluded from the policy.

11. Submit confirmation of good standing with Workplace Safety and Insurance Board (WSIB).

1.10 WORKER AND VISITOR PROTECTION

1. **Instructions:** Before entering asbestos work area, instruct workers and visitors in use of respirators, dress, showers, entry and exit from asbestos work areas, and all aspects of work procedures and protective measures. Instruction shall be provided by Competent Person as defined by Occupational Health and Safety Act.

2. **Full-Face Air-Purifying Respirator:** During wet removal and cleanup in enclosed asbestos work area workers, supervisors, and authorized visitors shall be supplied with and use air-purifying full-face respirator (APR) with N-, R- or P-100 filters. Replace filters daily or test according to manufacturer's specifications and replace as indicated. Respirators shall be acceptable to Occupational Health Branch of Ministry of Labour, Immigration, Training and Skills Development. Provide proper instruction to workers and visitors in use of respirators, including qualitative fit testing. Maintain respiratory protection equipment in proper functioning and clean condition.

3. **Atmosphere Supplying Respirators:** Removal of more than 1.0 m^2 of sprayed applied asbestos-containing materials that contain a type of asbestos other than chrysotile or the dry removal of asbestos-containing materials indicated in paragraph 1.41 require the use of atmosphere supplying respirators as stipulated in O. Reg. 278/05.

    1. Prior to use, testing of the compressed air system used with supplied air respirators shall be completed to ensure it meets the standards set out in Table 1 of CSA Standard Z180.1-19, Compressed Breathing Air and Systems.

1. If an oil-lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor equipped with an alarm shall be provided.
2. If an ambient breathing air system is used, the air intake shall be located in accordance with Appendix B of CSA Standard Z180.1-19.

4. **Protective Clothing**: Provide workers and visitors in Work Area with full body coveralls with integral hoods. Once coveralls are worn in the Work Area, dispose of as contaminated waste. Workers and visitors shall wear other protective apparel required by Ministry of Labour, Immigration, Training and Skills Development regulations.

5. Before entering Work Area, remove street clothes in clean change room and put on respirator with new or tested filters, clean coveralls and head covers before entering equipment and access areas or Work Area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.

6. Persons leaving Work Area shall remove gross contamination from clothing before entering dirty room of decontamination facility. Proceed to equipment and access area and remove all clothing except respirator. Place contaminated work suit in receptacles for disposal with other asbestos contaminated materials. Footwear, clothing, hardhats, protective eyewear, etc., shall be left in equipment and access area to dry for later use. Still wearing respirator proceed naked to showers. Clean respirator to ensure that visible contamination is removed. After having thoroughly washed hair and body with shampoo and soap, remove respirator. Remove filters and dispose of in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean before removing from equipment and access area, or carry in sealed plastic bag to next site.

7. Following showering, proceed to clean change room, dry off and dress in street clothes. Store respirators in fashion to allow them to be put on prior to entering asbestos work area at start of next shift without contaminating clean area. If re-entry to Work Area is to take place after having left for eating or drinking, follow procedures in para. 1.105.

8. Removal of waste and equipment from holding room of waste decontamination enclosure system shall be performed by workers entering from outside. These workers shall wear clean coveralls and half-face air-purifying respirator with P100 filters. No worker shall use this system as means to leave or enter Work Area.

9. Do not eat, drink smoke or chew gum or tobacco at work site. Tobacco products are not allowed on property.

10. Workers and visitors shall be fully protected as specified herein when possibility of disturbance of asbestos exists.

Part 2 Products

2.1 MATERIALS

1. **Polyethylene**: 0.15 mm (6 mil) minimum thickness unless otherwise specified.

2. **Rip-Proof Polyethylene**: 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil weave and 2 layers 0.04 mm (1.5 mil).

3. **Tape**: Tape suitable for sealing polyethylene to surface encountered, under both wet conditions using amended water, and dry conditions.

4. **Wetting Agent**: Non-foaming surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Standard of Acceptance, Asbesto-Wet, distributed by Asbetec Distributors, or equivalent.

5. **Amended Water**: Water with wetting agent added.

6. **Asbestos Waste Receptors**: Two separate containers of which 1 shall consist of 0.15 mm **(true 6 mil)** minimum thickness sealable polyethylene bag. Other container may be 0.15 mm **(true 6 mil)** minimum thickness polyethylene bag. Outer container shall be adequate to prevent perforating rips, or tears during filling, transport or disposal. Containers must be acceptable to disposal site selected, and the Ministry of the Environment, Conservation and Parks, and shall be clearly marked to indicate that contents contain asbestos.

7. **Sealer**: Sealer for purpose of trapping residual fibre debris. Product must have flame spread and smoke development ratings both less than 25. Product shall leave no stain when dry: Standard of acceptance - TC-55 (clear), A/D Fire Protection Systems Inc., Scarborough, Ontario, or equivalent. For mechanical equipment, piping and boilers, etc. use high temperature sealer only: Standard of acceptance - Chil-Abate CP210, Childers Products Company, or equivalent.

8. **Ground Fault Panel**: Portable electrical panel equipped with ground fault circuit interrupters (5 mA protection) of sufficient capacity to power all electrical equipment and lights in asbestos work enclosure. Panel complete with ground fault interrupter lights, test switch to ensure unit is working, and reset switch

9. **HEPA Vacuum:** Vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.

10. **Protective Coveralls**: Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material Tyvek by Dupont or nonwoven material Kleenguard by Kimberley Clark (or equivalent).

11. **Flexible ducting**: Metal reinforced flexible ductwork, 12" diameter minimum.

12. **Negative Air Unit**: Portable air handling system, which extracts air directly from asbestos work area and discharges air outside building. Unit shall be fitted with prefilter and HEPA final filter. Air shall pass HEPA filter before discharge. Unit shall have pressure differential gauge to monitor filter loading. Unit shall have auto shut-off and warning system for HEPA filter failure. HEPA filter shall have separate hold down clamps to retain filter in place.

13. **Power Sprayer**: Standard of acceptance - Graco Maxi-wetter, or equivalent.

14. **Encapsulant**: Standard of acceptance - Ocean No. 666, Ocean Fire Retardants Inc., or equivalent, coloured bright red.

Part 3 Execution

3.1 PREPARATION

1. Occupants who will be impacted by the work will need to be temporarily relocated during the work.

2. Cover wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of reinforced polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12") up walls then cover walls to overlap floor sheeting. Provide additional protection for floors likely to be damaged by amended water, by covering floor with rip-proof polyethylene sheeting sealed with tape.

3. Seal off openings such as doorways, windows, vents, service holes in walls and grilles to non-operating ducts with polyethylene sheeting with tape or with polyurethane foam as appropriate.

4. If applicable, cover with polyethylene sheeting, motors, heating units, fire apparatus, door closers, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings which are not being removed from asbestos work area and which could be damaged and/or which cannot be readily cleaned at completion of this work. Pre-clean surfaces potentially contaminated with asbestos, with HEPA vacuum or damp cloth prior to installing protection.

5. Install plywood enclosures, covered with rip-proof polyethylene sheeting to protect equipment or fixtures in asbestos work area(s) that may be damaged.

6. Establish negative pressure in asbestos work area as described in Para. 1.611. Negative pressure units shall have total rated capacity with filters in place sufficient to provide minimum one (1) air change every twenty (20) minutes in wet removal sites. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area. Vent units to outside of building by removing, and later replacing, windows, and/or providing flexible ducting. Locate vents to discharge air away from building access points or sidewalks. Do not discharge air into building interior without obtaining approval from The Owner’s Consultant. Leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment. Venting of exhaust air through occupied area shall be in rigid airtight ductwork. Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascal (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.

7. Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.

8. Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system where application of amended water is required for wetting asbestos containing materials. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.

9. Provide temporary lighting in asbestos work area to levels that will permit work to be done safely and well.

10. Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use.

3.2 WORKERS' DECONTAMINATION ENCLOSURE SYSTEM

1. Construct workers' decontamination enclosure at entrance to Work Area. Worker decontamination enclosure system shall comprise three interconnecting rooms as follows:

2. Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.

3. **Equipment and Access Room**: Build room between shower room and Work Area. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be reworn in asbestos work areas. Equipment and access room shall be large enough to accommodate specified facilities, and other equipment needed, and at least one worker allowing sufficient space to undress comfortably. Minimum size 3 square metres (30 sq. ft.).

4. **Shower Room**: Build room between clean room and equipment and access room. Provide constant separate supplies of hot and cold water. Provide valves controllable at shower(s) to regulate water temperature. Provide rigid piping with watertight connections and connect to water sources and drains. Provide soap, clean towels and appropriate containers for disposal of used respirator filters. Direct wastewater to sanitary sewer drains via water filtering system consisting of a minimum 2-stage filtering system (25-micron and 5-micron filters).

5. **Clean Room**: Build room between shower room and clean areas outside of enclosures. At doorway to clean room, provide vented wood door, with locking passage set. Provide hangers for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install water heater, if required.

3.3 WASTE AND EQUIPMENT DECONTAMINATION ENCLOSURE SYSTEM

1. Construct system comprised of three linked rooms: Purpose of this system is to provide means to decontaminate drums, scaffolding, material containers, vacuum and spray equipment; and other tools and equipment for which worker decontamination system is not suitable. Provide curtain doorways between rooms, and at both dirty and clean entrances to Enclosure System.

2. **Staging Area:** Build staging area in asbestos work area for gross removal of dust and debris from waste containers and equipment, labeling and sealing of waste containers, and temporary storage pending removal to container cleaning room.

3. **Container Cleaning Room**: Build container cleaning room between staging area and holding room. Room shall be of sufficient size to allow proper washing of equipment and drums or double bagging of asbestos waste. Treat wash water as asbestos contaminated waste.

4. **Holding Room**: Build holding room between container cleaning room and uncontaminated area. Holding room shall be of sufficient size to accommodate largest item of equipment used and ten waste containers.

3.4 CONSTRUCTION OF DECONTAMINATION ENCLOSURES

1. **Floor**: Prior to erecting wall framing, lay 1 sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. Turn 600 mm (24") of rip-proof polyethylene sheeting up outside of enclosure, overlapping with polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene sheeting to all floors, extending 600 mm up inside of enclosure walls.

2. **Walls**: Build load-bearing walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both sides walls with polyethylene sheeting. Walls exposed to asbestos work area shall be covered with min. 9 mm (3/8") plywood sheeting or hardboard. Caulk seal and tape plywood joints. Walls exposed to occupied area shall be covered with good one side 9 mm plywood.

3. **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 138 mm (2" x 6") joists. Cover joists with 19 mm (3/4") plywood sheeting. Seal and tape joints, and cover with two layers of rip-proof polyethylene sheeting. At underside of joists install one layer of polyethylene sheeting.

4. **Doorways**: Build curtain doorways designed so that when workers or drums and equipment move through doorway, one of two barriers comprising doorway always remains closed.

3.5 MAINTENANCE OF ENCLOSURES

1. Maintain enclosures in tidy condition.

2. Ensure barriers and polyethylene sheeting linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

3. Visually inspect enclosures at beginning and end of each working period.

3.6 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL

1. Arrangements have been made for disposal of waste.

2. Asbestos work areas and decontamination enclosures are effectively segregated.

3. Negative pressure equipment is operating continuously.

4. Tools, equipment and waste materials receptors are on hand.

5. Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall read:

CAUTION
Asbestos Hazard Area
No Unauthorized Entry
Wear assigned protective equipment
Breathing asbestos dust may cause serious bodily harm.

6. Proof of notification to Ministry of Labour, Immigration, Training and Skills Development has been submitted.

7. The Owner’s Consultant has been notified of intention to proceed and has reviewed enclosures, equipment and procedures.

3.7 CONTAMINATED PREPARATION

1. After work has been completed as described in 3.1 to 3.6, request inspection from Owner’s Consultant before proceeding with Contaminated Preparation as described in 3.7.

2. Request building personnel to deactivate air handling and ventilation systems supplying or exhausting from asbestos work area(s).

3. Remove false ceiling (if required) and install upper seals (polyethylene seal from the top surface of the false ceiling to the structural deck) as necessary to allow polyethylene sheeting

to be fastened to structure. Each of two sheets forming wall of enclosure shall be fastened separately to deck using tape, spray adhesive, rapid setting foam or other suitable method. Provide suitable framing to support polyethylene sheeting. Seal holes in existing perimeter walls, columns, deck etc., to ensure an airtight asbestos work area.

4. Promptly seal holes or penetrations in structure above ceiling, ducts, etc. to provide airtight enclosure around asbestos work area(s).

5. Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene sheeting.

6. Seal joints and holes in uninsulated HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene sheeting.

3.8 REMOVAL

1. Spray asbestos with amended water using airless spray equipment. Saturate asbestos to prevent release of airborne fibres during removal. Fully saturated asbestos may be scraped directly into waste containers or may be allowed to fall to floor.

2. Place asbestos waste into asbestos waste receptors. Double polyethylene bags are to be used, inner bag shall be cleaned of gross contamination and placed in a clean **6 mil** outer polyethylene bag in container cleaning room immediately prior to transfer from Site.

3. Treat all materials removed to expose asbestos, as asbestos-contaminated waste unless such materials are specified to be re-used.

3.9 CLEAN-UP

1. Clean surfaces from which asbestos has been removed with brushes and vacuum or wet-sponge to remove visible dust and debris.

2. Remove sealed and labeled asbestos waste receptors and dispose of in authorized disposal area in accordance with requirements of disposal authority.

3. After brushing and wet-sponging to remove visible asbestos, wet clean entire Work Area including equipment and access area, polyethylene sheeting and equipment used in process. Floor and wall surfaces, ducts, and similar items not covered with polyethylene sheeting must be wet cleaned.

4. Request visual inspection and acceptance. Following inspection and acceptance, apply heavy coat of slow drying sealer to all surfaces from which asbestos has been removed. Apply thinned coat (sufficient to coat all surfaces) to other surfaces in Work Area including all polyethylene sheeting and surfaces scheduled for demolition. Allow minimum of 12 hours flushing time with no disturbance of asbestos work area. Operate negative air units during this period.

3.10 DISMANTLING OF PROTECTION

1. If air sampling by The Owner’s Consultant shows that levels in asbestos work area do not exceed 0.01 fibres/cc. as determined by NIOSH 7400 Method, A counting rules, proceed with final dismantling of Work Area.

2. Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear half-face air-purifying respirator with P100 filters and disposable

coveralls during removal of sheeting. Carefully roll sheeting away from walls to center of Work Area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.

3. While removing top layer of sheeting from surfaces protected by two layers of sheeting, cut lower sheeting so as to expose horizontal surfaces that may be contaminated with asbestos debris. HEPA vacuum any visible debris.

4. Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in asbestos waste receptors for transport. Remove with HEPA vacuum any debris which may have fallen behind sheeting.

5. Clean Work Area, equipment and access area, washing/showering room, and other enclosures that may have been contaminated during work.

6. Clean asbestos waste receptors and equipment used in work and remove from Work Area via drum and equipment decontamination enclosure system, at an appropriate time in sequence.

7. Remove hoardings, temporary lighting, equipment and facilities provided for work. A final review may be carried out by the Owner's Consultant to ensure that no dust or debris remains. Contractor responsible for inspecting and cleaning all adjacent spaces to the Work Area. Adjacent work areas to be left free of construction related dust and debris.

3.11 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

1. When cleanup is complete re-establish mechanical and electrical systems to remain operative in proper working order. Arrange for, and pay costs of electrical or mechanical repairs needed due to work of this Section.

2. Make good all damage at completion of work not identified in pre-removal survey (para. 1.98).

3.12 AIR MONITORING

1. The Owner's Consultant will arrange for air samples to be taken from commencement of work until completion of cleaning operations, both inside and outside of Work Area in accordance with NIOSH methods.

2. If air monitoring (or visual inspection) shows that areas outside current asbestos work area(s) enclosure or decontamination facilities are contaminated above 0.05 fibre/cc., clean these areas in same manner as that applicable to asbestos work areas, at no cost to the Owner.

3. Air clearance sampling will be done in accordance with O. Reg. 278/05. The air clearance sampling will be conducted following aggressive air sampling methods as outlined in US Environmental Protection Agency "Guidance for Controlling Asbestos-Containing Materials in Buildings – Published June 1985 – Appendix M – Section M.1.5". A minimum of 2,400 L of air will be collected for each sample. An abatement area is deemed clear only if every air sample collected within the Work Area has a concentration of fibres that does not exceed 0.01 fibres/cc. The number of air clearance samples to be collected are based on Ontario Regulation. 278/05, Table 3.

4. If air monitoring in the Work Area shows airborne fibre levels exceed normal levels for wet removal, workers shall use positive pressure supplied air respirators with full-face piece.

5. If final air sampling by the Owner's Consultant shows that levels in completed Work Area do not exceed 0.01 fibres/cc. as determined by NIOSH 7400 Method - "A" counting rules, proceed with dismantling of Work Area.

6. Clearance level is < 0.01 f/cc.

3.13 INSPECTION

1. From commencement of work until completion of clean-up operations, the Owner's Consultant will be present on a full-time basis; both inside and outside Work Area. The following inspections will be conducted at a minimum:
    1. Pre-contamination inspection
    2. Inspection of upper seals and HVAC isolation measures
    3. Post-abatement inspection
    4. Clearance air sampling
2. If Work Area or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Owner.
3. Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

3.14 WASTE TRANSPORT AND DISPOSAL

1. Conform to requirements of Regulation 347/90 (as amended) - General Waste Management under Environmental Protection Act for Waste Management, transporting and disposal of hazardous waste.
2. Check with dump operator to determine type of waste containers acceptable.
3. Ensure shipment of containers to dump is taken by waste hauler licensed to transport asbestos waste. Waste hauler in possession of valid Ministry of the Environment, Conservation and Parks Certificate of Approval to transport asbestos waste.
4. Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide copies of bill of lading indicating acceptance of waste at landfill.
5. Co-operate with Ministry of the Environment, Conservation and Parks inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.
6. Ensure dump operator is fully aware of hazardous material being dumped.
7. Ensure that containers used for dumping are locked and covered at all times.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

1. Conform to Sections of Division 1 as applicable.

1.2 RELATED WORK

1. Section 02 82 13.1 – Type 1 Asbestos Abatement
2. Section 02 82 13.2 – Type 2 Asbestos Abatement
3. Section 02 82 13.3 – Type 3 Asbestos Abatement
4. Section 02 84 16 – Handling of Mercury Containing Equipment
5. Section 02 87 13 – Silica Disturbance Precautions

1.3 SITE CONDITIONS

1. Paints and surface coatings have been confirmed to be lead-containing. Paints and surface coatings not sampled are assumed to be lead-containing.
2. Materials identified to contain lead can be found within the Safetech Environmental Limited report titled “Designated Substances and Hazardous Materials Assessment Report, HVAC Upgrades Project, 126 Pape Avenue, Toronto, Ontario” issued on August 15, 2025.

1.4 DESCRIPTION OF WORK

1. Disturbance of lead-containing materials must be conducted in accordance with measures and procedures outlined in the Ministry of Labour, Immigration, Training and Skills Development “Lead on Construction Projects” guideline.
2. The following work is classified as a **Type 1 operation** under the Ministry of Labour, Immigration, Training and Skills Development “Lead on Construction Projects” guideline (September 2011).
    1. Application of lead-containing coatings with a brush or roller.
    2. Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap.
    3. Removal of lead-containing coatings or materials using a power tool that has an effective dust collection system equipped with a HEPA filter (Effective implies that the dust collection system should be capable of controlling airborne lead concentration levels to below 0.05 mg/m3. Employers should follow manufacturer's recommendations and maintenance specifications for optimal function)
    4. Installation or removal of lead-containing sheet metal.
    5. Installation or removal of lead-containing packing, babbit or similar material.
    6. Removal of lead-containing coatings or materials using non-powered hand tools, other than manual scraping or sanding.
    7. Soldering.

3. Work area surfaces may be HEPA vacuumed with vacuum cleaner contents collected and disposed of as hazardous waste.
4. Dispose of all waste as lead contaminated including insulation, polyethylene drop sheets, coveralls, respirator filters, and all porous materials that cannot be properly cleaned and decontaminated.
5. Lead-containing wastes should be recycled if practicable or handled and disposed of according to Reg. 347.

1.5 REFERENCES/REGULATIONS

1. Comply with Federal, Provincial and local authority requirements. The more stringent requirements shall apply in the event of a conflict with any particular authority or jurisdiction. Regulations and Guidelines include:
2. Regulations made under the Occupational Health and Safety Act, Revised Statutes of Ontario, 1990, Chapter O.1 as amended.
3. The Occupational Health and Safety Act, Regulation for Construction Projects, O. Reg. 213/91 (as amended).
4. The Occupational Health and Safety Act, Regulation Respecting Lead, O. Reg. 490/09.
5. Ministry of Labour, Immigration, Training and Skills Development Guideline regarding Lead on Construction Projects, April 2011.
6. Ministry of the Environment, Conservation and Parks, Regulation 347/90 (as amended) for disposal of hazardous waste.

1.6 DEFINITIONS

1. **Authorized Visitor(s):** Owner's Consultant or persons representing regulatory agencies, and person(s) authorized by either of them
2. **Work Area(s):** Area(s) where work takes place which will, or may disturb lead paint and lead dust.
3. **HEPA Filter:** High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in collecting 0.3-micrometer aerosol.
4. **HEPA Vacuum:** High Efficiency Particulate Aerosol filtered vacuum equipment acceptable to local provincial Ministry of Labour, Immigration, Training and Skills Development, and Health Canada. Ensure vacuums are equipped with hoses, fittings, and nozzle attachments. Maintain vacuum equipment and system properly.
5. **Polyethylene Sheeting**: Polyethylene sheeting of 0.15 mm (6 mil) minimum thickness with tape seals along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane protection.

1.7 SUBMITTALS

1. Submit list of existing damage for acceptance.
2. Laws of province of Ontario shall govern this work. Contractor shall observe all such laws and shall obtain and/or pay all permits, notices, fees, taxes, and duties as may be required. Likewise, it is the responsibility of contractor to comply with Workplace Safety and Insurance Board (WSIB).

3. Before commencing any work, Contractor shall submit, in writing, confirmation of good standing with Workplace Safety and Insurance Board (WSIB).
4. Submit proposed schedule showing phasing and scheduling.
5. Submit proof satisfactory to Owner's Consultant that suitable arrangements have been made to dispose of lead containing waste in accordance with requirements of authority having jurisdiction.
6. Instruction and Training
    1. Before commencing work provide satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
    2. Instruction and training on respirators includes:
        1. Limitations of equipment,
        2. Inspection and maintenance of equipment,
        3. Fitting of equipment, and disinfecting of equipment.
    3. Submit names of supervisory personnel who will be responsible for Lead abatement work area(s). One of these supervisors must remain on site at all times while lead paint disturbance, removal or cleanup is occurring.
    4. If respirators are worn, certificates indicating each worker has had proper respirator fit test for the respirator appropriate for work being performed.
7. The Abatement Contractor to post on the job bulletin board instructions, procedures and information pertaining to abatement work.

1.8 WORKER AND VISITOR PROTECTION

1. **Instructions:** Before entering lead removal work area(s), instruct workers and Authorized Visitor(s) in use of respirators (respirators are not mandatory for Type 1 operations, but may be worn by workers/visitors if requested), and all aspects of Work procedures and protective measures. Provide instruction by competent person as defined by The Occupational Health and Safety Act.
2. Provide disposable full body coveralls and approved respiratory protection to authorized visitors.
3. **Respirators:**
    1. Respirator should not be necessary for Type 1 operations provided that the contractor follows all Type 1 measures and procedures outlined in the MOL guideline.
    2. If the worker requests a respirator, provide worker with personally issued and marked half-face air-purifying respirators with N-, R-, or P-series filters with 95, 99 or 100% efficiency filters.

1. Provide sufficient filters and cartridges so workers can install new filters and cartridges following disposal of used filters and cartridges before re-entering contaminated areas.
2. Respirators shall be acceptable to Occupational Health Branch of Ministry of Labour.

3. Provide instruction in use of respirators, including qualitative fit testing. No worker or Authorized Visitor(s) may have facial hair which prevents proper contact between respirator face-piece and skin.
4. Maintain respirators in proper functioning and clean condition, or remove from Site.

4. **Protective Clothing:** Workers and Authorized Visitor(s) shall wear disposable full body personal protective apparel including attached head covering. In addition, workers are expected to wear nitrile gloves and protective eye goggles as is required by Ministry of Labour construction regulations. Once worn, protective coveralls shall be discarded and disposed of as lead contaminated waste
5. Do not eat, drink, smoke or chew gum or tobacco in work area.
6. Workers and Authorized Visitors shall wash hands and face when leaving lead removal work area. Contractor to provide workers with a designated washroom facility.

Part 2 Products

2.1 MATERIALS

1. **Polyethylene:** 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.
2. **Rip-Proof Polyethylene:** 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.
3. **Tape:** Tape suitable for sealing polyethylene to surface encountered, under both wet conditions using amended water, and dry conditions.
4. **Waste Receptors:** Two separate containers of which 1 shall consist of 0.15 mm (6 mil) minimum thickness sealable polyethylene bag. Other container may be 0.15 mm (6 mil) minimum thickness polyethylene bag. Other container shall be adequate to prevent perforating rips, or tears during filling, transport or disposal. Containers must be acceptable to disposal site selected, and Ministry of the Environment, Conservation and Parks.
5. **Sprayer:** Garden type, portable manual sprayer, low velocity, capable of producing fine spray.
6. **Ground Fault Panel:** Portable electrical panel equipped with ground fault circuit interrupters (5 mA protection) of sufficient capacity to power all electrical equipment and lights in Lead work enclosure. Panel complete with ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Installed by licensed electrician.
7. **HEPA Vacuum:** Vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.

8. **Protective Coveralls:** Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material Tyvek by Dupont or nonwoven material Kleenguard by Kimberley Clark.
9. **Power Sprayer:** Graco Maxi-wetter or equivalent, from Hazmasters Environmental, Pickering, Ontario.

Part 3 Execution

3.1 PREPARATION

1. Establish hoarding around work area (caution tape, ropes, etc.) to prevent unauthorized personnel from entering the Work Area.
2. Provide washing facility (wash basin, water, soap, and towels) at entrance to Work Area.
3. Place polyethylene drop sheets beneath the area of work.
4. Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use.

3.2 REMOVAL

1. Remove/disturb lead containing material as required. Ensure that classification of work is in accordance with work operation listed in 1.41.
2. Use laminate cloth and paint removers (e.g. Dumond Peel Away 1 Paint Remover, or equivalent) in accordance with the manufacturer's specifications.
3. Hand tools may also be used to perform required cutting of lead sheeting and/or pipe.
4. Removal or disturbance (e.g. drilling) of lead-containing paints, surface coatings or mortar with power tools is not permitted. Only power tools (drill, grinder) attached to an effective dust collection device equipped with a HEPA filter are permitted.
5. Any removed lead-containing materials must be placed in appropriate waste receptors.
6. Dust and debris generated by work activities must be cleaned up with a HEPA vacuum or by wet methods (wet shovelling, damp wiping, damp mopping).
7. If HEPA vacuuming, place full vacuum bags into waste receptors. Double polyethylene bags are to be used, inner bag shall be cleaned of gross contamination and placed in a clean 6 mil outer polyethylene bag in container cleaning room immediately prior to transfer from Site.
8. Workers to properly decontaminate him/herself before each break and before going home at completion of work shift. Wash area to have plenty of soap and hot water, and towels. Instruction to be provided for proper hygiene practices.
9. Perform work in manner to reduce dust creation to lowest levels practicable. Work is subject to visual inspection and air monitoring. Any contamination of surrounding areas indicated by visual inspection or air monitoring shall require complete enclosure and clean-up of affected areas.
10. If significant concentrations of dust are being generated the work should be re-evaulated by a qualified person and additional procedures should be implemented such as: a full enclosure should be erected using polyethylene sheeting (or in the event that the sheeting needs support, wood framing may also be used) in order to separate lead work area(s) from remaining

building areas. The Ontario Ministry of Labour, Immigration, Training and Skills Development Guideline – Lead on Construction Projects dated September 2011. The Environmental Abatement Council of Ontario (EACO) *"Lead Guideline"* (October 2014) and/or the Ministry of Labour, Immigration, Training and Skills Development *"Lead on Construction Projects"* guideline should be consulted for all additional recommended requirements.

3.3 CLEAN-UP

1. Clean surfaces from which lead has been removed with brushes and HEPA vacuum or wet-sponge to remove visible dust and debris. HEPA vacuum all surfaces to ensure free of dust and debris.
2. Remove sealed and labeled lead waste receptors and dispose of at authorized disposal area in accordance with requirements of disposal authority.
3. After brushing and wet sponging to remove visible lead dust, damp clean entire work area including equipment and access area, polyethylene sheeting and equipment used in process.
4. Request visual inspection and acceptance. There should be no dust on ducts, scaffold or platform, sills, building surfaces or enclosure, where applicable. Following inspection and acceptance, allow minimum of 2 hours flushing time with no disturbance of work area.

3.4 TEAR DOWN OF PROTECTION

1. Remove polyethylene sheeting exposed during contaminated work plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear appropriate personal protective equipment during this work.
2. Carefully roll sheeting away from walls to center of lead work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.
3. Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in Lead waste receptors for transport.
4. Clean up lead work area(s) to ensure all visible dust and debris associated with the work has been cleaned up or other surfaces that may have been contaminated during work.
5. Clean up lead waste receptors and equipment used in work and remove from work area(s) via drum and equipment decontamination enclosure system, at an appropriate time in sequence.
6. A final review may be carried out by Owner's Consultant to ensure that no dust or debris remains.

3.5 FIELD QUALITY CONTROL

1. Inspection
    1. From commencement of work until completion of clean-up operations, Owner's Consultant may be present periodically; both inside and outside lead removal work area(s) to ensure compliance with Section 02 83 13.1 (Type 1 Lead Abatement).
    2. If lead work area(s) or adjacent areas, are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to Owner.

3. Pay cost to provide re-inspection of work found not in accordance with these specifications and requirements of authorities having jurisdiction.
4. Cooperate with and assist inspection and testing company's personnel during inspection and testing.

2. Air Monitoring

1. Owner's Consultant may arrange for air samples to be taken from commencement of work until completion of cleaning operations in accordance with NIOSH methods. Air samples may be collected both inside the building during abatement activity and/or inside the Work Area.
2. Cooperate with Owner's Consultant in collection of air samples, including requiring workers to wear sampling pumps for up to half shift periods. Workers shall exercise care not to damage sampling equipment.
3. During the course of work, additional air samples for lead may be taken periodically inside the building or adjacent to ongoing work. If airborne concentrations exceed 50% of the Time-Weighted Average Limit (TWA) of 0.05 mg/m^3, then the contractor performing the lead abatement shall cease all work in the area until the source of infiltration is mitigated.

3.6 DISPOSAL

1. Conform to requirements of Regulation 347 (as amended) under Environmental Protection Act for Waste Management, transporting and disposal of hazardous waste.
2. Dispose of lead waste in accordance with requirements of Provincial and federal authority having jurisdiction.
3. Cooperate with Ministry of the Environment, Conservation and Parks inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to Owner.
4. Provided Owner's Consultant with original copy of waste shipping manifest for disposed lead containing waste issued by dump operator. Contractor is responsible for completing all required manifest documentation for each load leaving the site.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

1. Comply with requirements of Division 1.

1.2 RELATED SECTIONS

1. Section 02 82 13.1 – Type 1 Asbestos Abatement
2. Section 02 82 13.2 – Type 2 Asbestos Abatement
3. Section 02 82 13.3 – Type 3 Asbestos Abatement
4. Section 02 83 13 – Lead Disturbance Precautions
5. Section 02 87 13 – Silica Disturbance Precautions

1.3 SITE CONDITIONS

1. Mercury is present in the form of the following:
    1. Vapour in fluorescent lamps
    2. Liquid in vials
2. Materials identified to contain mercury can be found within the Safetech Environmental Limited report titled “Designated Substances and Hazardous Materials Assessment Report, HVAC Upgrades Project, 126 Pape Avenue, Toronto, Ontario” issued on August 15, 2025.
3. Please note that Section 02 84 16 has been provided in case fluorescent lamps need to be removed to facilitate work for this project.

1.4 DESCRIPTION OF WORK

1. Remove, package and recycle/dispose of, if applicable, all mercury vapour containing fluorescent light tubes.
2. All work may be subject to inspection by Client’s Consultant.

1.5 REGULATIONS

1. Comply with Federal, Provincial and local requirements, provided that in any case of conflict among those requirements or with these Specifications more stringent requirements shall apply. Work shall be performed under regulations in effect at time work is performed. Regulations include but are not limited to the following:
    1. Environmental Protection Act, Revised Statutes of Ontario 1990, Chapter E. 19.
    2. Canadian Environmental Protection Act, Revised Statutes of Canada 1985, c.16.
    3. Ministry of the Environment, Conservation and Parks Regulations for the disposal of mercury waste, including R.R.O. 1990, Regulation 347/90 (as amended).
    4. Ontario Regulation 490/09, Designated Substances (as amended).

1.6 INSTRUCTION AND TRAINING

1. Ensure that all workers likely to handle mercury-containing items are trained in use of Mercury Spill Kit and are trained in handling of mercury.

Part 2 Products

2.1 MATERIALS

1. **Cardboard Containers**: New or used cardboard boxes. Suitable for packaging of fluorescent light tubes to prevent breakage of tubes.

2.2 EQUIPMENT

1. Mercury Spill Response Kit consisting of following:
    1. HEPA vacuum dedicated for use with mercury spills
    2. Air-purifying cartridge respirators with mercury absorbing cartridges and an end-of-life service indicator
    3. Surgical gloves to prevent skin exposure when handling droplets of mercury
    4. Neutralizing compound such as 20% calcium polysulfide or 20% sodium thiosulfide to clean spilled surfaces

Part 3 Execution

3.1 PACKAGING OF FLUORESCENT LIGHT TUBES

1. Carefully remove fluorescent light tubes from fixtures wipe with a damp cloth or clean with a HEPA filtered vacuum and place in cardboard containers.
2. Place tubes in container as they are removed from fixtures. Ensure that tubes are packaged in a manner to prevent breakage.
3. Avoid rough handling of tubes to avoid breakage.
4. Store full containers in a central location on site.

3.2 DISPOSAL

1. Do not dispose of fluorescent light tubes containing mercury with other construction waste or in a landfill.
2. Dispose of mercury containing equipment at a recycling facility approved by Consultant. Recycling company must have the following minimum requirements:
3. Offer complete recycling of all parts (i.e., lamps, caps, clips etc.)
4. Must be able to supply contractor with packaging material, if necessary

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

1. Comply with requirements of Division 1.

1.2 RELATED SECTIONS

1. Section 02 82 13.1 – Type 1 Asbestos Abatement
2. Section 02 82 13.2 – Type 2 Asbestos Abatement
3. Section 02 82 13.3 – Type 3 Asbestos Abatement
4. Section 02 83 13 – Lead Disturbance Precautions
5. Section 02 84 13 – Handling of Mercury Containing Equipment

1.3 SITE CONDITIONS

1. Silica is present in, but not limited to, the following building materials:
    1. Brick
    2. Refractory brick
    3. Concrete
    4. Concrete block
    5. Mortar
    6. Asphalt
    7. Drywall
    8. Sprayed Fireproofing
2. Materials identified to contain silica can be found within the Safetech Environmental Limited report titled “Designated Substances and Hazardous Materials Assessment Report, HVAC Upgrades Project, 126 Pape Avenue, Toronto, Ontario” issued on August 15, 2025.

1.4 DESCRIPTION OF WORK

1. Removing/demolishing of building materials suspected to contain silica must follow Type 1, Type 2, and/or Type 3 operations and procedures as outlined in the Ontario
2. All work may be subject to inspection and/or air sampling (clearance and/or exposure monitoring) inside and outside work areas by Client’s Consultant. Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate complete clean-up of affected areas.

1.5 DEFINITIONS

1. **Silica**: means crystalline silica in a respirable form. Silica is the primary component of many construction materials. The best-known and most abundant type of crystalline silica is quartz. Other forms of crystalline silica include cristobalite, tridymite and tripoli. Some commonly used construction materials containing silica include: abrasives used for blasting, brick, refractory brick, plaster, concrete, concrete block, cement, mortar, granite, sandstone,

quartzite, slate, gunite, mineral deposits, rock and stone, sand, fill dirt, top soil and asphalt containing rock or stone.

2. **Silica Work Area**: Area where work takes place, which will, or may, disturb silica-containing material.

3. **Authorized Visitors**: Client's Consultant and/or person(s) representing regulatory agencies, and person(s) authorized by them.

4. **HEPA Filter**: High Efficiency Particulate Aerosol filter, at least 99.97% efficient in collecting a 0.3 micron aerosol. Each filter should be individually tested and certified to have an efficiency of not less than 99.97 percent when challenged with 0.3 micron dioctylphtalate (DOP) particles. DOP test must be conducted immediately prior to commencement of work and certificate presented to owner and/or consultant.

5. **Effective**: implies that the dust collection system should be capable of controlling airborne silica concentration levels to below 0.05 milligrams per cubic metre (mg/m^3).

6. **Competent Person:** A worker who is qualified because of knowledge, training, and experience to perform work, is familiar with relevant acts and regulations that apply to the work, and has knowledge of all potential or actual dangers to health or safety in work.

1.6 REGULATIONS, GUIDELINES, & INDUSTRY STANDARDS

1. Contractor shall:

    1. Comply with Federal, Provincial, and local requirements pertaining to silica, provided that in any case of conflict among these requirements or with these specifications, most stringent requirements shall apply.
    2. Carry out measures and procedures prescribed under the Ontario Regulation 490/09, Designated Substance – Silica.
    3. Protect health and safety of workers by ensuring compliance with the specific occupational exposure limits (OELs) for silica. The OEL for cristobalite silica is 0.05 mg/m^3 of air as an 8-hour daily or 40 hour weekly time-weighted average. The OEL for quartz and tripoli silica is 0.10 mg/m^3. Measures and procedures that ensure construction workers receive the same standard of protection as workers covered by O. Reg. 490 should be implemented on construction projects where exposure to silica is a hazard. Such measures and procedures are deemed to be in compliance with section 25(2) (h) of the OHSA, as taking "every precaution reasonable in the circumstances for the protection of a worker.
    4. Carry out measures and procedures prescribed under the Ontario Regulation 213/91 (as amended) – Regulation for Construction Projects; Ontario Regulation 860/90 – Workplace Hazardous Materials Information System (WHMIS); and Ontario Ministry of Labour, Immigration, Training and Skills Development Guideline – Silica on Construction Projects dated April 2011.
    5. Comply with Ontario Environmental Protection Act Regulation 347/90 (as amended) - General-Waste Management.
    6. Ensure every employee and every worker on project complies with applicable acts and regulations.
    7. Provide instruction and training by a competent person to every worker in the following subjects: WHMIS training, hazards of silica exposure, recognition of

typical operations containing silica, personal hygiene, the use, cleaning and disposal of respirators and personal protective equipment.

8. Protect health and safety of workers and public.

2. Contractor may:

1. Be requested to provide information on their health and safety record.
2. Be required to provide a copy of their respiratory protection program.
3. Be requested to provide periodic medical examinations for all workers who may be exposed to respirable crystalline silica.

1.7 INTERNAL POLICIES & PROCEDURES

1. Ensure that internal policies and procedures of the clients are complied with including, but not limited to the following:

1. All contractors/consultants will not enter designated areas unless trained and appropriately garmented, including appropriate medical clearance which may include medical monitoring and immunization.
2. Have a competent supervisor onsite at all times to supervise work of their employees/subcontractors for large projects.
3. Provide sufficient number of workers trained in first aid on large projects.
4. Do not modify, shut down, open, tap into or alter facilities systems without permission.

1.8 QUALITY ASSURANCE

1. Ensure work proceeds on schedule and meets all requirements of this Section.
2. Pay cost to Client for inspection performed as a result of failure to perform work satisfactorily regarding quality, safety, or schedule.
3. Use only skilled and qualified workers for all the trades required for this work.

1.9 SUBMITTALS

1. Before commencing work:

1. Laws of the province of Ontario shall govern this work. Contractor shall observe all such laws and shall obtain and/or pay all permits, notices, fees, taxes, duties as may be required.
2. Submit names of supervisor personnel who will be responsible for silica work area(s).
3. Contractor shall submit, in writing, confirmation of good standing with Workplace Safety and Insurance Board and transcription of insurance.
4. Submit documentation including test results for fire and flammable data and Material Safety Data Sheets for materials and chemicals to be used.

1.10 WORKER AND VISITOR PROTECTION

1. **Instruction and Training:** Before commencing work, provide to owner and/or consultant satisfactory proof that every worker has had instruction and training in WHMIS; hazards of silica exposure, including health effects and symptom recognition; personal hygiene;

respirator requirements; work measures and procedures; and use, cleaning and disposal of respirators and protective equipment by a competent person as defined by Occupational Health and Safety Act.

2. **Respirators:** NIOSH-approved respirators may be worn during silica removal activities as per Ontario Regulation 490/09. Silica dust on personal respirators should be removed by damp wiping or HEPA vacuuming. Respirators should be selected in accordance with the NIOSH assigned protection factors. A summary of respirator requirements based on anticipated concentration of airborne silica can be found in Table 1. Maintenance and care for respirators should be conducted as per Canadian Standards Association Z94.4-02 Selection, Use, and Care of Respirators Guideline. If Contractor can demonstrate that the silica exposure levels are below the OEL, respirators may not be required.

Table 1: Respirator Requirements

Silica Removal Operations	**Required Respirator**
Type 1 Silica Removal Operations (> 0.05 to 0.50 mg/m3 of silica in the form of cristobalite and tridymite) (> 0.10 to 1.0 mg/m3 of silica in the form of quartz and tripoli) • The drilling of holes in concrete or rock that is not part of a tunneling operation or road construction. • Milling of asphalt from concrete highway pavement. • Charging mixers and hoppers with silica sand (sand consisting of at least 95% silica) or silica flour (finely ground sand consisting of at least 95% silica) • Any other operation at a project that requires the handling of silica-containing material in a way that may result in a worker being exposed to airborne silica. • Entry into a dry mortar removal or abrasive blasting area while airborne dust is visible for less than 15 minutes for inspection and/or sampling. • Working within 25 metres of an area where compressed air is being used to remove silica-containing dust outdoors.	**NIOSH APF = 10** • Half-mask particulate respirator with N-, R-, or P-series filter and 95, 99, or 100 percent efficiency.
Type 2 Silica Removal Operations (> 0.50 to 2.5 mg/m3 of silica in the form of cristobalite and tridymite) (> 1.0 to 5.0 mg/m3 of silica in the form of quartz and tripoli) • Removal of silica containing refractory materials with a jackhammer. • The drilling of holes in concrete or rock that is part of a tunneling operation or road construction. • The use of a power tool to cut, grind, or polish concrete, masonry, terrazzo or refractory materials. • The use of a power tool to remove silica-containing materials. • The use of a power tool indoors to chip or break and remove concrete, masonry, stone, terrazzo or refractory materials. • Tunneling (operation of the tunnel boring machine, tunnel drilling, or tunnel mesh installation). • Tuckpointing and surface grinding. • Dry method dust clean-up from abrasive blasting operations. • Dry mortar removal with an electric or pneumatic cutting device. • The use of compressed air outdoors for removing silica dust. • Entry into area where abrasive blasting is being carried out for more than 15 minutes.	**NIOSH APF = 50** • Full-facepiece air-purifying respirator with any 100-series particulate filter. • Tight-fitting powered air-purifying respirator with any 100-series particulate filter. • Full-facepiece supplied-air respirator operated in demand mode. • Half-mask or full-facepiece supplied air respirator operated in continuous-flow mode.

Silica Removal Operations	Required Respirator
Type 3 Silica Removal Operations (> 2.5 mg/m3 of silica in the form of cristobalite and tridymite) (> 5.0 mg/m3 of silica in the form of quartz and tripoli) • Abrasive blasting with an abrasive that contains ≥ 1% silica. • Abrasive blasting of a material that contains ≥ 1% silica.	**NIOSH APF ≥ 1000** • Type CE abrasive-blast supplied air respirator operated in a positive pressure mode with a tight-fitting half-mask facepiece. • Type CE abrasive-blast supplied air respirator operated in a pressure demand or positive pressure mode with a tight-fitting facepiece.

3. **Protective Clothing:** Provide workers and visitors in silica work area(s) with disposable and/or washable work clothes, including shoe covers. Work clothes that are contaminated with silica dust should not be worn outside the work area(s). Silica dust on washable work clothes should be removed by damp wiping or HEPA vacuuming and washed in facilities suitable for handling silica contaminated laundry before reusing. Provide or have access to appropriate washing facility equipped with clean water, soap, and individual towels for washing hands and face of workers. The washing facility shall be used by every worker when leaving silica work area(s) and if feasible, the washing facility should include a shower.
4. Workers who may be exposed to silica on a regular basis should undergo a pre-placement medical assessment and periodic medical examinations.
5. A worker shall not eat, drink, chew gum, or use tobacco products in work area(s).

Part 2 Products

2.1 MATERIALS

1. **HEPA Vacuum:** High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
2. **Polyethylene sheeting sealed with tape**: Polyethylene sheeting of type and thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of silica dust through sheeting into a clean area.
3. **Tape**: Tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.

Part 3 Execution

3.1 PREPARATION

1. Equipment, tools, furnishings, and stored materials which can be moved, without disturbing silica-containing materials have been moved by Contractor.
2. Seal all opening or voids in work area(s), such as vents, service holes in walls and air handling ducts as appropriate with plugs and/or tape and/or caulking and/or polyethylene sheeting sealed with tape.

3. Building personnel have shut off air handling and ventilation systems (if applicable) supplying or exhausting from silica work area(s)/enclosure(s). Ensure air handling systems remain shut off during duration of work.

4. Before disturbing silica-containing material, install polyethylene drop sheets as appropriate to control spread of dust.

5. Establish ropes, barriers and/or partial enclosures in order to prevent unauthorized personnel from entering work area(s).

6. If significant concentrations of dust are being generated the work should be re-evaulated by a qualified person and additional procedures should be implemented such as: a full enclosure should be erected using polyethylene sheeting (or in the event that the sheeting needs support, wood framing may also be used) in order to separate silica work area(s) from remaining building areas. The Ontario Ministry of Labour, Immigration, Training and Skills Development Guideline – Silica on Construction Projects dated September 2011 should be consulted for all additional recommended requirements.

7. Emergency and fire exits are established from silica work area(s), or alternative exits have been established satisfactory to authorities having jurisdiction.

8. Temporary lighting in silica work area(s) has been provided (if necessary) to level that will permit work to be done safely and well where necessary.

9. Signs are displayed in all areas where access to silica work area(s) is possible. Signs should be at least 500 mm x 350 mm and state the date and place of the silica removal project. Such signs shall read in large, clearly visible letters:

   CAUTION

   Silica Dust Hazard

   No Unauthorized Entry

   Wear Assigned Personal Protective Equipment

10. Arrangements have been made with Client for work area security.

11. Client's Consultant has been notified of intention to proceed and has reviewed equipment and procedures.

3.2 REMOVAL

1. Seal opening to polyethylene enclosure with tape or ensure appropriate barriers are in place after entry of worker(s).

2. Perform work required within silica enclosure(s)/work area(s) using appropriate dust control measures, including a mechanical ventilation system and/or wetting, and/or the use of a dust collection system if practical. Compressed air or dry sweeping should be avoided.

3. The work area(s) should be thoroughly wetted prior to and/or during all silica removal operations.

4. Continuous cleaning during removal work operations should be conducted to control the spread of silica dust.

3.3 CLEAN-UP

1. Clean all surfaces by washing down with water and vacuuming with a HEPA vacuum until no visible residue remains to prevent dust-containing silica from spreading.
2. Workers exposed to silica should be provided with or have access to washing facilities equipped with clean water, soap, and individual towels.
3. Silica dust on personal protective clothing and equipment should be removed by damp wiping or HEPA vacuuming.
4. When exiting the enclosure(s)/area(s), dispose of contaminated disposable work clothes as construction waste.
5. All workers and visitors in the silica work area(s) must properly decontaminate themselves prior to leaving the work area.

3.4 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

1. Reconstruct items demolished (if required) which are to remain and reinstall objects and items in their proper positions which were removed to facilitate silica removal operations. Reconstruction and reinstallation shall be done by tradesmen qualified in work being reinstalled or reconstructed.
2. Re-establish mechanical and electrical systems (if required) to remain operative in proper working order. Arrange for, and pay costs of, electrical or mechanical repairs needed due to this work.

3.5 DISPOSAL OF WASTE

1. Conform to requirements of Ontario Environmental Protection Act Regulation 374/90 (as amended) – General Waste Management.

END OF SECTION