

ASBESTOS ABATEMENT SPECIFICATIONS

**510 MAIN STREET AVENUE
WINNIPEG, MANITOBA**

Submitted to:

The City of Winnipeg
Municipal Accommodations, Planning, Property and Development
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Part 1 **General**

1.1 **SUMMARY**

- .1 This specification outlines the basic requirements for the handling and/or disposal of asbestos containing building materials prior to or in conjunction with renovation activities in the select areas of the basement floor of the City of Winnipeg Council Building located at 510 Main Street in Winnipeg, Manitoba (the "Site").
- .2 Prior to preparation of this specification, Wood Environment and Infrastructure Solutions (Wood) reviewed available documents from the City of Winnipeg including various Site drawings, EMC Labs, Inc. laboratory certificates of analysis for Bulk Asbestos Analysis by Polarized Light Microscopy and the Pinchin Ltd. document "Asbestos Assessment Council Building – Print Shop 510 Main Street, Winnipeg, Manitoba" dated 17 March 2017.
- .3 These specifications and supplementary document(s) are intended to provide Contractors invited to bid on the project with the general procedures and standards of workmanship which are expected to be followed and defines the Contractors' responsibilities. It is the Contractor's responsibility to determine the magnitude of work. The intent of the information contained in this document is to provide guidance to the successful Contractor in the performance of that work.
- .4 The Contractor is to abide by all Federal, Provincial and Municipal regulations and is to complete the work to the satisfaction of City of Winnipeg and Wood Environment & Infrastructure Solutions (hereby referred to as the Owner and Consultant(s)).
- .5 The abatement consultant is Wood Environment & Infrastructure Solutions (hereby referred to as the Abatement Consultant).

1.2 **RELATED REQUIREMENTS**

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00.1, Asbestos Abatement – Type 1.
 - .2 Section 02 82 00.2, Asbestos Abatement – Type 2.
 - .3 Section 02 82 00.3, Asbestos Abatement – Type 3.
 - .4 Section 02 82 00.4, Asbestos Abatement – Type 2 Glovebag.

1.3 **REFERENCES**

- .1 Asbestos Assessment Council Building – Print Shop 510 Main Street, Winnipeg, Manitoba. Completed by Pinchin Ltd., 17 March 2016.
- .2 Bulk Asbestos Analysis by Polarized Light Microscopy Laboratory Reports completed by EMC Labs, Inc.
- .3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.205-94, Sealer for Application to Asbestos-Fibre-Releasing Materials.
- .4 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
- .5 Department of Justice Canada.
 - .1 Canadian Environmental Protection Act (CEPA), 1999.
 - .2 Transportation of Dangerous Goods Act, 1992 (TDGA).
 - .3 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .7 Manitoba Workplace Safety and Health Act (C.C.S.M. c. W210), Workplace Safety and Health Regulation (MR217/2006).
- .8 Manitoba Environment Act, Chapter E125, Waste Disposal Grounds Regulation (MR 150/91) as it pertains to asbestos.
- .9 National Research Council Canada Institute for Research in Construction (NRC-IRC).
 - .1 National Fire Code of Canada (2010 as updated).
- .10 Provincial Guidelines or Safe Work Bulletins associated with MR217/2006. Such guidelines and bulletins are available on the SAFE Work Manitoba website at: <http://safemanitoba.com/resources/bulletin#en>.
- .11 Underwriters' Laboratories of Canada (ULC).
- .12 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH).
 - .1 NIOSH 94-113-August 1994, NIOSH Manual of Analytical Methods (NMAM), 4th Edition.

1.4 **SITE CONDITIONS**

- .1 This section identifies the known conditions at the site with respect to known asbestos containing building materials (ACMs). This information is provided for reference purposes only and the contractor must confirm existing conditions within the work area(s) as a part of this contract.
- .2 The presence and/or suspect presence of ACMs have been identified at the site. Identified materials which have specified disposal and/or handling requirements include:
 - .1 Asbestos containing spray applied insulation materials are present on the decking and equipment throughout the ceiling space of the work areas.
 - .2 Asbestos containing parging associated with the duct insulation materials located in the ceiling spaces of the work areas.

- .3 Asbestos containing mastic associated with the duct within the ceiling space of the proposed renovation area. It is suspected that the mastic is present beneath the fiberglass insulation materials.
- .4 Asbestos containing parging associated with pipe fitting/elbow insulation in the ceiling space of the work areas.
- .3 Examine local conditions affecting work under this contract. No allowance will be made for necessary changes, unless notification of interferences has been brought to the Consultant's attention, in writing, prior to closing of tenders.
- .4 All materials which may contain asbestos fibres indicated in this specification shall be considered as an asbestos containing building material unless proven otherwise by laboratory analysis or other means approved by the Consultant.
- .5 Where material is encountered by the Contractor that is suspected of containing asbestos not identified in this Section or other hazardous substances, the Trade or Contractor is to immediately stop work in the area and notify the Consultant. Do not resume work in the area until further follow-up has been completed and authorization granted by the Consultant.

1.5 **OUTLINE OF WORK**

- .1 Refer to other Sections of this specification for a specific outline of work.
- .2 Procedures in addressing asbestos containing building materials known to be present within the building are identified in this section. Hidden or unidentified materials are present and shall be removed in accordance with the procedures stated for similar materials subject to the approval of the Consultant.
- .3 Where unknown or suspect asbestos containing building materials are encountered that cannot be handled in accordance with the below procedures, the Consultant shall provide direction.
- .4 All asbestos containing building materials identified in this specification and scheduled to be disturbed as part of the renovation activities shall be removed prior to renovation or demolition activities.
 - .1 Exceptions are: the vinyl roll flooring located within the west section of room 2LB07 in the vicinity of the server rack. These materials are to remain in place.
- .5 The removal of vinyl roll flooring and associated asbestos mastic (if present) shall be completed using Type 3 (high risk) asbestos abatement procedures.
- .6 The removal of select sections of gypsum board joint compound materials shall be completed using Type 3 (high risk) procedures. Disturbance of <1 m² of gypsum board with joint compound may be completed using Type 2 (moderate risk) procedures provided that consultant inspections including air monitoring is conducted.
- .7 The removal of duct mastic or sections of duct with mastic (if present) shall be completed using Type 1 (low risk) asbestos abatement procedures.

- .8 The removal of parging insulation from pipe fittings / elbows shall be completed using Type 2 Glovebag (moderate risk) asbestos abatement procedures, where possible.
- .9 The Contractor shall refer to the reference documents listed in Section 1.3 for further information and precautions. In the event a discrepancy between the specifications, the reports occurs, applicable regulations or guidelines, these shall be identified to the Consultant at the time of tender and further direction received.
- .10 Do not remove any materials not specifically identified by the Owner or Owner's Representative. Any removal of unauthorized materials shall be at the cost of the Contractor including the cost of repairs or re-insulation subject to the satisfaction of the Owner.
- .11 All work related to scaffolding shall be in accordance with all Manitoba workplace safety and health requirements, and in accordance with CAN/CSA-S269.2.

1.6 **SITE EXAMINATION**

- .1 Prior to commencing actual work, check field conditions, obtain and confirm actual site dimensions, examine surface conditions, site restrictions, etc., as required, to ensure correct execution of work. Notify the Consultant in writing of all matters which could prejudice proper execution of work.
- .2 Determination of quantities, location, and nature of asbestos and other regulated work activities including, but not limited to, considerations for transportation, disposal, handling and storage of materials, availability of labour, worker and visitor protection, water, electric power, roads, uncertainties of weather or physical conditions at the site, is the responsibility of the Contractor.
- .3 Commencement of construction or any part thereof constitutes acceptance of existing conditions and means all dimensions and the scope of work has been considered, verified and is acceptable.

1.7 **SCHEDULE**

- .1 Work is to be carried out during agreed upon hours with the Consultant. It is expected that normal working hours will be maintained.
- .2 The Contractor is to assume that all work is to be performed when the area is unoccupied as determined by the Consultant. Removal of asbestos containing building materials must not delay the performance of other trades.
- .3 Prior to any on-site activities, the Contractor shall submit a proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.
- .4 Modifications to the project schedule would only be granted on approval by the Consultant.

1.8 **GENERAL REQUIREMENTS**

- .1 Supply all labour, material, and equipment necessary to safely execute and complete all work specified, required, or implied under Section 02 82 00.

- .2 Prepare and isolate the specified work area(s) from adjoining occupied and unoccupied areas.
- .3 Shut down and/or isolate any air moving equipment that could contribute to the dispersal of contaminants, including asbestos, from the work area.
- .4 Under no circumstances shall existing service or utility lines be disconnected, shut off, or otherwise removed from service without prior consent of the Consultant.
- .5 Construct worker and waste decontamination facilities at the perimeter of the work area as further specified in the sections listed in Para. 1.2.
- .6 As required, allow for access to security, site equipment and other alarm panels at all times.
- .7 Securing the work site is the responsibility of the Contractor. Any damage to the work site or unauthorized access during or after normal working hours resulting from contractor negligence will be the responsibility of the Contractor to make right.
- .8 After preparation and approval of the work areas and decontamination facilities, remove and dispose of all required materials.
- .9 The Contractor will be responsible for the general upkeep of the site. Where available, workers and trades will use designated washrooms only. Designated washrooms must be kept clean at all times. All other facilities will be off limits.
- .10 All work will be subject to inspection inside and outside work area by the Consultant as further specified in the sections listed in Para. 1.2 and paragraph 1.5.
- .11 All containment structures, such as hoardings, platforms, etc., that are used to segregate the work area are to remain in place until directed by the Consultant.
- .12 When directed by the Consultant, decommission the work area and decontamination facilities.
- .13 Exercise care and caution in operations relative to the site. Any unnecessary destruction or damage of the site will not be permitted.
- .14 All hazardous building materials removed shall be transported and disposed as further specified in the sections listed in Part 3.0 of this Section.

1.9 **DEFINITIONS**

- .1 **Airlock:** System for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated areas, typically consisting of two (2) curtained doorways spaced minimum of 2 m apart.
- .2 **Amended Water:** Water with a non-ionic wetting agent added to reduce water tension to allow wetting of fibres.
- .3 **Asbestos containing Material (ACM):** Materials identified under Site Conditions including fallen materials and settled dust.

- .4 **Asbestos or Hazardous Building Materials Contaminated Waste:** Materials identified under Site Conditions that have been removed as specified including fallen materials, debris, rubble, and settled dust, and materials and/or equipment deemed to be contaminated under this specification and/or by the Consultant.
- .5 **Asbestos or Hazardous Building Materials Work Area(s):** Area(s) where work takes place which will or may disturb asbestos containing material or other hazardous building materials, including fallen material or settled dust that may contain asbestos.
- .6 **Authorized Visitor(s):** Owner, Consultants or person(s) representing regulatory agencies, and person(s) authorized by them.
- .7 **Competent Worker:** in relation to specific work, means a worker who:
 - .1 Is qualified because of knowledge, training and experience to perform the work.
 - .2 Is familiar with the applicable laws and with the provisions of the regulation that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health and safety in the work.
- .8 **Curtained doorway:** arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
 - .1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.
 - .2 Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing.
 - .3 Overlap each polyethylene sheet at openings not less than 1.5 m on each side.
- .9 **DOP/PAO Test:** A testing method used to determine the integrity of the negative pressure unit using dioctyl phthalate (DOP) or poly alpha olefin (PAO) HEPA filter leak test.
- .10 **Fitting:** Individual segments of a mechanical service line which may include hangers, tees, elbows, joints, valves, unions, etc.
- .11 **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 during removal.
- .12 **Glovebag:** Prefabricated polyvinylchloride Glovebag with a minimal thickness of 0.25 mm with integral gloves and elastic ports, equipped with a reversible double pull throw zipper on top, securing straps and an internal closure strip if intended to be used at multiple locations.

- .13 **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. Panel is to be installed by licensed technician and meet applicable CSA standards.
- .14 **Hazardous Building Material:** Materials identified under Site Conditions including fallen materials and settled dust.
- .15 **HEPA Filter:** High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in collecting 0.3 micrometer aerosol.
- .16 **HEPA Vacuum:** HEPA filtered vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.
- .17 **Knife:** Knife with fully retractable blade for use inside glove bag.
- .18 **Negative Pressure:** Reduced pressure within specified 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. Air volume extracted should be sufficient to provide four (4) air changes per hour and maintain a reduced pressure of 5 Pascals (0.02 inches water column) within the work area in relation to the surrounding areas.
 - .1 Negative pressure system shall be equipped with an instrument to continuously monitor and automatically record pressure differences.
- .19 **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 pre-filter and HEPA final filter. Air shall pass HEPA filter before discharge. Unit shall have pressure differential gauge to monitor filter loading. Unit shall have warning system for HEPA filter failure. HEPA filter shall have separate hold down clamps to retain filter in place.
- .20 **Non-Friable Materials:** material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .21 **Occupied Area:** Any area of the site building or work site that is outside the work area.
- .22 **Polyethylene sheeting sealed with tape:** polyethylene sheeting of type and thickness specified sealed with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through sheeting into clean area.
- .23 **Securing Straps:** For glove bag, reusable nylon straps at least 25 mm (1") wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.

- .24 **Sprayer:** Garden reservoir type portable manual sprayer or airless spray equipment capable of producing mist or fine spray. Must be of appropriate capacity for scope of work.

1.10 REGULATIONS AND GUIDELINES

- .1 Comply with applicable Building Codes, Electrical, Fire and Construction Safety Codes as well as Federal, Provincial, and local requirements pertaining to asbestos and other designated substances provided that in any case of conflict among these requirements or with these specifications the more stringent requirement shall apply. Work shall be performed under regulations in effect at the time work is performed.
- .2 Provide necessary notices, obtain permits and pay all fees, in order that work specified may be carried out. Charges and alterations required by authorized inspector of any authority having jurisdiction, to be carried out.
- .3 Manitoba Workplace Safety and Health Act (C.C.S.M. c. W210), Workplace Safety and Health Regulation (MR217/2006).
- .4 Manitoba Environment Act, Chapter E125, Waste Disposal Grounds Regulation (MR 150/91) as it pertains to asbestos, lead and other hazardous materials.
- .5 Provincial Guidelines or Safe Work Bulletins associated with MR217/2006. Such guidelines and bulletins are available on the SAFE Work Manitoba website at: <http://safemanitoba.com/resources/bulletin#en..>
- .6 The Contractor shall ensure that:
- .1 Every employee and every worker under their control complies with applicable Acts and Regulations.
- .2 Health and safety of workers and public area protected.
- .3 Policies and procedures of the Owner are complied with including site specific safety, health and environment requirements.
- .4 Notify sanitary landfill or waste disposal site as per Municipal and Provincial requirements.
- .7 Laws of Province of Manitoba shall govern this work. The Contractor shall observe all such laws and shall obtain and/or pay all permits, notices, fees, taxes, duties as may be required. Likewise, it is the responsibility of the contractor to comply with Worker's Compensation and Workplace Safety and Health Acts.
- .8 If no regulations exist, follow guidelines most widely accepted by recognized professional organizations such as occupational hygienists, health professionals or environmental engineers as listed in References.

1.11 QUALITY ASSURANCE

- .1 Ensure work proceeds to schedule and meets all requirements of this section.
- .2 Perform work so airborne contaminants or wastewater run-off does not contaminate areas outside specified work areas.

- .3 Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate the enclosure of these areas and complete cleanup of affected areas in same manner as that applicable to work areas, at no cost to Owner or Consultants. The Consultant shall be notified as soon as possible following such an occurrence and informed of the measures being implemented to correct the situation.
- .4 Pay cost to Owner of inspection and air monitoring performed as result of failure to perform work satisfactorily.
- .5 Protect and maintain work until work has been completed and accepted. Protect work against damage during installation. Repair all damage to existing facilities without expense to Owner or Consultants.
- .6 Coordinate work with other sections to avoid conflict and ensure proper installation of all materials.
- .7 On completion of work, remove all tools, surplus and waste material and leave work in a clean condition.
- .8 Use only skilled and qualified workers for all trades required for this work.

1.12 **SUBMITTALS**

- .1 The Contractor shall ensure that the following has been submitted to the Consultant prior to commencing work:
 - .1 Contractor health and safety records.
 - .2 Before commencing any work, Contractor shall submit, in writing, confirmation of good standing with Worker's Compensation Board.
- .2 The Contractor shall ensure that the following has been submitted to the Owner and the Owner's Consultant at least seven (7) days prior to commencing work:
 - .1 Provide proof that notification of asbestos work has been submitted to the Manitoba Workplace Safety and Health.
 - .2 Necessary permits for transportation and disposal of asbestos waste. Submit written proof satisfactory to Consultant that the disposal site is aware of the waste(s) being disposed of and that suitable arrangements have been made to receive and properly dispose of asbestos and other hazardous building materials waste.
 - .3 Names of supervisory personnel who will be responsible for the specified work area(s).
 - .4 Satisfactory proof that every worker has had instruction and training in the hazards of asbestos and other hazardous building materials (as appropriate), in personal hygiene and work practices, and in the use, cleaning, and disposal of respirators and protective clothing.
 - .5 A proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.
 - .6 Negative air unit performance data and results of DOP/PAO test as required.

- .7 Recording manometer calibration data as required.
- .8 Documentation for materials used in the course of the project including MSDS sheets or other data documenting compliance with specifications for such materials as, but not limited to sealants, encapsulants, wetting agents, and polyethylene sheeting.
- .9 Provide a written emergency access/egress plan for the work area for acceptance by the Consultant.
- .10 Provide a written visitor entrance procedure for the work area for acceptance by Consultant.
- .11 If requested, submit copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant on a weekly basis.
- .12 Copies of any reports or directions issued by Federal and Provincial health and safety inspectors.
- .13 Copies of incident and accident reports.
- .14 Manifests, waybills, bills of lading etc. as applicable for each type of waste on completion of the work or as requested by the Consultant.

1.13 **SUPERVISION**

- .1 A minimum of one (1) supervisor is required for every ten (10) workers unless otherwise approved by the Consultant.
- .2 An approved supervisor must remain within the designated work area at all times during the disturbance, removal, or other handling of designated substances.
- .3 Site supervision must only be replaced by approved replacement on approval by the Consultant. The Consultant reserves the right to request the replacement of the supervisor without explanation.

Part 2 **Products**

2.1 **MATERIALS**

- .1 Materials and equipment specified and acceptable manufactures are named in this specification for the purposes of establishing the standard of materials and workmanship to which the Contractor shall adhere. Tender price shall be based on the use of materials and equipment as specified.
- .2 **Encapsulant:** Type 2 surface film forming or Type 1 penetrating type Class A water based conforming to CAN/CGSB-1.205 and approved by the Fire Commissioner of Canada. Encapsulant used to meet requirements for fire resistance, flame spread or acoustical characteristics as required. Accepted material and approved manufactures include Bakor, Childers and Fosters.
- .3 **Flexible ducting:** Metal reinforced flexible ductwork, 300 mm (12") diameter minimum.
- .4 **Polyethylene Sheeting:** 0.15 mm (6 mil) minimum thickness unless otherwise specified. Sheet size shall be such to minimize joints.

- .5 **Protective Coveralls:** Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material or non-woven material and must be rated for asbestos and lead abatement applications by the manufacturer.
- .6 **Rip-Proof Polyethylene:** 0.15 mm (6 mil) woven fibre reinforced fabric bonded both sides with polyethylene. Sheet size shall be such to minimize joints.
- .7 **Sealer (Lock down agent):** Sealer for purpose of trapping residual fibre debris. Product must have flame spread and smoke development ratings both less than 25. Product, such as TC-55 (clear) or equivalent, shall leave no stain when dry. For mechanical equipment, pipes, boilers, etc. use high temperature sealer only, such as Chil-Abate CP210 or equivalent.
- .8 **Tape:** Tape suitable for sealing polyethylene to surface encountered under both wet conditions using amended water, and dry conditions. Standard of acceptance, Nashua 300 polyethylene coated cloth tape, Tyco Adhesives, or equivalent.
- .9 **Asbestos Waste Containers:** contain waste in two separate containers.
 - .1 Inner container: 0.15 mm (6 mil) thick sealable polyethylene bag or where glove bag method is used, glove bag itself.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm (6 mil) thick sealable polyethylene bag.
 - .3 Containers must be acceptable to disposal site selected and the Ministry of Environment. Other containers may be acceptable as approved by the Consultant.
 - .4 Labelling requirements: affix preprinted cautionary asbestos warning, that is visible when ready for removal to disposal site. Label in both official languages if required.
 - .5 Labelling shall be as per the following:

CAUTION CONTAINS [ASBESTOS FIBRES or WASTE NAME] (25 mm high)
Do Not Mishandle (19 mm high).
- .10 **Wetting Agent:** Non-foaming surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Standard of acceptance, Asbesto-Wet, or equivalent.

Part 3 **Waste Management and Disposal**

3.1 **GENERAL REQUIREMENTS AND PROCEDURES**

- .1 Separate waste materials for recycling as required.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Provincial and Municipal regulations.
- .4 Check with local landfill operator or waste disposal site to determine type of waste containers acceptable.

- .5 Ensure shipment of containers to landfill or waste disposal site is by a waste hauler licensed by the Province of Manitoba to transport the specified waste materials.
- .6 Transportation of all waste and materials through occupied areas shall be covered and must never be left unattended. Cleanup waste route and loading area after each load. Use appropriate worker protection as required.
- .7 All waste containing designated substances removed as part of this specification must be removed from the work area at the end of each work shift unless approved by the Consultant.
- .8 Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide proof (copies of all waste manifests or other approved documentation) of proper disposal to the Consultant on a weekly basis (at a minimum) and on completion of the project.
- .9 Cooperate with Provincial or Federal inspectors and immediately carry out instructions for remedial work at landfill or waste disposal site to maintain environment, at no additional cost to the Owner or Consultants.
- .10 Ensure landfill or waste facility operator is fully aware of substances being disposed.
- .11 Ensure that containers used for disposal are locked and covered at all times.

Part 4 **Inspection and Air Monitoring**

4.1 GENERAL INSPECTION

- .1 The following general inspection specifications shall be followed for all abatement activities.
- .2 From commencement of work until completion of Cleanup operations, the Consultant is to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos and other work area(s).
- .3 The Consultant is empowered to shut down all work activities when leakage of asbestos or other hazardous building materials from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner or Consultants.
- .5 If the designated 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 the Owner or Consultants.
- .6 The Contractor is to pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

- .7 The Contractor is to provide a minimum of 24 hours written notice to the Consultant of any request for scheduling milestone inspections or transportation of waste through an occupied area.
- .8 Do not proceed with next phase of work until written approval of each inspection is received from the Consultant.

4.2 **GENERAL AIR MONITORING**

- .1 The following general air sampling specifications shall be followed for all projects.
- .2 Air sampling may include occupational and area samples including those areas within and immediately adjacent to each work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Project Coordinator, applicable Health & Safety Officer and the Contractor.
- .3 All air samples must be collected and analysed in accordance with Provincial Regulations and Guidelines.
- .4 If air monitoring or visual inspection indicates that areas outside current work area enclosures are contaminated above the designated action level of one half the Provincial Occupational Exposure Limit, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner or Consultants.
- .5 If air monitoring in work areas shows that removal procedures are not sufficient to maintain airborne levels of specified substances below that appropriate for the level of personal protective equipment employed by the Contractor, all work is to stop within the work area and removal procedures re-assessed.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removing non-friable asbestos containing materials, if the material can be removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
 - .2 Break, cut, grind, sand, drill, scrape, vibrate or abrade non-friable asbestos containing materials using non-powered hand-held tools, and the material is wetted to control the spread of dust or fibres.
 - .3 Removal of asbestos containment hoarding at the completion of asbestos abatement activities and upon successful inspections and air clearances.
- .2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 02 82 00 General Requirements.

1.2 RELATED REQUIREMENTS

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00, General Requirements.
 - .2 Section 02 82 00.2, Asbestos Abatement – Type 2.
 - .3 Section 02 82 00.3, Asbestos Abatement – Type 3.
 - .4 Section 02 82 00.4, Asbestos Abatement – Type 2 Glovebag

1.3 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area including authorized visitors. The following shall apply to the use of respirators for Type 1 activities:
 - .1 During Type 1 removal all workers, supervisors, and authorized visitors shall wear, at minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.
 - .3 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Growth, Enterprise and Trade.

- .4 Provide instruction to workers and visitors in use of respirators including qualitative or quantitative fit testing.
 - .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .6 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.
 - .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
 - .8 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:
- .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other protective apparel required by Manitoba construction regulations.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 Eating, drinking, chewing, and smoking are not permitted in asbestos work area.
- .5 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.
- .6 Before entering asbestos work area(s), don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access area(s) or asbestos work area(s).
- .7 Persons leaving asbestos work area(s) shall:
- .1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.
 - .2 Remove contaminated coveralls and place in receptacles for disposal with other asbestos contaminated materials prior to leaving the asbestos work area.
 - .3 Still wearing appropriate respirator, proceed out of the established asbestos work area to the decontamination facility.
 - .4 Clean using soap and warm water wash and remove respirator then thoroughly wash hands and face. Remove filters and dispose as asbestos

- waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator.
- .5 Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.
 - .8 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.
 - .9 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
 - .10 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from asbestos work area.

Part 2 Preparation

2.1 SITE PREPARATION

- .1 Request that building personnel 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.
- .2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos containing materials.
- .3 Erect appropriate worker and waste decontamination facilities at locations approved by the Owner or Owner's Consultant.
- .4 Complete isolation measures between the asbestos work area and occupied areas using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the asbestos work area.
- .5 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall be in both official languages (if required) and shall read:

CAUTION (25 mm high)
Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high)

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

- .7 If appropriate, use polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.
- .8 Locate required tools, equipment, and waste receptors within the asbestos work area.
- .9 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 in accordance with applicable CSA standard prior to applying water to asbestos containing materials. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
- .10 Provide temporary lighting in asbestos work area to levels that will permit work safely.
- .11 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.

2.2 WORKERS' DECONTAMINATION FACILITIES

- .1 Set-up an isolated worker decontamination area adjacent to the asbestos work area consisting of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for asbestos contaminated disposable coveralls.

Part 3 Execution

3.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL:

- .1 Arrangements have been made for disposal of waste.
- .2 Asbestos work areas are effectively segregated.
- .3 Tools, equipment and waste materials receptors are on hand.
- .4 Arrangements have been made with the Owner or Owner's Consultant for work area security.
- .5 Signs are displayed in areas where access to asbestos work area is possible.
- .6 The Owner or Owner's Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 ASBESTOS CONTAINING MATERIAL REMOVAL

- .1 Before removing asbestos, prepare site as described previously.
- .2 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the asbestos work area.
- .3 Pre-clean / remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.

- .4 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
- .5 Do not use compressed air to clean up or remove dust from any surface.
- .6 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
- .7 Spray using sprayer or otherwise wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
- .8 Remove the saturated asbestos containing material in small sections with minimal breakage and place directly into waste containers. Do not allow saturated asbestos to dry out or fall to the floor. As it is being removed, pack the material in sealable polyethylene bags or other appropriate sealable container and place in labelled containers for transport.
- .9 When removing materials adhered to substrate with mastic or other adhesives, mastic or adhesive is to be scraped smooth with the substrate surface.
- .10 Perform work to reduce dust creation to lowest levels practicable.
- .11 Frequently and at regular intervals during work and immediately on completion of work:
 - .1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and
 - .2 Drop sheets to be wetted and placed in a waste container as soon as practicable.
- .12 Cleanup:
 - .1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.
 - .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from asbestos work area.
 - .3 Seal waste bags and remove from site. Dispose in accordance with requirements of Provincial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.
 - .4 Perform final thorough Cleanup of work areas and adjacent areas affected by work using HEPA vacuum.

Part 4 Decommissioning

4.1 Dismantling Of Protection

- .1 A final review may be carried out by the Owner or Owner's Consultant to confirm that no dust or debris remains and that the required work has been completed.

Air monitoring may be considered as part of the final review at the discretion of the Owner or Owner's Consultant.

- .2 On written approval of the Owner or Owner's Consultant, the Contractor may proceed with final dismantling of the asbestos work area.

Part 5 Inspection and Air Monitoring

5.1 Inspection

- .1 From commencement of work until completion of Cleanup operations, the Owner or Owner's Consultant to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Owner or Owner's Consultant will inspect both inside and outside the work area during active abatement.
- .3 The Owner or Owner's Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Owner or Owner's Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.
- .5 If asbestos 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 the Owner.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.2 Air Monitoring

- .1 Air sampling may be performed within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Consultant, the General Contractor for the Project (if present) and the Abatement Contractor.
- .2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .3 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL, clean these areas in same manner as that applicable to asbestos work areas, at no cost to the Owner.
- .4 If air sampling by Owner's Consultant show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.
- .5 The air clearance concentration shall not exceed the designated action level of 0.05 fibres/mL.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Generally, Type 2 or moderate risk asbestos abatement specifications shall apply to the removal or disturbance of less than 1 m² of friable asbestos containing materials located outside a Type 3.
- .2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 02 82 00, Asbestos Abatement – General and all other Sections.

1.2 RELATED REQUIREMENTS

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
- .2 Related work specified elsewhere:
- .3 Section 02 82 00 General Requirements.
- .4 Section 02 82 00.1, Asbestos Abatement – Type 1
- .5 Section 02 82 00.3, Asbestos Abatement – Type 3
- .6 Section 02 82 00.4, Asbestos Abatement – Type 2 Glovebag

1.3 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area enclosure including authorized visitors. The following shall apply to the use of respirators for Type 2 activities:
 - .1 During wet removal and clean-up in enclosed asbestos work area workers, supervisors, and authorized visitors shall wear, at a minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Consultant.
 - .2 Where airborne fibre levels are expected to be greater than 1 fibres/ml, minimum powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges shall be used.
 - .3 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.
 - .4 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Growth, Enterprise and Trade.
 - .5 Provide instruction to workers and visitors in use of respirators including qualitative or quantitative fit testing.

- .6 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
- .7 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.
- .8 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
- .9 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:
 - .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other protective apparel required by Manitoba construction regulations.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 Before entering full-enclosure or other asbestos work area(s), remove street clothes in clean change room and don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.
- .5 Persons leaving asbestos work area(s) shall:
 - .1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.
 - .2 Enter the Staging Area, remove contaminated coveralls, and place in receptacles for disposal with other asbestos contaminated materials.
 - .3 Still wearing appropriate respirator, proceed to the Clean Room or designated wash area.
 - .4 Using soap and clean, warm water wash and remove respirator then thoroughly wash hands and face.

- .5 Upon completion of asbestos abatement, dispose footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.
- .6 Do not eat, drink, smoke or chew gum or tobacco in asbestos work area.
- .7 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.
- .8 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
- .9 Maintain one visitor/emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination facility access point to the asbestos work area for use by the Owner or authorized visitors.
- .10 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to enter work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from asbestos work area.

Part 2 Preparation

2.1 CLEAN SITE PREPARATION FOR FULL-ENCLOSURE ASBESTOS WORK AREAS

- .1 Request that building personnel 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.
- .1 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos containing materials.
- .2 Erect appropriate worker and waste decontamination facilities at locations approved by the Consultant.
- .3 Complete isolation measures between the asbestos work area and occupied areas. Where required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas. The hoarding walls shall be constructed as follows:
 - .1 Build 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 side walls with polyethylene sheeting.
 - .2 If hoarding walls do not extend to the underside of the ceiling construct a 'roof' to completing isolate the asbestos work area.

- .3 Construct roof as follows: Size of joists shall be determined by span, loads, use and Building Codes. Use as a minimum 39 mm x 138 mm (2" x 4") joists. Cover joists facing the asbestos work area with one layer of polyethylene sheeting, overlapping the perimeter walls at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls.
- .4 Where required, cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of 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.
- .4 All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.
- .5 Seal off all openings including but not limited to doorways, hatch openings, windows, vents, service holes in walls and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.
- .6 On approval of Consultant, seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight.
- .7 Establish negative pressure in asbestos work area. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.
- .8 Vent units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 3 m away from building entrances, open windows or air intakes. Do not discharge air into building interior. The location of venting must be approved by the Consultant.
- .9 If requested, leak test negative air units prior to commencement of abatement at operating position, using DOP/PAO method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.
- .10 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 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.
- .11 The negative air system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .12 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings

- within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
- .13 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
 - .14 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 in accordance with applicable CSA standard prior to applying water to asbestos containing materials. A minimum of one (1) ground fault electrical panel shall be provided for every 300 m² of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
 - .15 Provide temporary lighting in asbestos work area to levels that will permit work safely.
 - .16 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Consultant.

2.2 DECONTAMINATION ENCLOSURE SYSTEM FOR FULL – ENCLOSURE ASBESTOS WORK AREAS

- .1 Where required by the Consultant, construct worker and waste decontamination facilities at entrance to each asbestos work area as approved by the Consultant. Decontamination Facility shall be comprised of a minimum one room which serves as an air lock as described below.
- .2 Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.
- .3 Clean Room: Build Clean Room to be used as change room (to and from street clothes) with washing facilities for hands and face. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be re-worn in asbestos work areas. Clean Room shall be large enough to accommodate at least one worker and allow sufficient space to undress comfortably. Room shall also be of sufficient size to accommodate largest item of equipment used and/or two (2) waste containers. Minimum size of room is to be 1.5 square metres with a minimum height of 1.9 m.
- .4 Access Room / Container Cleaning Room: When requested, build or establish a second chamber to serve as an Access Room / Container Cleaning Room between asbestos work enclosure and Clean Room. Room shall be of sufficient size to accommodate largest item of equipment used and/or two (2) waste containers. Access Room / Container Cleaning Room is to be used for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal, as well as changing out of protective clothing and storage of contaminated protective clothing and equipment. Minimum size of room is to be 1.5 square metres with a minimum height of 1.9m.
- .5 Staging Area: When a separate Access Room / Container Cleaning Room has not been constructed, the area within the Type 2 containment closest to the entranceway shall be considered the Staging Area. The Staging Area shall be used for gross removal of dust and debris from waste containers and equipment,

labelling and sealing of waste containers, and temporary storage pending removal.

- .6 Where a separate clean room is not required by the Consultant, a designated wash-up area must be provided within the work area. The wash-up area must be supplied with a HEPA filtered vacuum, wash basin with clean, warm water, soap, rags or towels, a disposal container for asbestos contaminated disposable coveralls and storage facilities for worker's shoes and any protective clothing to be re-worn in asbestos work areas.

2.3 CONSTRUCTION OF DECONTAMINATION ENCLOSURES (WHERE REQUIRED)

- .1 **Floor:** Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should extend at least 600 mm (24") beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene 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 of walls with polyethylene sheeting.
- .3 **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 89 mm (2" x 4") joists. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls by at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting
- .4 **Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed

2.4 MAINTENANCE OF ENCLOSURES

- .1 Maintain enclosures and work areas in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift.
- .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- .3 Visually inspect enclosures and work areas at beginning and end of each working period.
- .4 The negative air system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .5 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Consultant.

Part 3 Execution

3.1 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 (where required).
- .4 Tools, equipment and waste materials receptors are on hand.
- .5 Arrangements have been made with Consultant for work area security.
- .6 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall be in both official languages and shall read:

CAUTION (25 mm high)
Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high).

- .7 Provide proof that notification of asbestos work has been submitted to Manitoba Workplace Health and Safety at least five working days prior to start of work.
- .8 The Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 CONTAMINATED SITE PREPARATION

- .1 Before performing any contaminated work, prepare site as previously described.
- .2 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area enclosure(s). Ensure air handling systems remain shut off for duration of work.
- .3 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).
- .4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

3.3 ASBESTOS CONTAINING MATERIAL REMOVAL

- .1 All individuals involved with any portions of the removal or handling process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.
- .2 Repeatedly mist the air throughout the performance of this work and maintain all surfaces within the asbestos work area in a damp state.
- .3 Spray asbestos containing materials with amended water using airless spray equipment. Dampen asbestos to prevent release of airborne fibres during removal or handling.
- .4 Where required, remove the saturated asbestos containing material in small sections and place directly into waste containers. Do not allow saturated asbestos to dry out or fall to the floor. As it is being removed, pack the material in asbestos waste containers.
- .5 Remove any non-asbestos containing debris and rubble present throughout the work area that cannot be practically segregated from asbestos containing or asbestos contaminated materials.

- .6 If asbestos debris falls to the floor or drop sheet, spray asbestos debris on floor with amended water to prevent it from drying out and immediately remove from the floor or drop sheet and put in waste containers.
- .7 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.
- .8 After completion of removal of asbestos containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.
- .9 Remove asbestos waste containers and decontaminated equipment and materials from the asbestos work area through the decontamination enclosure as follows:
 - .1 In the Staging Area, remove gross contamination from the surface of the item to be removed. The item shall then be cleaned, wet wiped, and double bagged and/or sealed in polyethylene prior to transferring to a second worker present in the Clean Room. Wash water shall be treated as asbestos contaminated waste.
 - .2 The worker present in the Clean Room shall transfer the clean items outside the waste decontamination enclosure. Workers present in the work enclosure must not leave the asbestos work area until decontaminating as specified in Para. 1.3 of this section.
 - .3 Treat all removed materials exposed to asbestos, as asbestos contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.
- .10 After removing all visible asbestos, wet clean entire work area including but not limited to pipes, pipefittings, ducts, and similar items not covered with polyethylene sheeting and request visual inspection and acceptance.
- .11 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 interior of polyethylene enclosure. The work area shall not be disturbed for a minimum of 12 hours after application of sealer. If present, operate negative air units during this period.

Part 4 Decommissioning

4.1 DISMANTLING OF PROTECTION

- .1 All containment structures, such as hoardings, platforms, etc., which are used to segregate the work area, are to remain in place until directed by the Consultant.
- .2 A final review may be carried out by the Owner or Consultant to ensure that no dust or debris remains and that the required work has been completed. Air monitoring may be considered as part of the final review at the discretion of the Consultant.
- .3 On written approval of the Consultant, the Abatement Contractor may proceed with final dismantling of enclosures affected by asbestos abatement as follows.
- .4 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 appropriate respirator and

disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.

- .5 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.
- .6 Remove hoardings, temporary lighting, equipment and facilities provided for asbestos work which are not to be used by other trades.
- .7 Complete final general cleaning of worksite and ensure no dust and debris remain.

Part 5 Inspection and Air Monitoring

5.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Consultant is empowered by the Owner to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Owner or Consultant may inspect both inside and outside the work area during active abatement or disturbance.
- .3 The Owner or Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Abatement Contractor is to allow inspection by the Owner or Consultant and provide full access to the work area. The Abatement Contractor shall make good on any work disturbed by the inspection at no cost to the Owner or Consultants.
- .5 If asbestos 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 the Owner or Consultants.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.
- .7 Provide a minimum of 24 hours written notice to the Consultant of any request for scheduling milestone inspections or transportation of asbestos water through an occupied area.
- .8 The following milestone inspections are to take place during work:
 - .1 Clean Site Preparation: Inspection of site preparations and set-up prior to contaminated work.
 - .2 Visual Clearance: Inspection of asbestos work area after removal of asbestos but before the application of sealer.
 - .3 Final Air Sampling Clearance: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.
 - .4 Joint Visual Clearance: Inspection of asbestos work area by Owner or Consultant and Contractor's site supervisor following Final Air Sampling

Clearance but before the removal of hoarding and perimeter seals from within the asbestos work area.

- .9 Do not proceed with next phase of work until written approval of each inspection is received from the Consultant.

5.2 AIR MONITORING

- .1 Air sampling may be performed within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Consultant, the General Contractor for the Project (if present) and the Abatement Contractor.
- .2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .3 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above the designated action level of 0.05 fibres/ml, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Owner.
- .4 If air sampling by Consultant show that levels in asbestos work area do not exceed the action level of 0.01 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of enclosures.
- .5 The air clearance concentration is ≤ 0.01 fibres/mL.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Generally Type 3 or high risk asbestos abatement specifications shall apply to activities that pose a high risk of exposure to airborne asbestos and a corresponding higher risk of health effects if handled improperly. This specification shall apply to such activities as the removal or disturbance of greater than 1 square metre (1m²) of friable asbestos containing materials.
- .2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 02 82 00 General Requirements.

1.2 RELATED REQUIREMENTS

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00, General Requirements.
 - .2 Section 02 82 00.1, Asbestos Abatement – Type 1.
 - .3 Section 02 82 00.2, Asbestos Abatement – Type 2.
 - .4 Section 02 82 00.4, Asbestos Abatement – Type 2 Glovebag

1.3 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area including authorized visitors. The following shall apply to the use of respirators for Type 3 activities:
 - .1 During wet removal and clean-up in enclosed asbestos work area workers, supervisors, and authorized visitors shall wear, as a minimum, powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Abatement Consultant.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.
 - .3 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Growth Enterprise & Trade.
 - .4 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.

- .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
- .6 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.
- .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
- .8 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:
 - .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other protective apparel required by Workplace Safety and Health construction regulations.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- .5 Before entering full enclosure asbestos work area(s), remove street clothes in clean change room and don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.
- .6 Persons leaving full enclosure asbestos work area(s) shall:
 - .1 Remove gross contamination from clothing before leaving asbestos work area.
 - .2 Proceed to equipment and access room 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 room to dry for later use.
 - .3 Still wearing appropriate respirator, proceed naked to showers.
 - .4 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 as asbestos waste in container

- provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator.
- .5 Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.
 - .6 Following showering, proceed to clean room, dry off and dress in street clothes. Store respirators in such a 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 asbestos work area is to take place, follow procedures in Para. 1.3.5.
 - .7 Removal of waste and equipment from holding room of waste decontamination enclosure system shall be performed as per Para. 2.3 of this section. No worker shall use this system as means to leave or enter asbestos work area.
 - .8 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.
 - .9 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
 - .10 Maintain one emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination chamber access point to the asbestos work area for use by Owner or authorized visitors. The emergency access respirator shall be a PAPR Full Face Respirator during hours of active asbestos abatement work and, at a minimum, a half face respirator with minimum P100 filter cartridges after shift-end when active abatement is not being conducted.
 - .11 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2 Preparation

2.1 CLEAN SITE PREPARATION FOR FULL ENCLOSURE ASBESTOS WORK

- .1 Request that building personnel 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.
- .2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos containing materials.
- .3 Isolate and protect equipment that cannot be removed from the asbestos work area in a manner detailed by the Owner or Owner's Representatives.

- .4 Erect appropriate worker and waste decontamination facilities at locations approved by the Consultant.
- .5 Complete isolation measures between the asbestos work area and occupied areas. Where required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas. The hoarding walls shall be constructed as follows:
 - .1 Build 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 side walls with polyethylene sheeting.
 - .2 If hoarding walls do not extend to the underside of the ceiling construct a 'roof' to completing isolate the asbestos work area.
 - .3 Construct roof as follows: Size of joists shall be determined by span, loads, use and Building Codes. Use as a minimum 39 mm x 138 mm (2" x 4") joists. Cover joists facing the asbestos work area with one layer of polyethylene sheeting, overlapping the perimeter walls at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls.
 - .4 Where required, cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of 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.
- .6 All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task
- .7 Seal off all openings including but not limited to doorways, hatch openings, windows, vents, service holes in walls, and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.
- .8 If necessary, caulk and seal ducts and duct shafts to remain in service as required, to make airtight. Cut and cap supply ducts with rigid sheet metal caps and seal. Perform work at appropriate time under contaminated conditions if necessary.
- .9 On approval of the Consultant, seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight.
- .10 Establish negative pressure in asbestos work area. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.
- .11 Vent negative pressure units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 5 m away from building entrances, open windows or air intakes. Do not

- discharge air into building interior. The location of venting must be approved by the Consultant.
- .12 If requested, leak test negative pressure units prior to commencement of abatement at operating position, using DOP/PAO method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.
 - .13 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 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.
 - .14 The negative pressure system is to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
 - .15 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
 - .16 Install plywood enclosures, covered with rip-proof polyethylene, to protect equipment or fixtures in asbestos work area(s) that may be damaged.
 - .17 Remove, clean and turn over to Owner, all re-usable mechanical equipment, electrical equipment and building components that may interfere with the asbestos removal and associated clean-up. The removal of such materials is at the discretion of the Owner.
 - .18 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 in accordance with applicable CSA standard where application of amended water is required for wetting asbestos containing materials. A minimum of one (1) ground fault electrical panel shall be provided for every 300 m² of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
 - .19 Provide temporary lighting in asbestos work area to levels that will permit work to be done safely.
 - .20 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
 - .21 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Owner.

2.2 WORKERS' DECONTAMINATION FACILITIES

- .1 Construct a workers' decontamination enclosure at entrance to each asbestos work area as approved by the Consultant and the Abatement Consultant.

Worker decontamination enclosure system shall be comprised of three interconnecting rooms (chambers) as described below.

- .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 asbestos work area. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be re-worn 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 m² with a minimum height of 1.9 m.
- .4 **Shower Room:** Build room between clean room and equipment and access room of suitable size (minimum height 1.9 m) and install one (1) shower for every five (5) workers. Provide constant separate supplies of hot and cold water capable of maintaining a water temperature of between 40 and 50 °C. 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. When requested or where required by Provincial or Municipal law, direct wastewater to sewer via water filtering system consisting of a minimum 2-stage filtering system (25-micron and 5-micron filters) or other approved means of filtering.
- .5 **Clean Room:** Build room between shower room and clean areas outside of enclosures with a minimum height of 1.9 m. At doorway to clean room, provide secure doorway. Provide hangers for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install water heater, if required.

2.3 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.
- .2 Provide curtain doorways between rooms and at both dirty and clean entrances to the Enclosure System.
- .3 **Staging Area:** Establish a staging area within the asbestos work area for gross removal of dust and debris from waste containers and equipment and temporary storage pending removal to container cleaning room. Minimum size of 3 m².
- .4 **Container Cleaning Room:** Build container cleaning room between the Staging Area and Holding Room. Room shall be of sufficient size to allow proper washing or otherwise decontaminating equipment, drums and other waste containers and double bagging and labelling of asbestos waste. Treat wash water as asbestos contaminated waste. Minimum size of 1.5 m² with a minimum height of 1.9 m.
- .5 **Holding Room:** Build Holding Room between Container Cleaning Room and Transfer Room. Room shall be of sufficient size to accommodate largest item of equipment used and two (2) rigid waste containers or five (5) waste bags. Minimum size of 1.5 m² with a minimum height of 1.9 m.

- .6 **Transfer Room:** Build Transfer Room between Holding Room and uncontaminated area with a secure doorway.

2.4 CONSTRUCTION OF DECONTAMINATION ENCLOSURES

- .1 **Floor:** Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should extend at least 600 mm (24") beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene 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 of walls with polyethylene sheeting with caulk sealed and taped joints or seams
- .3 **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 88 mm (2" x 4") joists. Cover joists with 19 mm (3/4") plywood sheeting and seal and tape joints. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting.
- .4 **Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed.

2.5 MAINTENANCE OF ENCLOSURES

- .1 Maintain enclosures and work areas in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift.
- .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- .3 Visually inspect enclosures and work areas at beginning and end of each working period.
- .5 The negative pressure system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .6 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Abatement Consultant.

Part 3 Execution

3.1 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 Arrangements have been made with the Consultant for work area security.
- .6 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall be in both official languages (if required) and shall read:

CAUTION (25 mm high)
Asbestos Hazard Area (19 mm high)
Unauthorized Entry Prohibited (19 mm high)
Wear Assigned Protective Equipment (19 mm high)
Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high).

- .7 Provide proof that notification of asbestos work has been submitted to Manitoba Workplace Health and Safety at least five working days prior to start of work.
- .8 The Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 CONTAMINATED SITE PREPARATION FOR FULL ENCLOSURE ASBESTOS WORK AREA

- .1 Before performing any contaminated work, prepare site as previously described.
- .2 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area enclosure(s). Ensure air handling systems remain shut off for duration of work.
- .3 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).
- .4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

3.3 ASBESTOS CONTAINING MATERIAL REMOVAL

- .1 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.
- .2 Repeatedly mist the air throughout the performance of this work and maintain all surfaces within the asbestos work area in a damp state.
- .3 Clean and protect from damage all ceiling and wall components that are to remain including but not limited to furring, channels, hangers, wires and clips.
- .4 Spray asbestos containing materials with amended water using airless spray equipment. Where impermeable materials exist, slowly remove impermeable layer while wetting underlying layers. Saturate asbestos to prevent release of airborne fibres during removal.
- .5 Remove the saturated asbestos containing material in small sections, where possible. Do not allow saturated asbestos to dry out. As it is being removed, pack the material in sealable plastic bags 6-mil minimum thickness and place in labelled containers for transport.

- .6 Spray asbestos debris on floor with amended water to prevent it from drying out. Remove asbestos debris from the floor and put in waste containers at regular intervals as the work progresses and at the end of every shift.
- .7 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.
- .8 After completion of removal of asbestos containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.
- .9 Removal of asbestos waste containers and decontaminated equipment and materials from the asbestos work area shall be removed through the waste decontamination enclosure as follows:
 - .1 Remove gross contamination from the surface of the item to be removed within the staging area.
 - .2 Pass the item to a second worker present in the container cleaning room. The item shall be cleaned, wet wiped and double bagged and/or sealed in polyethylene prior to transferring to a third worker present in the holding room. Wash water shall be treated as asbestos contaminated waste.
 - .3 The worker present in the holding room shall transfer the clean items to a fourth worker located outside the waste decontamination enclosure. The fourth worker must not enter the waste decontamination enclosure. Those workers present in the enclosure must leave the asbestos work area through the worker decontamination chamber only.
 - .4 Treat all removed materials exposed to asbestos, as asbestos contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.
- .10 After removing all visible asbestos, wet clean entire work area including but not limited to pipes, pipefittings, ducts, and similar items not covered with polyethylene sheeting. Request visual inspection and acceptance.
- .11 Apply an encapsulant product to the exposed edges of asbestos containing materials that are not scheduled to be removed as part of the current renovation project. It is anticipated that sections of vinyl roll flooring are to remain in place in the room currently identified as 2LB07.
- .12 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 interior of polyethylene enclosure. Do not disturb the work area for a minimum of 12 hours after the application of sealer. Operate negative air units during this period.

Part 4 Decommissioning

4.1 Dismantling Of Protection

- .1 All containment structures, such as hoardings, platforms, etc., which are used to segregate the work area, are to remain in place until directed by the Consultant.
- .2 If air sampling by the Abatement Consultant shows that airborne fibre concentrations in asbestos work area do not exceed 0.01 fibres/mL as

determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Consultant or Abatement Consultant, proceed with final dismantling of decontamination and work enclosures as follows:

- .1 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 appropriate respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos 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 (2) 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 Remove hoardings, temporary lighting, equipment and facilities provided for work.
- .6 Visible debris discovered on the course of the site dismantlement is to be promptly cleaned using a damp cloth and/or HEPA vacuum.
- .7 Site inspections and air monitoring shall be conducted for all Type 3 asbestos work including a final review of the work area by the Consultant and/or Abatement Consultant to ensure that no dust or debris remains

Part 5 Inspection and Air Monitoring

5.1 Inspection

- .1 From commencement of work until completion of clean-up operations, the Consultant to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Consultant will inspect both inside and outside the work area a minimum of once per 10 hour work shift during active abatement.
- .3 The Owner or Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner.
- .5 If asbestos 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 the Owner.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

- .7 Provide a minimum of 24 hours written notice to the Consultant of any request for scheduling milestone inspections or transportation of asbestos waste through an occupied area.
- .8 The following milestone inspections are to take place during work:
 - .1 Clean Site Preparation: Inspection of site preparations and set-up prior to contaminated work.
 - .2 Contaminated Perimeter Preparation: Inspection of contaminated preparations at perimeter of asbestos work area prior to any bulk removal.
 - .3 Before Bulk Removal (Contaminated Site Preparation): Inspection of asbestos work area following Contaminated Perimeter Preparation but before start of main asbestos removal.
 - .4 Visual Clearance: Inspection of asbestos work area after removal of asbestos but before the application of sealer.
 - .5 Final Air Sampling Clearance: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.
 - .6 Owner and Consultant Joint Visual Clearance. Inspection of asbestos work area by Owner, Abatement Consultant and Contractor's site supervisor following Final Air Sampling Clearance and removal of non-critical barriers (i.e. non-perimeter seals such as floor) and seals (i.e. non-perimeter seals such as floor) but before the removal of hoarding and perimeter seals from within the asbestos work area.
 - .7 Final Dismantling Inspection: Inspection after the removal of hoarding, perimeter seals and decontamination facility from the asbestos work area.
- .9 Do not proceed with next phase of work until written approval of each inspection is received from the Consultant.

5.2 Air Monitoring

- .1 Air sampling may be performed within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Consultant, the General Contractor for the Project (if present) and the Abatement Contractor.
- .2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .3 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL, clean these areas in same manner as that applicable to asbestos work areas, at no cost to the Owner.
- .4 If air sampling by Consultant show that levels in asbestos work area do not exceed the action level of 0.01 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of enclosures.
- .5 The air clearance concentration is ≤ 0.01 fibres/mL.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Type 2 Glovebag asbestos abatement specifications shall apply to the removal of asbestos-containing mechanical pipe insulation outside of a sealed Type 2 or Type 3 enclosure where required prior to demolition of the building.
- .2 Supply all labour, material, and equipment necessary to safely execute and complete all work of this section while in conjunction with work specified, required, or implied under Section 02 82 00 General Requirements.

1.2 RELATED REQUIREMENTS

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00, General Requirements.
 - .2 Section 02 82 00.1, Asbestos Abatement – Type 1.
 - .3 Section 02 82 00.2, Asbestos Abatement – Type 2.
 - .4 Section 02 82 00.3, Asbestos Abatement – Type 3.

1.3 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Workplace Safety and Health Act, shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area including authorized visitors. The following shall apply to the use of respirators for Type 2 Glovebag activities:
 - .1 During glovebag removal all workers, supervisors, and authorized visitors shall wear, at minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.
 - .3 Respirators shall be acceptable to the Workplace Safety and Health Branch of Manitoba Growth Enterprise & Trade.
 - .4 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.
 - .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .6 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be

- provided to and reviewed with each worker who is required to wear a respirator.
- .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
 - .8 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:
- .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other protective apparel required by Manitoba Labour and Immigration construction regulations.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- .5 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.
- .6 Before entering asbestos work area(s), don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access area(s) or asbestos work area(s).
- .7 Persons leaving asbestos work area(s) shall:
- .1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.
 - .2 Remove contaminated coveralls and place in receptacles for disposal with other asbestos-contaminated materials prior to leaving the asbestos work area.
 - .3 Still wearing appropriate respirator, proceed out of the established asbestos work area to the decontamination facility.
 - .4 Clean using soap and warm water wash and remove respirator then thoroughly wash hands and face. Remove filters and dispose as asbestos waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator.
- .8 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

- .9 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
- .10 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2 Preparation

2.1 SITE PREPARATION

- .1 Complete isolation measures between the asbestos work area and occupied areas using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the Asbestos Work area.
- .2 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall be in both official languages (if required) and shall read:
 - CAUTION** (25 mm high)
 - Asbestos Hazard Area (19 mm high)
 - Unauthorized Entry Prohibited (19 mm high)
 - Wear Assigned Protective Equipment (19 mm high)
 - Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high)
- .3 Request that building personnel 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.
- .4 Lay polyethylene drop sheets directly underneath piping from which insulation materials are to be removed. Drop sheets are not to be reused.
- .5 Locate required tools, equipment, and waste receptors within the asbestos work area.
- .6 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 in accordance with applicable CSA standard prior to applying water to asbestos-containing materials. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
- .7 Provide temporary lighting in asbestos work area to levels that will permit work safely.
- .8 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Consultant.

2.2 WORKERS' DECONTAMINATION FACILITIES

- .1 Set-up an isolated worker decontamination area adjacent to the asbestos work area consisting of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for asbestos contaminated disposable coveralls.

Part 3 Execution

3.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL:

- .1 Arrangements have been made for disposal of waste.
- .2 Asbestos work areas are effectively segregated.
- .3 Tools, equipment and waste materials receptors are on hand.
- .4 Arrangements have been made with the Consultant for work area security.
- .5 Signs are displayed in areas where access to asbestos work area is possible.
- .6 The Consultant has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 ASBESTOS-CONTAINING MATERIAL REMOVAL

- .1 Before removing asbestos, prepare site as described previously.
- .2 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the asbestos work area.
- .3 Pre-clean / remove visible dust from surface of pipe or fitting by HEPA vacuuming or damp wiping.
- .4 Wet surface with amended water and wrap entire length of fitting and/or piping with 0.15 mm (6 mil) polyethylene sheeting taped in place.
- .5 Place tools necessary to remove insulation in tool pouch. Zip glovebag onto pipe and/or fitting and seal all openings to fitting with cloth securing straps. For valve bags seal valve cover with wire tie or equivalent.
- .6 Upon installation of the glove bag, inspect bag for any damage or defects. If any damage or defects are found, the glove bag is to be repaired or replaced. The glove bag to be inspected at regular intervals for damage and defects, and repair or replaced, as appropriately. The asbestos containing contents of the damaged or defective glove bag found during removal are to be wetted and the glove bag and its contents are to be removed and disposed of in an appropriate waste disposal container. Any damaged or defective glove bags are not be reused.
- .7 Insert nozzle of sprayer into bag through valve and thoroughly wet insulation and interior of glovebag.
- .8 Spray asbestos-containing materials with amended water using airless spray equipment. Where impermeable materials exist, slowly remove impermeable layer while wetting underlying layers. Saturate asbestos to prevent release of airborne fibres during removal.

- .9 Place hands into gloves and use necessary tools to remove insulation. Roll jacketing carefully to minimize possibility of ripping or puncturing bags. Preformed insulation block should be cut at joints to minimize fibre release.
- .10 Wet freshly exposed insulation frequently during work.
- .11 After insulation has been removed, wash down fitting and/or exposed pipe and interior of glovebag thoroughly. Use one hand to aid washing process. Wet surface of insulation in lower section of glovebag and exposed end of asbestos insulation remaining on fitting by spraying with water prior to moving glovebag.
- .12 If glovebag is to be moved along fitting, evacuate air from bag using a HEPA vacuum through the valve opening, move glovebag along pipe and re-seal. Use double-pull zipper to pass hangers. Repeat insulation removal procedures specified above.
- .13 If glovebag is to be removed from cleaned pipe and/or fitting for use on new pipe and/or fitting, seal interior zip lock and evacuate air from glovebag using a HEPA vacuum through the valve opening. Re-install in new location before opening zip lock. Repeat insulation removal procedures specified above.
- .14 If glovebag is ripped, cut or opened in any way, cease work and repair with tape before continuing work. Immediately clean spilled material with HEPA vacuum or wet washing.
- .15 To remove glovebag once filled, wash top section and tools thoroughly. Place tools in one hand (glove), pull hand out inverted and twist to create a separate pouch. Tape in two locations to seal separate pouch from glovebag and cut between two tape locations to remove separated pouch. Place pouch with tools in next glove bag, or into a water bucket. Open the pouch underwater to remove and clean tools.
- .16 Pull waste disposal bag over glovebag before removing from pipe and/or fitting. Remove securing straps. Unfasten zipper.
- .17 After removal of glovebag, ensure newly exposed pipe and/or fitting is clean of residue by HEPA vacuuming or wet wiping surfaces. Ensure that surfaces are kept free of wet sludge.
- .18 Dispose of removed glovebags as contaminated waste.
- .19 Remove drop sheet and dispose of as contaminated waste.
- .20 On completion of removal activities, clean asbestos work area with HEPA vacuum or by wet wiping or mopping and request inspection.

Part 4 Decommissioning

4.1 Dismantling Of Protection

- .1 A final review may be carried out by the Owner or Consultant to confirm that no dust or debris remains and that the required work has been completed. Air monitoring may be considered as part of the final review at the discretion of the Consultant.
- .2 On written approval of the Consultant, the Contractor may proceed with final dismantling of the asbestos work area.

Part 5 Inspection and Air Monitoring

5.1 Inspection

- .1 From commencement of work until completion of clean-up operations, the Consultant to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Consultant will inspect both inside and outside the work area during active abatement.
- .3 The Owner or Consultant is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Owner or Consultant and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Owner or Consultants.
- .5 If asbestos 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 the Owner or Consultants.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.2 Air Monitoring

- .1 Air sampling may be performed within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Consultant, the General Contractor for the Project and the Abatement Contractor.
- .2 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .3 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL, clean these areas in same manner as that applicable to asbestos work areas, at no cost to the Owner or Consultants.
- .4 If air sampling by Consultant show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.
- .5 The air clearance concentration shall not exceed the designated action level of 0.05 fibres/mL.

END OF SECTION