Granville Ferry Public Works Building

ASBESTOS SURVEYS AND MANAGEMENT PLAN
Municipality of the County of Annapolis

August 17, 2016

SECTION A. MANDATE

This document has been prepared to allow the Municipality of the County of Annapolis to properly manage construction materials present within its buildings that contain asbestos.

Currently, management of asbestos containing materials (ACMs) in Nova Scotia workplaces is addressed by the Nova Scotia Department of Labour and Advanced Education through a series of four Codes of Practice and Guidelines as follows:

- A Guide to Assessment and Management of Asbestos in the Workplace – Code of Practice
- A Guide to Removal of Friable Asbestos Containing Materials – Code of Practice
- Guidelines for Maintenance Operation Involving Asbestos
- Guidelines for Outdoor Work with Asbestos

The Municipality of the County of Annapolis has expanded these documents into an Asbestos Management Plan (AMP). The intention of these documents is to:

- Comply with the Codes of Practice and Guidelines noted above,
- Establish Management's intent to properly manage asbestos that is present in Municipality of the County of Annapolis buildings,
- To provide instructions to permit management of asbestos in terms of:
    - sampling to determine locations, types, quantities and conditions of ACMs
    - information management
    - identify proper removal methods
    - provision of awareness training for management and custodial staff
    - provision of training in minor removal methods for maintenance staff
    - prequalification of outside contractors that will be retained for abatement work
- To initiate an Operations and Maintenance Program to include:
    - Repair and/or removal of ACMs as needed
    - Maintain remaining ACMs in good condition
    - Minimise future exposure to asbestos by management of activities
    - Continued inspections and monitoring of activities that may impact ACMs

When asbestos has been identified as being present in a building, it is often not technically feasible, necessary or cost effective to remove all of it. In fact, in the absence of any renovation, maintenance or demolition work that has the potential for disrupting any asbestos, most owners elect to manage their asbestos in-place.

This document that follows addresses each of these considerations.

SECTION B. MANAGEMENT OF ASBESTOS

Program Objectives

In order that a uniform approach to the control and management of asbestos-containing materials (ACM) throughout all Municipality of the County of Annapolis facilities may be developed, the following program objectives have been established:

- The program shall clearly establish management's intent to manage any asbestos that remains in the buildings.
- The program shall provide the criteria in which all asbestos-containing materials are to be identified and evaluated within the building and shall establish the means in which this information is to be passed on to all affected parties (i.e. management, planning staff, maintenance or custodial workers, outside contractors or building tenants, etc.).
- The program shall establish the need for necessary training and education of all staff, maintenance or custodial workers or outside contractors.
- The program shall contain the necessary work practices and procedures to affect asbestos work in a safe manner.
- The program shall initiate the implementation of an Operations & Maintenance Program to address the following:
    a. Repair and/or removal (as required) of any ACM identified as being in disrepair.
    b. Maintain all remaining ACM in good condition.
    c. Minimize future fibre releases by controlling activities that may disturb asbestos.
    d. Inspection and monitoring of all scheduled asbestos disturbances.

The following document provides information, procedures and work practices relevant to the management and control of asbestos-containing building materials known to be present. It has been commissioned in part, to fulfil obligations under Nova Scotia Labour and Advanced Education (NSLAE) Codes of Practice and Guidelines and to provide the means from which future exposures to asbestos may be prevented through the combined efforts of all parties (i.e. management, staff, maintenance or custodial workers, outside contractors, etc.).

It also includes work procedures for the removal of friable asbestos-containing materials, glove bag work, outdoor work and maintenance work as performed by employees and/or an outside contractor.

Types of Asbestos

Asbestos is a generic term used to describe a family of naturally occurring fibrous minerals. These are divided into two groups; serpentines and amphiboles. The important property of asbestos as compared to non-asbestiform varieties of minerals is the presence of long, thin fibres that can be easily separated. Chrysotile (also known as white asbestos), which is by far the most abundant, is the only type that belongs to the serpentine group. Crocidolite (blue

asbestos) and amosite (brown asbestos), the two other most commonly used fibres, together with anthophyllite, tremolite, and actinolite all belong to the amphibole group.

Serpentine fibres differ from those of amphiboles in that they are more flexible, will become wet more easily and will tend to bend rather than splinter and thereby are far less dusty to work with.

Health Effects of Asbestos

For many years, asbestos has been recognized as a health hazard for workers employed in asbestos production, processing and use. Several serious, debilitating diseases that often end in death have been linked to the inhalation of fine asbestos fibres. It is not clear how asbestos fibres cause disease after they enter the lung. For each disease there is a period of latency, usually more than ten years, between first exposure to asbestos and the appearance of the disease. Each of the more common diseases linked to asbestos exposure are described below.

Asbestosis: Asbestosis is characterized by a fibrosis (scarring) of the lung tissue, which makes breathing difficult. The most prominent symptom is breathlessness. Detection of asbestosis is possible by X-ray examination and lung function testing. Asbestosis will develop only with chronic exposure to high levels of airborne asbestos.

Mesothelioma: This is a rare cancer arising from the cells of the pleura (lining of the chest cavity and lungs) and the peritoneum (lining of the abdominal cavity). The development of mesothelioma is characterized by a long latency period, usually at least 15 years and sometimes more than 40. There is no effective treatment for mesothelioma. Although asbestos was once thought to be responsible for all mesothelioma, other causes have now been identified. Still, the chance of getting mesothelioma in the absence of asbestos exposure is considered to be extremely remote.

Lung Cancer: Unlike asbestosis and mesothelioma, lung cancer is not associated only with asbestos exposure. Furthermore, there is no basic difference between lung cancer caused by asbestos and that due to other causes. In general, the risk of getting lung cancer increases with the extent of asbestos exposure, in terms of both intensity and duration. This risk is also greatly enhanced by smoking; most asbestos workers who develop lung cancer are smokers.

Other Asbestos-Related Cancers: The relationship between asbestos exposure and asbestosis, mesothelioma and lung cancer has been clearly established and is beyond argument. Several other cancers have also been associated with the inhalation of asbestos. Although the evidence is not as good as for the diseases discussed above, these cancers should be noted. They are gastrointestinal cancer affecting all sites in the gastrointestinal tract (oesophagus, stomach, colon and rectum) and cancer of the larynx.

Other Asbestos-Related Conditions: A number of less serious effects have been associated with asbestos exposure, namely pleural plaques and asbestos warts. Pleural plaques are areas of scarring of the pleural surfaces. In general, they are not associated with any functional abnormality and are merely an indicator of asbestos exposure. Asbestos warts are harmless skin growths that occur when asbestos fibres penetrate the skin.

Elements of the Asbestos Management Program

The maintenance of a safe work environment depends on the establishment of an effective management program. Such a program shall incorporate and/or require the implementation of the following measures to ensure the safe and proper control of all suspected or confirmed ACM.

1. The development of a WRITTEN PLAN.
2. Establish PARAMETERS FOR THE EVALUATION of all suspected or confirmed ACM.
3. Create or otherwise establish an INVENTORY of all suspected or confirmed ACM.
4. Establish procedures for the NOTIFICATION of all workers, custodial or maintenance staff, outside contractors, etc. whose work or use of the building will or may result in the disturbance of any suspect or confirmed ACM.
5. Provide direction for IDENTIFICATION of ACM.
6. Establish TRAINING protocol for all employees and any other personnel (i.e. outside contractors, maintenance or renovation workers) required to work on or near any ACM or whose activities in the building may result in the disturbance of asbestos.
7. Establish direction pursuant to the periodic INSPECTION and re-evaluation of all materials known to contain asbestos.
8. Develop WORK PROCEDURES for the repair, clean-up or removal of minor amounts of ACM during routine maintenance, minor renovations or demolition.
9. Give consideration to the PRO-ACTIVE REMOVAL of asbestos during any renovation or demolition work performed on or near any known or suspect ACM. Such activities are normally performed by an outside contracting firm who specializes in asbestos work and will require the preparation of site-specific contract documents.
10. REMOVAL AND/OR REPAIR of any asbestos-containing materials that have been damaged and/or are otherwise in disrepair.
11. MINIMIZE FUTURE FIBRE RELEASES by controlling activities that may disturb asbestos and ensuring all affected ACM is removed prior to any major renovations, maintenance or demolition work.
12. Provide for the SCHEDULED RE-ASSESSMENT & UPDATING of the AMP document itself to ensure it remains a current and viable document.
13. Establish policy to ensure the INDEPENDENT INSPECTION AND MONITORING of all asbestos-related disturbances to ensure compliance with the requirements of the AMP document and governing authorities.

Each of the above elements is discussed under the following sections and/or appendices and has been formulated so as to meet or exceed the requirements of current codes of practice and guidelines specific to asbestos control and management.

Responsibilities under the Asbestos Management Program

Responsibilities Assigned to Management

The following tasks and/or duties shall be the responsibility of Municipality of the County of Annapolis Management:

1. Implement the AMP.
2. Assign staff to be responsible for the overall administration and maintenance of the AMP.
3. Provide necessary technical support and resources to effectively manage and administrate his/her duties assigned under the AMP.
4. Ensure that appropriate staff are kept informed (in advance) of all maintenance, renovation, or construction activities in sufficient time to assess their potential for asbestos disturbance.
5. Provide or arrange for awareness and procedural training of all maintenance or custodial workers and supervisory staff whose job descriptions require them to work on or near asbestos or may have occasion to respond to a spill or damage of asbestos.
6. Engage, as required, the services of an asbestos consulting firm to assist in the design, co-ordination, inspection and monitoring of all friable asbestos remedial work.
7. Engage, as required, a contracting firm specializing in asbestos abatement work for all friable asbestos removal projects. Ensure adequate information is contained in the Tender Package to satisfy provincial codes of practice and guidelines.
8. Engage, as required, the services of an asbestos consulting firm to assist in providing regular site inspection and air monitoring services during scheduled friable asbestos disturbances.
9. Ensure all asbestos-containing materials present throughout the buildings are maintained in good condition and/or are repaired or removed as deemed appropriate.
10. Commission or otherwise undertake a self-examination or review of the Asbestos Management Program every two years.
11. Ensure that general asbestos related information is provided to building occupants prior to all significant abatement projects.

Responsibilities Assigned by Management to Operations Staff

Management will assign the following tasks and/or duties to designated staff:

1. Maintain documents required by the AMP including copies of any asbestos work reports, permits, correspondence with regulatory agencies, improvement orders, survey

updates, worker training certificates, asbestos waste transportation manifests, site inspection reports, etc.

2. Arrange for copies of the completed Asbestos Inventory and Assessment Report to be held on file at location(s) readily accessible to all maintenance workers, custodial staff and/or outside contractors.
3. Evaluate on an annual basis or more frequently as the need may arise, and in consultation with management, the need to hold refresher training for any recently employed workers or to individual workers engaged in active asbestos work on a more regular basis.
4. Ensure all departmental supervisors, managers, maintenance and custodial staff are informed of the current location of all known asbestos-containing materials and are updated as conditions change or as these materials are removed.
5. Notify all outside contractors or service personnel (i.e. plumbers, custodial or maintenance firms, telephone service personnel, etc.), of the presence and approximate location of all known asbestos-containing materials if their work in the building may lead to the possible disturbance of known asbestos-containing materials.
6. Ensure all outside contractors or service personnel (i.e. plumbers, custodial or maintenance firms, telephone service personnel, etc.) are provided with and complete a Contractor's Notification & Acknowledgement form.
7. Ensure that all building occupants and the Joint Occupational Health and Safety Committee (JOHSC) are notified prior to all asbestos projects that require enclosures in public areas.
8. Update the asbestos inspection reports, inventory reports and files to reflect ongoing asbestos abatement projects.
9. Ensure that all appropriate staff receive a copy of all site inspection reports and any corresponding air monitoring data as compiled in association with asbestos abatement activities undertaken on the premises.

<u>Responsibilities Assigned to Supervisors and Client Service Managers/Coordinators</u>

The following tasks and/or duties shall be the responsibility of Maintenance and Custodial Supervisors:

1. Coordinate and/or otherwise effect the removal or repair of any asbestos-containing materials that have been damaged and/or are otherwise in disrepair.
2. Respond to any report of asbestos debris, damage or disturbance. Evaluate the condition and provide or initiate the necessary clean-up, removal or repair as appropriate.
3. Evaluate the potential for asbestos disturbance in advance of any major maintenance renovation or construction activities planned. Ensure the appropriate risk classification is assigned to any asbestos removal required and that such work is completed safely.
4. Update the asbestos inspection report, asbestos inventory report, and files to reflect ongoing asbestos abatement projects.

5. Coordinate and supervise all asbestos abatement activities whether undertaken internally by Municipality of the County of Annapolis employees or through an outside contractor.
6. Ensure that asbestos work is carried out in accordance with the AMP. Ensure that project signs are posted in locations that cover all access to the area. Ensure all persons in the area are informed prior to the commencement and when the work has been completed.
7. Ensure a duly signed and executed Asbestos Work Permit is issued and completed by all project supervisors and outside contractors, maintenance or custodial staff prior to commencing any scheduled friable asbestos abatement activities. Refer to the form provided for this purpose at the end of this document.
8. Ensure notification in advance to all appropriate personnel of any scheduled asbestos disturbances.
9. Ensure that work involving disturbance of ACM material is coordinated with and reviewed with the Supervisor or designate.
10. Ensure that contractors and employees are aware of the AMP and the location and type of asbestos-containing material.
11. Review and give Section 3 to contractor before start of contract work begins.
12. Commission and/or otherwise complete a regular review and evaluation of all remaining asbestos-containing materials on an annual basis or more frequently as circumstances warrant.
13. Ensure that all persons in the area are informed when asbestos work procedures are being implemented.
14. Ensure that only authorized individuals trained in asbestos work procedures and equipped with the required protective equipment are assigned to work involving contact with asbestos containing material.
15. Ensure that specific AMP procedures are implemented as required by this program with staff for which the Supervisor has supervisory responsibilities.
16. Ensure that written procedures are available for work involving friable asbestos material or products containing asbestos and are implemented by staff and contractors carrying out work in buildings under the responsibility of the Supervisor.
17. Ensure that the requirements of the AMP are strictly enforced in properties for which the Supervisor has responsibility.
18. Ensure that current information for updating of the asbestos survey/inventory is available to staff responsible at all times (i.e. removal of asbestos containing materials, changes in conditions of ACM, etc.).
19. Ensure that the condition of ACM in buildings is inspected and re-assessed in compliance with this AMP.
20. Ensure that annual respirator fit-testing for all staff that may have occasion to make use of a respirator during the completion of any asbestos abatement activities has occurred.
21. Notify the JOHSC and the OHS Coordinators of workplace occupational health or safety monitoring or tests related to asbestos abatement.
22. Upon discovery of any unidentified asbestos-containing or suspect asbestos-containing materials, secure the area and suspend all activities that may disturb such materials. Do

not proceed with work in the area until it has been determined if the material in questions contains asbestos and written authorization to proceed is obtained.

Responsibilities Assigned to Contractors

The following responsibilities fall upon any contractor whose work may result in the disturbance of any asbestos-containing or contaminated materials or surfaces.

1. Before commencing work, ensure all contractors employees and supervisory staff have been informed as to the presence and approximate location of all asbestos-containing materials that may become subject to disturbance (whether intentional or not).
2. Only workers trained and authorized in friable asbestos work procedures are assigned to work involving exposure to material containing friable asbestos.
3. File with Municipality of the County of Annapolis a signed and executed copy of a Contractor's Notification & Acknowledgement form as provided at the end of this document.
4. Perform work in such a manner as to avoid the disturbance of any asbestos-containing or contaminated surfaces or materials other than those materials intentionally contracted to remove, repair, encapsulate or enclose.
5. Upon discovery of any unidentified asbestos-containing or suspect asbestos-containing materials, secure the area, suspend all activities that may disturb such materials and do not proceed with work in the area until it has been determined if the material in question contains asbestos and written authorization to proceed is obtained from Universal.
6. Prior to proceeding with any asbestos disturbance for friable work (i.e. removal, clean-up or repair) ensure a signed and duly executed Asbestos Work Permit is obtained.
7. Ensure all work that may disturb any asbestos-containing or contaminated surfaces is completed in accordance with current regulatory requirements.
8. As required, provide a copy of all executed Asbestos Waste Transportation Manifests verifying the safe and proper disposal of asbestos waste generated.

Employee Responsibilities

The following responsibilities shall be assigned to all Municipality of the County of Annapolis employees whose work will and/or may result in the disturbance of any asbestos-containing or contaminated materials or surfaces.

1. Be familiar with all duties and responsibilities assigned to him/her under the terms of the AMP.
2. Be knowledgeable as to the location of all known asbestos-containing materials and/or surfaces known to be contaminated with asbestos.
3. Upon discovery of any unidentified asbestos-containing or suspect asbestos-containing materials, secure the area, suspend all activities that may disturb such materials and immediately notify the supervisor/designate. Do not proceed with work in the area

until it has been determined if the material in question contains asbestos and authorization to proceed is granted by Universal.
4. Report any damage to existing asbestos-containing materials to the supervisor upon discovery.
5. Execute all work in compliance with the AMP.
6. Follow all work and job procedures outlined in the AMP and use all protective equipment as required by the procedures issued under the AMP.

Joint Occupational Health & Safety Committee Responsibilities

1. The JOHSC shall conduct scheduled reviews of the AMP on an annual basis.
2. The JOHSC shall incorporate the AMP as part of an annual workplace hazard inspection.

Regulatory Requirements

Municipality of the County of Annapolis has varying responsibilities assigned to it as building managers and employers under the following acts, regulations and guidelines:

- Occupational Health and Safety Act,
- Workplace Hazardous Materials Information System (WHMIS),
- Code of Practice for Managing Asbestos in Buildings, Nova Scotia Labour and Advanced Education (NSLAE) (attached as Appendix at the end of this document),
- Code of Practice for Removal of Friable Asbestos Containing Materials, Nova Scotia Labour and Advanced Education (NSLAE) (attached as Appendix at the end of this document),
- Guidelines for Maintenance Operation Involving Asbestos, Nova Scotia Labour and Advanced Education (NSLAE) (attached as Appendix at the end of this document),
- Guidelines for Outdoor Work with Asbestos, Nova Scotia Labour and Advanced Education (NSLAE) (attached as Appendix at the end of this document).

SECTION C. Identification of Asbestos Containing Materials

Uses of Asbestos in Buildings

The uses of asbestos are generally classed into two groups; friable and non-friable products. A friable material is a material that when dry can be crumbled, pulverized or powdered by hand pressure; this includes non-friable materials that have already been crumbled, pulverized or powdered. The use of friable materials in construction is banned today but due to the widespread use of friable materials in the past, these materials still are present in many buildings. In order to establish an effective control program, the possible uses of asbestos must be known.

Asbestos-Cement (A/C) Products: The largest use of asbestos, in terms of the tonnage of fibres employed, is as a reinforcing agent in cement products. Asbestos-reinforced cement is strong, durable, rigid and resistant to both fire and weather. Portland cement, water and asbestos are mixed to form a slurry from which end-products can be fabricated by a process similar to that used in paper making. Such products can then be formed into sheets, pipes and a wide variety of other shapes. The asbestos fibre content of A/C products is usually about 15-50 percent. Asbestos-cement sheeting that is produced that comes in four basic forms: flat sheets, corrugated sheets, siding shingles or roofing shingles. The main use of A/C sheeting is for roofing and for cladding the exterior of buildings.

Other uses are decorative panelling, electrical insulation and laboratory tabletops. Asbestos-cement piping is used for water supply, sewage, irrigation, drainage applications, the transport of corrosive chemical fluids, and electric and telephone conduits. Asbestos cement products are still in use and production today.

Gaskets and Packings: The combination of long asbestos fibres and high temperature rubbers has provided some of the best gasket materials ever produced. The asbestos, in bulk fibre, woven, or plaited form, provides strength and temperature resistance, while the rubber acts as a binder and sealing material. Asbestos yarns have been commonly used in the manufacture of braided and woven packing materials. Many of these uses, particularly in sheet forms, are still in production and use today.

Coatings and Sealants: Asbestos has been used in roof coatings, cements and to a lesser extent, in sealants and caulks. Roof coatings consist of asphalt that has been liquefied with solvents and then has had asbestos fibre added as filler. Roof cements are similar, but they are formulated to a thicker consistency so that they can be used to seal openings through which a liquid coating would flow. Some of these are still in production today.

Paper Products: Asbestos paper products are used in a wide variety of applications. Among the most important in construction are roofing felts, gaskets, pipeline wrap, millboard and electrical insulation. Some uses (particularly where impregnated with tar or asphalt for roofing and pipeline wrap) are still in production today.

Plastics: Asbestos has been used as a reinforcing agent in a wide range of asbestos/polymer composites. Applications include brake and transmission components, floor tiles, engine housings, bins and containers, and a variety of coatings, adhesives, caulks, sealants and patching compounds. Two areas have dominated asbestos use in plastics: phenolic moulding compounds and vinyl-asbestos tile. Few of these products remain in production today.

Friction Materials: Asbestos has been used in the manufacture of brake and clutch linings and pads. The asbestos fibres may be embedded in a phenolic resin with various mixtures of fillers or a woven asbestos cloth may be impregnated with the resin. Friction products are primarily used in vehicles but may be used in any rotating machinery. They are still widely produced and used.

Asbestos Textiles: Asbestos textile materials are predominantly manufactured from chrysotile fibres. Two types of yarn are produced: plain, possibly braced with organic fibres, and reinforced, which incorporates either wire or another yarn such as nylon, cotton or polyester. Major uses for asbestos textiles are gaskets, packings, friction materials, thermal and electrical insulation, and fire resistant applications, e.g. welding curtains, protective clothing, theatre curtains, hot conveyor belts and ironing board covers. These products may be considered or become friable in use. Asbestos textiles are no longer in widespread production.

Acoustic Ceiling Tiles: Some types of mineral wool type acoustic ceiling tiles were formulated with asbestos from the early 1960's. The use of asbestos in ceiling tiles was discontinued in the early 1980's. Analytical testing is required to distinguish the asbestos and non-asbestos ceiling tiles. The fire-rated tiles are more likely to contain asbestos. Amosite was the predominant fibre type used. Acoustic tile, particularly if splined or glued on, can release dust when removed. Prior to removal, all ceiling tiles must be checked against the asbestos inventory. Ceiling tiles containing asbestos may only be removed by persons trained and certified in asbestos work procedures. Damaged ceiling tile must be treated as a friable product that must be checked and handled by persons trained and certified in asbestos work procedures.

Drywall Joint Compound*:* Drywall joint compound also contained asbestos until the early 1980's. The concentration is quite low (less than 5%, often around 1% and always chrysotile). The product in place is quite hard and is treated as non-friable unless damaged.

Potentially Friable Plaster: Asbestos was used in random fashion in the brown coat and surface coat of smooth plaster finishes. This has been used at a low level (less than 10% in most cases). In many instances the asbestos content is less than 1% or even less than 0.5%. This is often due to the presence of vermiculite in plaster. Vermiculite frequently contains actinolite or chrysotile as an impurity which contributes to the asbestos content.

Plaster is non-friable in place but removal is impossible without causing it to become friable.

Vermiculite Insulation: Some vermiculite insulation may contain amphibole asbestos fibres as a contaminant. These products can cause health risks if disturbed during maintenance, renovation or demolition. However, there is currently no evidence of risk to your health if the insulation is sealed behind wallboards and floorboards, isolated in an attic, or otherwise kept from exposure to the interior environment.

Spray or Trowel Applied Fireproofing or Sprayed Insulation: Several types of fireproofing or insulation were used in the period encompassing the mid 1930's through to about 1974. Fibrous products were spray applied after being blown as a dry mix through an application gun. These products may contain up to 90% asbestos and any of the three major types (chrysotile, amosite or crocidolite). Cementitious products were trowel applied or sprayed as a wet slurry. These were harder products which did not contain more than 25% asbestos. Only chrysotile asbestos was used in the cementitious type materials.

Sprayed or Trowel Applied Texture or Acoustic Plasters: The use of asbestos was widespread in trowel applied or sprayed texture coats, stipple coats or acoustic plasters commencing in the 1950's through to the late 1970's (at least as late as 1977). These products always contained less than 25% chrysotile. Some of these products may be considered non-friable in place and only become friable when disturbed by construction or demolition. Other products in this group can be very soft and extremely friable.

Mechanical System Insulation: This is the most widespread use of friable asbestos in buildings. Their use dates from the late 1800's to the late 1970s. The material can have a number of appearances and asbestos contents.

- white, brown, pink or grey block
- white or grey corrugated paper
- white, grey or brown layered paper
- grey trowel or hand applied material (with the appearance of hard grey dry mud)

It is possible to find all asbestos types in mechanical insulation although chrysotile is predominant and amosite the next most common.

SECTION D. Sampling and Maintenance of Inventory

In order to reduce risk of accidental exposure to asbestos fibres resulting from damage to asbestos containing materials (ACMs) that results in fibre release, an inventory will be maintained for each building identifying the location of all asbestos containing materials or, where that is not immediately practical, a list of materials that could potentially contain asbestos. The following guideline identifies materials that often contain asbestos and that will be helpful in determining the types of materials to sample or, where samples are not yet

available, the types of materials that are apt to contain asbestos in buildings constructed before 1986:

- exterior siding and shingles, sometimes under vinyl siding
- some exterior paint, typically thick consistency
- boiler and flue stack insulation
- cement insulation on pipes, fittings, tees, valves, etc
- gaskets on furnaces and valves
- drywall joint-filling compound
- plaster scratch coat
- acoustical and decorative texture coats (stuccos)
- floor tiles and adhesives, especially 9 inch tiles
- suspended and glued-in-place ceiling tiles, including the glue
- fireproofing, typically on structural components or concrete ceiling decks
- fire resistant cement panels, often in boiler and electrical rooms
- paper under hardwood floors and around air ducts
- corrugated cardboard products on water pipes
- old wiring
- concrete conduits
- chalkboards
- lab bench tops
- fume hood liners
- caulking on windows and doors
- seamless flooring, especially on the back
- fire doors
- vermiculite

Sampling of materials has already been completed. These data follow at the end of this report, tabulated individually for each building.

Note that data complied in the report were collected in a way to minimise obvious damage – these data may NOT be suitable to support extensive renovations or demolitions as ACM may be present in wall/ceiling cavities, under upper layers of flooring, or between exterior sheathing components.

The number of samples needed to be collected depends upon the type of material to be sampled, its quantity and homogeneity. Some materials, such as floor tiles, are consistent in terms of asbestos content and can be reliably sampled based simply on color and size, whereas materials such as plaster, texture coats and drywall filler can vary in asbestos content due to both differences within the same material as well as difference between materials, neither of which is visible to the naked eye. Accordingly, the following table should be consulted to determine minimum numbers of samples to be collected for various materials should additional testing be required.

Table 1. Bulk Material Sample Guidelines

Type of material	Size of area of homogeneous material[1]	Minimum number of bulk material samples to be collected
Surfacing material, including without limitation material that is applied to surfaces by spraying, by towelling or otherwise, such as acoustical plaster on ceilings and fireproofing materials on structural members	Less than 90 square metres	3
	90 or more square metres, but less than 450 square metres	5
	450 or more square metres	7
Thermal insulation, except patch	any size	3
Thermal insulation patch	Less than 2 linear metres or 0.5 square metres	1
Other material	Any size	3

Note 1. Homogeneous material is one that looks to the eye to be uniform in terms of colour, texture and application.

Buildings with asbestos containing materials must be inspected not less often than annually to determine current condition of the ACMs, reprioritize any necessary actions regarding the materials, and update the inventory as needed.

SECTION E. Maintenance, Renovation or Demolition of Asbestos Containing Materials

This section describes the procedures to be followed for various levels of abatement and also the criteria to be used to select the appropriate procedure to follow for the work to be done.

In Nova Scotia, as per the Code of Practice, use of enclosures is recommended for all friable asbestos removal. The "Type 2" and "Type 3" procedures notes above should be followed for all friable asbestos removal. "Type 2" methods will be suitable only for circumstances in which only small quantities of friable materials require removal – "Type 3" methods should be used otherwise. "Type 1" procedures are suitable for non-friable asbestos removal.

Definitions

In this description,

"asbestos-containing material" means friable material that contains 0.5 per cent or more asbestos by dry weight;

"building" means any structure, vault, chamber or tunnel including, without limitation, the electrical, plumbing, heating and air handling equipment (including rigid duct work) of the structure, vault, chamber or tunnel;

"competent worker", in relation to specific work, means a worker who,

(a) is qualified because of knowledge, training and experience to perform the work,
(b) has knowledge of all potential or actual danger to health or safety in the work;

"demolition" includes dismantling and breaking up;

"friable material" means material that,

(a) when dry, can be crumbled, pulverized or powdered by hand pressure, or
(b) is already crumbled, pulverized or powdered;

"HEPA filter" means a high efficiency particulate aerosol filter that is at least 99.97 per cent efficient in collecting a 0.3 micrometre aerosol;

"homogeneous material" means material that is uniform in colour and texture;

"Type 1 operation" means an operation described in section 2 following,
"Type 2 operation" means an operation described in section 2 following,
"Type 3 operation" means an operation described in section 2 following.

Procedures

Type 1, Type 2 and Type 3 operations are described below. All asbestos removal, whether done by outside contractors or in-house, shall follow these methods. Additional requirements are noted in the "Guide to Removal of Friable Asbestos Containing Material" as published by the Department of Labour and Advanced Education and attached to this document. Currently, this latter document is provided for guidance purposes but can be enforced as a regulation should no other suitable prescribed method be available or should a regulator inspector be unsatisfied with a removal method either being used or planned for use. These requirements should also be considered with the most stringent being followed in case of conflict.

1. For the purposes of this description, operations are classified as Type 1, Type 2 and Type 3 operations.

2. The following are Type 1 operations:

- Removing non-friable asbestos-containing material, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,
  i. the material is wetted to control the spread of dust or fibres, and
  ii. the work is done only by means of non-powered hand-held tools.

3. The following are Type 2 operations:

- Removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling.
- Applying tape or a sealant or other covering to pipe or boiler insulation that is asbestos-containing material.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if,
  i. the material is not wetted to control the spread of dust or fibres, and
  ii. the work is done only by means of non-powered hand-held tools.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.
- Removing insulation that is asbestos-containing material from a pipe, duct or similar structure using a glove bag.
- An operation that is not mentioned above or is not classified as a Type 1 or Type 3 operation.

4. The following are Type 3 operations:

- The removal or disturbance of friable asbestos-containing material during repair, alteration, maintenance or demolition.
- The spray application of a sealant to friable asbestos-containing material.
- Repairing, altering or demolishing all or part of a furnace or similar structure that is made in part of refractory materials that are asbestos-containing materials.
- Breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material, if the work is done by means of power tools that are not attached to dust-collecting devices equipped with HEPA filters.

Respirators

A respirator provided by an employer and used by a worker in a Type 1, Type 2 or Type 3 operation,

1. Shall be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet;

2. Shall be assigned to a worker for his or her exclusive use;

3. Shall be used and maintained in accordance with written procedures that are established by the employer and are consistent with the manufacturer's specifications;

4. Shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary;

5. Shall have damaged or deteriorated parts replaced prior to being used by a worker; and

6. When not in use, shall be stored in a convenient, clean and sanitary location.

7. If respirators are used in the workplace,
- The employer shall establish written procedures regarding the selection, use and care of respirators; and
- A copy of the procedures shall be provided to and reviewed with each worker who is required to wear a respirator.
- A worker shall 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.

Table 2 - Respirators

Work Category		Required respirator
Type 1 Operations, Glove Bag		Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter
Type 2 Operations		Powered air purifying respirator equipped with a tight-fitting facepiece and a high efficiency filter or N-100, P-100 or R-100 particulate filter
Type 3 Operations	Airborne fibre levels maintained below 100 fibres/cc as determined by air monitoring	Powered air purifying respirator equipped with a tight-fitting facepiece and a high efficiency filter or N-100, P-100 or R-100 particulate filter
Type 3 Operations	Airborne fibre levels not maintained below 100 fibres/cc as determined by air monitoring	Pressure demand supplied air respirator equipped with a full facepiece and assigned protection factor of 10,000

Type 1 Operations

The following measures and procedures apply to Type 1 operations:

1. Before beginning work, visible dust shall be removed with a damp cloth or a vacuum equipped with a HEPA filter from any surface in the work area, including the thing to be worked on, if the dust on that surface is likely to be disturbed.

2. The spread of dust from the work area shall be controlled by measures appropriate to the work to be done including the use of drop sheets of polyethylene or other suitable material that is impervious to asbestos.

3. The material shall be wetted before and kept wet during the work to control the spread of dust or fibres, unless wetting would create a hazard or cause damage.

4. A wetting agent shall be added to water that is to be used to control the spread of dust and fibres.

5. Frequently and at regular intervals during the doing of the work and immediately on completion of the work,

- dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a suitable container, and
- drop sheets shall be wetted and placed in the suitable container as soon as practicable after the item above been complied with.

6. Drop sheets shall not be reused.

7. After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a suitable container as soon as practicable.

8. After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping, as soon as practicable.

9. Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.

10. Compressed air shall not be used to clean up and remove dust from any surface.

11. Eating, drinking, chewing or smoking shall not be permitted in the work area.

12. The employer shall provide the worker with a CSA approved respirator in accordance with the attached Table, and the worker shall wear and use the respirator.

13. The employer shall provide the worker with protective clothing that

- shall be made of a material that does not readily retain nor permit penetration of asbestos fibres,
- shall consist of 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,
- shall include suitable footwear, and
- shall be repaired or replaced if torn.
- the worker shall wear the protective clothing.

14. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area.

Type 2 and Type 3 Operations, Common Requirements

The following measures and procedures apply to both Type 2 operations and to Type 3 operations:

1. The work area shall be identified by clearly visible signs warning of an asbestos dust hazard.

2. Signs shall be posted in sufficient numbers to warn of the hazard and shall clearly state that,
- there is an asbestos dust hazard, and
- access to the work area is restricted to persons wearing protective clothing and equipment.

3. A wetting agent shall be added to water that is to be used to control the spread of dust and fibres.

4. Eating, drinking, chewing or smoking shall not be permitted in the work area.

5. Containers for dust and waste shall be
- dust tight,
- suitable for the type of waste,
- impervious to asbestos,
- identified as asbestos waste,
- cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before being removed from the work area, and
- removed from the workplace frequently and at regular intervals.

6. Frequently and at regular intervals during the doing of the work and immediately on completion of the work, dust and waste shall be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a suitable container, and drop sheets shall be wetted and placed in suitable container.

7. Drop sheets shall not be reused.

8. After the work is completed, polyethylene sheeting and similar materials used for barriers and enclosures shall not be reused, but shall be wetted and placed in a suitable container as soon as practicable.

9. After the work is completed, barriers and portable enclosures that will be reused shall be cleaned, by using a vacuum equipped with a HEPA filter or by damp wiping, as soon as practicable.

10. Barriers and portable enclosures shall not be reused unless they are rigid and can be cleaned thoroughly.

11. The employer shall provide every worker who will enter the work area with a CSA approved respirator in accordance with the attached Table and the worker shall wear and use the respirator.

12. Protective clothing shall be provided by the employer and worn by every worker who enters the work area, and the protective clothing,

- shall be made of a material that does not readily retain nor permit penetration of asbestos fibres,
- shall consist of 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,
- shall include suitable footwear, and
- shall be repaired or replaced if torn.

13. Compressed air shall not be used to clean up and remove dust from any surface.

14. Only persons wearing protective clothing and equipment shall enter a work area where there is an asbestos dust hazard.

Additional Procedures, Type 2 Operations

In addition to the measures and procedures prescribed previously, the following measures and procedures apply to Type 2 operations:

1. Before commencing work that is likely to disturb friable asbestos-containing material that is crumbled, pulverized or powdered and that is lying on any surface, the friable material shall be cleaned up and removed by damp wiping or by using a vacuum equipped with a HEPA filter.

2. Friable asbestos-containing material that is not crumbled, pulverized or powdered and that may be disturbed or removed during the work shall be thoroughly wetted before the work and kept wet during the work, unless wetting would create a hazard or cause damage.

3. The spread of dust from a work area shall be prevented by

- using an enclosure of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure is opaque, one or more transparent window areas to allow observation of the entire work area from outside the enclosure), if the work area is not enclosed by walls, and kept under negative air pressure relative to non-work areas by use of HEPA filtered equipment,
- disabling the mechanical ventilation system serving the work area, and
- sealing the ventilation ducts to and from the work area.

4. Before leaving the work area, a worker shall,

- decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, and
- if the protective clothing will not be reused, place it in a suitable container.

5. Facilities for the washing of hands and face shall be made available to workers and shall be used by every worker when leaving the work area.

Additional Type 2 Procedures, Glove Bag Operations

In addition to the measures and procedures prescribed previously, the following measures and procedures apply to Type 2 operations referred to as glove bag operations.

1. The work area shall be separated from the rest of the workplace by walls, barricades, fencing or other suitable means.

2. The spread of asbestos-containing material from the work area shall be prevented by disabling the mechanical ventilation system serving the work area and sealing all openings or voids, including ventilation ducts to and from the working area.

3. Surfaces below the work area shall be covered with drop sheets of polyethylene or other suitable material that is impervious to asbestos.

4. The glove bag shall be made of material that is impervious to asbestos and sufficiently strong to support the weight of material the bag will hold.

5. The glove bag shall be equipped with,

- sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period,
- valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure,
- a tool pouch with a drain,
- a seamless bottom, and
- a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

6. A glove bag shall not be used to remove insulation from a pipe, duct or similar structure if,

- it may not be possible to maintain a proper seal for any reason including, without limitation,
    - the condition of the insulation, or
    - the temperature of the pipe, duct or similar structure, or

- the bag could become damaged for any reason including, without limitation,
    - the type of jacketing, or
    - the temperature of the pipe, duct or similar structure.

7. Immediately before the glove bag is attached, the insulation jacketing or coating shall be inspected for damage or defects, and if any damage or defect is present, it shall be repaired.

8. The glove bag shall be inspected for damage or defects,
- immediately before it is attached to the pipe, duct or other similar structure, and
- at regular intervals during its use.

9. If damage or defects are observed when the glove bag is inspected the glove bag shall not be used and shall be disposed of.

10. If damage or defects are observed when the glove bag is inspected at any other time,
- the use of the glove bag shall be discontinued,
- the inner surface of the glove bag and the contents, if any, shall be thoroughly wetted,
- the glove bag and the contents, if any, shall be removed and placed in a suitable container, and
- the work area shall be cleaned by vacuuming with a vacuum equipped with a HEPA filter before removal work is resumed.

11. When the removal work is completed,
- the inner surface of the glove bag and the waste inside shall be thoroughly wetted and the air inside the bag shall be removed through an elasticized valve, by means of a vacuum equipped with a HEPA filter,
- the pipe, duct or similar structure shall be wiped down and sealed with a suitable encapsulant,
- the glove bag, with the waste inside, shall be placed in a container, and
- the work area shall be cleaned by damp wiping or by cleaning with a vacuum equipped with a HEPA filter.

Additional Procedures, Type 3 Operations

In addition to the measures and procedures prescribed previously, the following measures and procedures apply to Type 3 operations:

1. Friable asbestos-containing material that is crumbled, pulverized or powdered and that is lying on any surface in the work area shall be cleaned up and removed using a vacuum equipped with a HEPA filter or by damp wiping and everything shall be removed from the work area or covered with polyethylene sheeting or other suitable material that is impervious to asbestos.

2. The spread of dust from the work area shall be prevented by an enclosure of polyethylene or other suitable material that is impervious to asbestos, if the work area is not enclosed by walls, and by a decontamination facility consisting of a series of interconnecting rooms including,

- a room suitable for changing into protective clothing and for storing contaminated protective clothing and equipment,
- a shower room as described in paragraph 7,
- a room suitable for changing into street clothes and for storing clean clothing and equipment, and
- curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted to each side of the entrance or exit to each room.

3. The rooms described above shall be arranged in sequence and constructed so that any person entering or leaving the work area must pass through each room.

4. The mechanical ventilation system serving the work area shall be disabled and all openings or voids, including ventilation ducts to or from the work area, shall be sealed by tape or other appropriate means.

5. The spread of dust from the work area shall also be prevented by,

- creating and maintaining within the enclosed area, by installing a ventilation system equipped with a HEPA filtered exhaust unit, a negative air pressure of 0.02 inches of water, relative to the area outside the enclosed area. Specific requirements for integrity-testing of the filtration system of any HEPA filtered equipment (negative air units, vacuums) are noted in the Code of Practice attached to this document. Different requirements are in place for systems venting exhausted air to the building exterior versus systems vented exhausted air back into the building.

- ensuring that replacement air is taken from outside the enclosed area and is free from contamination with any hazardous dust, vapour, smoke, fume, mist or gas, and
- using a device, at regular intervals, to measure the difference in air pressure between the enclosed area and the area outside it.
- The ventilation system noted above must be left in operation until completion and acceptance of final air monitoring within the enclosed space.
- Where exhausted air is discharged into non work areas on the building rather than outside, air testing will be conducted daily outside of the enclosure to ensure that airborne fibre levels do not exceed 0.01 fibres/cc.

6. The ventilation system referred to above shall be inspected and maintained by a competent worker before each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it shall be replaced before the ventilation system is used.

7. The shower room in the decontamination facility shall,

- be provided with hot and cold water or water of a constant temperature that is not less than 40° Celsius or more than 50° Celsius,
- have individual controls inside the room to regulate water flow and, if there is hot and cold water, individual controls inside the room to regulate temperature,
- be capable of providing adequate supplies of hot water to maintain a water temperature of at least 40° Celsius, and
- be provided with clean towels.

8. When leaving the work area, a worker shall enter the decontamination facility and shall, in the following order,
- decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing,
- place protective clothing it in a suitable waste container,
- shower, and
- remove and clean the respirator.

9. If practicable, existing electrical power distribution systems that are not water-tight shall be de-energized and locked out where wet removal operations are to be carried out.

10. Temporary electrical power distribution systems for tools and equipment involved in wet removal operations shall be equipped with ground fault circuit interrupters.

11. Friable asbestos-containing material shall be thoroughly wetted before and during removal, unless wetting would create a hazard or cause damage. Amosite and crocidolite cannot be removed by dry procedures.

12. The work area shall be inspected by a competent worker for defects in the enclosure, barriers and decontamination facility,
- at the beginning of each shift,
- at the end of a shift if there is no shift that begins immediately after the first-named shift, and
- at least once each day on days when there are no shifts.

13. Defects observed during an inspection shall be repaired immediately and no other work shall be carried out in the work area until the repair work is completed.

14. If practicable, dust and waste shall be kept wet.

15. On completion of the work,
- negative air pressure shall be maintained until air testing is complete,
- the inner surface of the enclosure and the work area inside the enclosure shall be cleaned by a thorough washing or by vacuuming with a vacuum equipped with a HEPA filter,

- equipment, tools and other items used in the work shall be cleaned with a damp cloth or by vacuuming with a vacuum equipped with a HEPA filter or they shall be placed in a suitable waste container before being removed from the enclosure, and
- a visual inspection shall be conducted by a competent worker to ensure that the enclosure and the work area inside the enclosure are free from visible dust, debris or residue that may contain asbestos.

16. Once the work area inside the enclosure is dry after the steps set out above have been completed, clearance air testing shall be conducted by a competent worker.

17. The barriers, enclosure and decontamination facility shall not be removed or dismantled until,

- cleaning has been done as described above, and
- if clearance air testing is required, it has been completed and the work area inside the enclosure has passed the clearance air test.

Additional Procedures, Emergency Operations

1. Emergency work, defined as an immediate response required to address an unexpected possible release of asbestos-containing materials, may be required if

- building materials not known to be asbestos-free are damaged or otherwise disturbed,
- known ACMs are damaged or otherwise disturbed by accident,
- known ACMs are damaged or otherwise disturbed intentionally,
- known ACMs may be impacted or must be removed immediately to permit proper responses to other emergency circumstances to be addressed.

2. All emergency work will be conducted following Type 1, 2 and 3 procedures (including Glove Bag) as noted in the sections.

3. Immediately stop work (if the asbestos has been damaged from a work-related activity) in the area and notify the supervisor or designate or competent asbestos consulting firm should any unexpected materials or materials suspect of containing asbestos be encountered. Do not clean-up, cover, move or otherwise disturb the suspect asbestos-containing material in question.

4. Have the supervisor or designate, or others in his/her absence, advise occupants to vacate the area.

5. Where practical, or where such actions will not interfere with established emergency or fire routes, isolate the area in question by closing and locking all perimeter exists. In the alternative, workers shall establish a tape or rope barricade complete with necessary signage at all points of entry.

6. The supervisor or designate or others in his/her absence shall make arrangements to shut down ventilation systems to or from the affected area where the materials concerned are friable or may contain amphibole asbestos.

7. The supervisor or designate shall then determine if the material in question contains any asbestos, the extent of any contamination (if any) to surrounding areas and the desired course of action. If necessary, the supervisor or designate shall collect a representative sample of the material (debris) in question and have it submitted for analysis.

8. Should the material (debris) in question be determined or assumed to be asbestos, the affected area shall be cleaned-up while following the appropriate asbestos precautions.

9. Do not resume work in the area until it has been determined if the material in question contains asbestos, the required clean-up (if necessary) has been completed, and that authorization to return to the area has been given.

Clearance Air Testing

1. Sample collection and analysis shall be done,
- using the phase contrast microscopy method, or
- using the transmission electron microscopy method.

2. If the work area inside the enclosure fails the clearance air test, the area shall be recleaned and retested.

3. Clearance air testing using the phase contrast microscopy method shall be carried out in accordance with NIOSH Method 7400, using the asbestos fibre "A" counting rules, and shall comply with the following requirements:
- Testing shall be based on samples taken inside the enclosure.
- Forced air shall be used, both before and during the sampling process, to ensure that fibres are dislodged from all surfaces inside the enclosure before sampling begins and are kept airborne throughout the sampling process. Agitation of air must last for 5 minutes for each 90 m^3 of enclosed volume being tested.
- The number of air samples to be collected is noted the attached Table.
- The work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of fibres that does not exceed 0.01 fibres/cm^3 of air.
- When a second analysis is done if needed, the work area inside the enclosure passes the clearance air test only if every air sample collected has a concentration of asbestos fibres that does not exceed 0.01 fibres per cubic centimetre of air.

Table 3 - Air Samples

Minimum number of air samples to be taken from each enclosure	Number of Tests
For every 270 m^3 of enclosed volume	1 test per 270 m^3

SECTION F. Training of Staff

All Municipality of the County of Annapolis staff whose job may require working with asbestos containing materials will receive asbestos awareness training. This training is not intended to be sufficient to permit asbestos removal to be undertaken, but is instead intended to ensure that employees are aware of:

- What asbestos is
- What type of products can contain asbestos
- The risks of working with asbestos
- Personal protective measures
- Sampling protocols
- Guidelines and Codes of Practice
- Introduction to the various removal protocols
- Protocols for determination if asbestos may be present
- Protocols for addressing planned and unplanned disturbances

This training can be provided by outside consultants or in-house personnel as necessary.

All training will be conducted not less than annually and prior to any employee working with ACMs.

A copy of a “checklist” for respirator care, fitting and inspection as well as a copy of a certificate to acknowledge basic worker awareness training are attached in Appendices 1 and 2.

Appendix 1. Respirator Care

The following applies to the use of a Half-faced Negative Pressure Air Purifying Respirator equipped with P100 filters.

WARNING: Such respirators do not generate or have their own supply of oxygen. They must not be used in oxygen deficient atmospheres (less than 19.5%) and must not be worn for removal of friable asbestos unless using a glove bag.

Respirators filters must be approved for protection against asbestos.

RESPIRATOR FITTING

- Persons required to wear a respirator must first pass a qualitative fit-test administered in accordance with the most current version of CSA standard Z-94.4. The fit-test should be repeated yearly with the records maintained on file.
- The respirator wearer must be clean-shaven along all the seal points for proper protection to be obtained. Even stubble growth may be sufficient to reduce the seal of the face-piece and, therefore, the protection. The respirator approval is voided for users with facial hair that may interfere with the seal.

CHECK PRIOR TO EACH USE

- Examine facepiece for any:
    - dirt (clean if necessary);
    - cracks, tears or holes (obtain new face-piece);
    - distortion and inflexibility (stretch and knead to restore shape and flexibility or obtain new face-piece);
    - cracks, or breaks in filter holders, worn threads and missing gaskets (replace or obtain new face-piece).
- Examine head straps for any:
    - breaks or tears (replace if discovered);
    - loss of elasticity (replace if discovered);
    - broken or malfunctioning buckles and attachments (replace if discovered).
- Examine valves for signs of any:
    - detergent residue, dust or other material on valves or valve seats (clean before use);
    - cracks, tears or distortion in the valve material (replace if discovered);
    - missing or defective valves or valve covers (replace if discovered).
- Examine filter for:
    - proper filter for protection against asbestos (High Efficiency Particulate)
    - incorrect installation, loose connections, missing or worn gaskets or cross threading (remove and re-install);
    - cracks or dents in filter housing (replace if discovered).
- Perform the following tests for leaks on each donning of the respirator:

- negative pressure test: cover inlets to filters, breathe in and hold breath; respirator should be drawn to face for minimum of 10 seconds (if not, check exhalation valve and fit);
- positive pressure test: cover exhalation valve cover and puff out slightly and hold breath; respirator should slightly pressurize and still hold seal (if not, check inhalation valves and fit).

RESPIRATOR CLEANING AND DISINFECTION

- Remove filters and disassemble face-piece. Discard or repair defective parts.
- Wash components in warm water (50°C - 60°C) with mild detergent, using a brush. Respirator suppliers can provide ready-made cleaning and disinfectant solutions and instructions for use.
- Thoroughly rinse components in clean, warm water.
- Air dry or hand dry components with a clean, lint-free cloth.
- Reassemble respirator and test to ensure that all components are working properly (see above). Be careful to check that valves are not lost in cleaning.

Use of positive pressure respiratory protection will not be required by employees of the Municipality of the County of Annapolis.

Appendix 2. Training Acknowledgement

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBRES CAN CAUSE VARIOUS TYPES OF LUNG DISEASE INCLUDING CANCER. SMOKING INCREASES THE RISK OF LUNG CANCER FROM ASBESTOS EXPOSURE.

RESPIRATOR PROTECTION: I have been supplied with a respirator and received training for its proper use including qualitative fit testing (irritant smoke). I understand that I must be free of any facial hair that may interfere with the seal of the respirator with my face.

TRAINING COURSE: I have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. The topics covered in the course included the following:

Awareness Training:

- Physical characteristics and use of asbestos
- Health hazards associated with asbestos
- Sampling and analytical methods
- Regulations concerning work with asbestos
- Assessment of asbestos containing materials
- Respiratory protection
- Use of protective equipment
- General practices for asbestos removal

By signing this certificate, I acknowledge that I have received the above training and agree to follow these procedures for all work assigned to me.

EMPLOYEE NAME:_____

DATE OF TRAINING: _____

RESPIRATOR MANUFACTURER:_____ SIZE:_____

SIGNATURE:_____ DATE:_____

TRAINER:_____ DATE:_____

Appendix 6. Asbestos Survey Results

Samples were collected in each of the following buildings of every material that could be reasonably expected to contain asbestos. Both friable and non-friable products were tested. Materials known not to contain asbestos, such as fibreglass insulations on pipes, cellulose ceiling tiles, etc were not sampled and are not otherwise specifically referenced. Surveys were generally conducted to be non-intrusive and cause minimal damage, meaning that test holes were not advanced into wall/ceiling/floor cavities nor through roofing structures to collect samples. The reader is advised that, should demolition or extensive renovation be required, additional testing may be needed to address these issues.

Please note the following specific limitations of these survey data:

- Vermiculite insulation might be present between brick veneers and exterior structural components on in cavities in hollow concrete block walls. It may also be present in attic cavities that could not be inspected. Vermiculite can contain amphibole asbestos in low concentrations as a contaminant.

- Test data may be of insufficient detail to support major renovations or demolitions.

- Asbestos containing flooring materials may be covered by newer non-asbestos containing materials. Efforts were made during survey work to identify such possibilities but not all may have been identified.

- In general, roofing materials were not sampled to avoid creating leaks.

- Some buildings have been renovated in part with asbestos containing plasters, drywall joint fillers and flooring materials remaining in the older sections and non-asbestos containing products being present in the newer sections. In some cases, particularly with drywall joint filler, the “cross over” points are not necessarily obvious, and can be a problem when only portions of older buildings were renovated (i.e. one wall in an office or one office in an area).

- As a visual guide, drywall joint fillers that are of a “tan” or “straw yellow” colour contain asbestos. This material was found in some buildings together with “grey” or “white” materials that were of newer construction and did not contain asbestos. It is not practical during survey work to attempt to categorise these materials on each wall to the level where uncertainty can be reduced to near zero. Additional testing on a specific “case-by-case” basis may be required where generalities are insufficient to provide the needed guidance.

- Test data describing various types of floor and ceiling tiles in specific rooms should be interpreted to imply that all similar materials in other rooms meeting the same

description should be considered to be the same composition. For example, if brown 9x9 inch floor tiles in Room A contain asbestos then all other similar tiles in the building should be presumed to also contain asbestos.

- Fires doors were not samples but older ones may contain asbestos insulation as a filler.

- Although concrete mortars and grouts were sampled, note that these materials are extremely non-homogenous in nature. If used, asbestos content would be expected to be very low and potentially not detectable by routine light microscopical methods. Overall, if these materials must be pulverised, drilled or otherwise damaged such that airborne concrete dust is created, additional larger samples might need to be collected. As well, not that most concrete materials have crystalline silica, and protection needed to address exposure to this would also be suitable to protect from asbestos.

The following buildings were surveyed with results following:

- Administration Buildings
    - Annapolis Royal Administration Building
    - Lawrencetown Office
    - Bridgetown Office
    - Granville Ferry Public Works Building
- Wastewater Treatment Plants
    - Cornwallis Park
    - Bridgetown (full survey not needed, plaster samples collected from one building)
- Water Treatment Plants
    - Margaretsville
    - Cornwallis Park
- Other
    - Bridgetown Arena
    - Bridgetown Pool
    - Raven Haven
    - Jubilee Park (full survey not needed, floor tile samples collected from one building)

The following Buildings were not surveyed due to construction dates after 1990:

- Nictaux wastewater treatment plant
- Granville Ferry water treatment plant
- Bridgetown water treatment plant

Sample Analysis Results and Summary, Granville Ferry Public Works Building.

Building Description.

- Concrete stone and mortar foundation walls
- Vinyl siding, windows are new
- Floors are bare concrete or concrete with floor tiles, plywood and new seamless flooring, combination of new and old materials
- Walls and ceilings are plywood or drywall, combination of new and old materials
- Forced hot air furnace, no insulated ducts
- Furnace room has plaster ceiling

Test Data.

Here are test data for sample(s) that we collected from the Granville Ferry Public Works Building on 16 June, 2016, and then analysed asbestos content testing by light microscopy method EPA 600/R-93/116.

Sample Label	Description	Friable	Asbestos Content
Sample 1	Garage loading area, drywall joint filler	yes	none
Sample 2	Garage loading area, drywall joint filler	yes	none
Sample 3	Garage loading area, concrete block mortar	no	none
Sample 4	Lunchroom, wall drywall joint filler	yes	none
Sample 5	Lunchroom, ceiling drywall joint filler	yes	5% chrysotile asbestos
Sample 6	Office area, wall drywall joint filler	yes	5% chrysotile asbestos
Sample 7	Locker room, wall drywall joint filler	yes	5% chrysotile asbestos
Sample 8	Locker room, ceiling drywall joint filler	yes	5% chrysotile asbestos
Sample 9	Locker room, chimney concrete	no	none
Sample 10	Attic, plaster ceiling	yes	none
Sample 11	Attic, plaster ceiling	yes	none
Sample 12	Attic, chimney concrete	yes	none
Sample 13	Storage room near washroom, drywall joint filler	yes	5% chrysotile asbestos
Sample 14	Tool storage, 9x9 brown floor tiles	no	15% chrysotile asbestos
Sample 15	Tool storage, 9x9 beige floor tiles	no	15% chrysotile asbestos
Sample 16	Workshop, wall drywall joint filler	yes	5% chrysotile asbestos

Sample 17	Workshop, ceiling drywall joint filler	yes	5% chrysotile asbestos
Sample 18	Basement/furnace room, plaster ceiling	yes	none
Sample 19	Basement, concrete block mortar	no	none
Sample 20	Basement, foundation mortar	no	none
Sample 21	Basement, foundation mortar	no	none
Sample 22	Basement, foundation mortar	no	none

Summary.

Based upon these data, the following materials should be presumed to contain asbestos at this location.

- This building has been renovated and both original and newer materials are present; asbestos is present in original construction materials as noted below.
- All original drywall joint filler contains asbestos
- All original floor tiles contain asbestos