

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- .1 Designated Substances Survey, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., October 2013, Ref. No.: 04-0074-13-051.
- .2 Plaster Investigation, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., November 2014, Ref. No.: 04-0074-14-028

1.2 RELATED SECTIONS

- .1 Section 01 35 29.14 – Health and Safety
- .2 Section 02 41 21 – Deconstruction of Structures
- .3 Section 02 81 01 – Hazardous Materials
- .4 Section 02 82 00.02 – Asbestos Abatement Type 2 Operations
- .5 Section 02 82 00.03 – Asbestos Abatement Type 3 Operations

1.3 REFERENCES

- .1 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O.
- .2 Canada Labour Code, Canada Occupational Safety and Health Regulations (Current).
- .3 Canadian Standards Association (CSA International)
 - .1 CSA Standard Z94.4-11, Selection, Use and Care of Respirators.
- .4 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 SUBMITTALS

- .1 Submit site-specific Health and Safety Plan and items listed in this section, within 7 days after date of Notice to Proceed and prior to mobilization to site.

- .2 Contractor submit proof to Project Authority that all workers have received appropriate training and education by a competent person in the hazards of designated and hazardous substances/materials exposure, good personal hygiene, entry and exit from hazardous materials work area, aspects of work procedures and protective measures while working in hazardous materials work area, and the use, cleaning and disposal of respirators and protective clothing.
- .3 Contractor submit proof to Project Authority that all workers have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene, entry and exit from asbestos work area, aspects of work procedures and protective measures while working in asbestos work area, and the use, cleaning and disposal of respirators and protective clothing.
- .4 Safety and health risk or hazard analysis for each site task and operation.
- .5 Develop checklist for items to be inspected on a daily basis. Document actions taken.
- .6 Personnel training requirements including:
 - .1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.
 - .2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of site-specific Health and Safety Plan.
- .7 Personal protective equipment (PPE) program addressing:
 - .1 Donning and doffing procedures.
 - .2 PPE selection based upon site hazards.
 - .3 PPE use and limitations of equipment.
 - .4 Work mission duration, PPE maintenance and storage.
 - .5 PPE decontamination and disposal.
 - .6 PPE inspection procedures prior to, during, and after use.
 - .7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.
 - .8 Site control measures employed at site including site map, site work zones, use of 'buddy system', site communications including site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest hospital.
 - .9 Decontamination procedures for both personnel and

equipment.

.10 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, and procedures for reporting incidents to local, provincial, or federal agencies.

.11 Written respiratory protection program for project activities in accordance with item 1.3.3.

.12 Procedures dealing with heat and/or cold stress.

.13 Spill containment program if waste material is generated, excavated, stored, or managed on site.

.8 Project Authority will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 days after receipt of plan. Revise plan as appropriate and resubmit plan to Project Authority within 2 days after receipt of comments from Project Authority.

.9 Respirator Fit Testing: submit proof of respirator fit testing for site personnel, within 2 days after date of Notice to Proceed and prior to mobilization to site.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

.11 Off-site Contingency and Emergency Response Plan:
.1 Prior to commencing Work, develop off-site Contingency and Emergency Response Plan.
.2 Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from site.

1.5 REGULATORY REQUIREMENTS

.1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.6 SITE CONDITIONS

.1 Work at site may involve contact with:
.1 Designated Substances
.2 Polychlorinated Biphenyls

- .2 Documents listed in item 1.1 of this section must be reviewed prior to Site mobilization.
- .3 The project area is defined as Building 2A.

1.7 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan prior to commencing site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Ensure Health and Safety guidelines provide for safe and minimal risk working environment for site personnel and minimize impact of activities involving contact with hazardous materials or hazardous wastes on general public and surrounding environment.
- .3 Relief from or substitution for portion or provision of minimum Health and Safety Guidelines specified or reviewed site-specific Health and Safety Plan must be submitted to Project Authority in writing. Project Authority will respond in writing, either accepting or requesting improvements.

1.8 RESPONSIBILITY

- .1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of contract documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 HAZARD COMMUNICATION REQUIREMENTS

- .1 Comply with Workplace Hazardous Materials Information System (WHMIS) Regulation, R.R.O.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, Part X - Hazardous Substances.
- .3 Provide Project Authority with Material Safety Data Sheets (MSDS) and documentation on any controlled product that the Contractor or Contractor Representatives plan to bring onto site.

1.10 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Health and Safety Officer where required to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Project Authority may also stop Work for health and safety considerations.
 - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

**1.11 UNFORESEEN
HAZARDS**

- .1 Should unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, stop work and immediately advise Project Authority verbally and in writing.

**1.12 PERSONNEL
HEALTH, SAFETY, AND
HYGIENE**

- .1 Medical Surveillance:
 - .1 Conduct medical surveillance of personnel as required by Federal, Provincial, and local requirements.
- .2 Training: ensure personnel entering site are trained in accordance with specified personnel training requirements. Training session must be completed by a competent person.
- .3 Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity
- .4 Personal Protective Equipment:
 - .1 Furnish site personnel with appropriate PPE as required. Ensure that safety equipment and protective clothing is kept clean and maintained.
- .5 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:
 - .1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.
 - .2 Ensure footwear is steel-toed safety shoes or boots and is covered by specified booties when entering or working in potentially contaminated work areas.
 - .3 Dispose of or decontaminate PPE worn on site at end of

- each workday in accordance with Federal, Provincial and local requirements.
- .4 Ensure site personnel have passed respirator fit test prior to entering potentially contaminated work areas.
 - .5 Ensure facial hair does not interfere with proper respirator fit.
- .6 Respiratory Protection:
- .1 Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for respirators in accordance with specified regulations.
 - .2 Develop, implement, and maintain written respirator program.
 - .3 Monitor, evaluate, and provide respiratory protection for site personnel.
 - .4 Ensure levels of protection are consistent with site-specific potential airborne hazards associated with contaminants and potential contaminants identified on site.
 - .5 Immediately notify Project Authority when level of respiratory protection required increases.
 - .6 Ensure appropriate respiratory protection during work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection in accordance with item 1.3.3.
 - .7 Assess ability for site personnel to wear respiratory protection.
 - .8 Ensure site personnel are able to pass respirator fit test prior to entering potentially contaminated work areas.
- .7 Heat Stress/Cold Stress: implement temperature stress monitoring program as applicable and include in site-specific Health and Safety Plan.
- .8 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
- .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
- .9 Emergency and First-Aid Equipment:
- .1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; two 9 kg ABC type dry chemical fire extinguishers.
- .10 Site Communications:
- .1 Post emergency numbers near site telephones.
 - .2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for site activities.

- .3 Provide employee alarm system to notify employees of site emergency situations or to stop Work activities if necessary.
- .4 Furnish selected personnel with 2-way radios.
- .5 Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new site conditions as encountered. Hold additional safety meetings on as-needed basis.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Methods and procedures for deconstruction of structures and parts of structures.

1.2 RELATED DOCUMENTS

- .1 Designated Substances Survey, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., October 2013, Ref. No.: 04-0074-13-051.
- .2 Plaster Investigation, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., November 2014, Ref. No.: 04-0074-14-028

1.3 RELATED SECTIONS

- .1 Section 01 35 29.14 – Health and Safety for Contaminated Sites.
- .2 Section 02 81 01 – Hazardous Materials
- .3 Section 02 82 00.02 – Asbestos Abatement Type 2 Operations
- .4 Section 02 82 00.03 – Asbestos Abatement Type 3 Operations

1.4 REFERENCES

- .1 Definitions:
 - .1 Alternate Disposal: reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.
 - .2 Deconstruction: systematic dismantling of structure in a manner that achieves safe removal/disposal of hazardous materials and maximum salvage/recycling of materials.
 - .1 Ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been significant portion of waste system.
 - .3 Demolition: rapid destruction of structure with or without prior removal of hazardous materials.
 - .4 Hazardous Materials: designated substances, dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: corrosive agents, flammable substances, ammunition,

explosives, radioactive substances, or other material that can endanger human health, well being or environment if handled improperly.

.5 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.6 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form.

.1 Recycling does not include burning, incinerating, or thermally destroying waste.

.7 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from remodelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.8 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.9 Source Separation: acts of keeping different types of waste materials separate, beginning from first time they became waste.

.10 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.2 Reference Standards:

.1 Canadian Council of Ministers of the Environment (CCME)

.2 Canadian Standards Association (CSA International)

.1 CSA S350-[M1980(R2003)], Code of Practice for Safety in Demolition of Structures.

.3 Federal Legislation

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.4 National Building Code 2005, Part 8 - Safety Measures at Construction and Demolition Sites

1.5 PERFORMANCE REQUIREMENTS

.1 Reuse and recycle all materials to the highest extent practicable. Work shall be performed in accordance with Chapter 8 -

Construction, Renovation and Demolition Waste of the Public Works and Government Services document, The Environmentally Responsible Construction and Renovation Handbook to achieve a minimum of 80% waste diversion.

**1.6 ACTION AND
INFORMATIONAL
SUBMITTALS**

- .1 Provide deconstruction plan prior to starting work.
- .2 Provide certificates: copies of certified weigh bills or bills of lading or used building material receipts from authorized disposal sites and reuse and recycling facilities for material removed from site to Project Authority
 - .1 Written authorization from Project Authority is required to deviate from reuse and recycling of materials.
- .3 Include following information:
 - .1 Time and date of removal.
 - .2 Description of material(s).
 - .3 Quantity of material.
 - .4 Breakdown of reuse, recycling and landfill quantities.
 - .5 End destination of material(s).
- .4 Hazardous Materials:
 - .1 Provide description of hazardous materials and notification of filing with proper authorities prior to beginning of work as required.
 - .2 Workers, haulers and subcontractors must possess current, applicable Certificates of Approval to remove, handle and dispose of wastes categorized Provincially and Municipally as hazardous.

**1.7 QUALITY
ASSURANCE**

- .1 Regulatory Requirements:
 - .1 Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable provincial regulations.
 - .2 Site Meetings:
 - .1 Arrange for site visit with Project Authority to examine existing site conditions, prior to start of Work.
 - .3 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.14 - Health and Safety for contaminated sites.

1.8 SITE CONDITIONS

- .1 Protection:
 - .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, landscaping, and adjacent grades. Provide control measures as required. Repair damage caused by deconstruction.
 - .2 Support affected structures and, if safety of structures being deconstructed or adjacent structures and services appears to be endangered, take preventative measures. Cease operations and immediately Project Authority.
 - .3 Prevent debris from blocking elevators, mechanical and electrical systems.
 - .4 All life safety systems must be maintained and protected at all times
- .2 Documents listed in item 1.2 of this section must be reviewed prior to Site mobilization.
- .3 The Work area is defined as floors one through three of Building 2A.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- .1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.
- .2 Use water efficient wetting equipment/trucks/attachments when minimizing dust.
- .3 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Do work in accordance with Section 01 35 29.14 - Health and Safety for Contaminated Sites.
- 2 Provide temporary electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical

tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

- .3 Disconnect electrical, telephone and communication service lines entering the area of the building to be deconstructed. Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.
- .4 Locate and protect utility lines. Do not disrupt active or energized utilities.
- .5 Disconnect and cap mechanical services.
 - .1 Natural gas supply lines: remove in accordance with utility company requirements.
 - .2 All plumbing servicing the plating laboratory which have a valve can be shut off, capped and isolated from the rest of the lines for removal. Any lines that can't be isolated should be decontaminated and kept in place.

3.2 REMOVAL OF HAZARDOUS WASTES

- .1 Prior to start of deconstruction work remove contaminated or hazardous materials from the site and dispose of at appropriate disposal facilities in safe manner in accordance with TDGA and other applicable regulatory requirements, in accordance with Section 02 81 01 - Hazardous Materials.

3.3 DISASSEMBLY

- .1 Materials removed from the Site are property of Contractor.
- .2 Throughout course of deconstruction pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to materials and equipment.
- .3 Ensure workers and subcontractors are briefed and trained to carry out work in accordance with appropriate deconstruction techniques.
- .4 Project supervisor with previous deconstruction experience must be present on site throughout project.
- .5 Maintain structural integrity of structure.
- .6 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take appropriate measures to ensure safety.

- .7 Separate from waste stream, material in condition suitable for reuse and/or recycling.
- .8 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt.
- .9 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

3.4 PROCESSING

- .1 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.
- .2 Separate materials to ensure best possible condition of salvaged materials.
- .3 Keep processing area clean and free of excess debris.
- .4 Supply separate, marked disposal bins for categories of waste material.

3.5 STOCKPILING

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Eliminate double handling wherever possible.
- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.6 REMOVAL FROM SITE

- .1 Waste bins to be placed on the grassy area adjacent to stairwell to right of room 107 of Building 2A. Bins must be kept a minimum of 10ft away from the building.
- .2 The Contractor must ensure that they comply with the "Directive on Disposal of Surplus Material" Treasury Board of Canada Secretariat and provide Industry Canada with documented proof

upon disposal that items have met the criteria .

- .3 Transport material designated for alternate disposal by approved haulers and in accordance with applicable regulations.
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.7 CLEANING AND RESTORATION

- .1 Keep site clean and organized throughout deconstruction.
- .2 Upon completion of project, remove debris, trim surfaces and leave work site clean.
- .3 Repair all damage caused by the placement, movement and removal of the waste bins.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 35 29.14 – Health and Safety for Contaminated Sites.
- .2 Section 02 41 21 – Deconstruction of Structures
- .3 Section 02 82 00.02 – Asbestos Abatement Type 2 Operation
- .4 Section 02 82 00.03 – Asbestos Abatement Type 3 Operations System

1.2 RELATED DOCUMENTS

- .1 Designated Substances Survey, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., October 2013, Ref. No.: 04-0074-13-051.
- .2 Plaster Investigation, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., November 2014, Ref. No.: 04-0074-14-028

1.3 REFERENCES

- .1 Canadian Environmental Protection Act, 1999 (CEPA 1999).
 - .1 Export and Import of Hazardous Waste Regulations (SOR/2002-300).
 - .2 PCB Regulations (SOR/2008-273).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 National Fire Code of Canada, as amended.
- .4 Transportation of Dangerous Goods Act (TDG Act) as amended, (c. 34).
- .5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).
- .6 Occupational Health and Safety Act (OHSA)
 - .1 Ontario Regulation 278/05, Designated Substances – Asbestos on Construction Projects and on Building Repair

Operations 2005 (278).
.2 Ontario Regulation 490/09 – Designated Substances.

- .7 Ontario Ministry of Labour
.1 Guideline – Lead on Construction Projects, Health and Safety Guidelines, 2004.
.2 Guideline – Silica on Construction Projects, Health and Safety Guidelines, 2004.

- .8 Ontario Environmental Protection Act (OEPA)
.1 Waste Management – PCB's, Regulation 362/90.

1.4 DEFINITIONS

- .1 Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .3 Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

1.5 SUBMITTALS

- .1 Submit hazardous materials management plan to Project Authority that identifies hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Co-ordinate storage of hazardous materials with Project Authority and abide by requirements for labelling and storage of materials.

- .2 Store and handle hazardous materials in accordance with applicable Federal and Provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 Do not use flammable liquids having flash point below 38 degrees C, such as naphtha or gasoline as solvents or cleaning agents.
- .5 Storage requirements for quantities of hazardous materials in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials in closed and sealed containers.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials in containers compatible with that material or waste.
 - .4 Segregate incompatible materials.
 - .5 Ensure that different hazardous materials are not mixed.
 - .6 Store hazardous materials in secure storage area with controlled access.
 - .7 Maintain clear egress from storage area.
 - .8 Store hazardous materials in location that will prevent them from spilling into environment.
 - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
 - .10 Maintain inventory of hazardous materials including product name, quantity, and date when storage began.
- .9 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .10 Report spills or accidents immediately to Project Authority. Submit a written spill report to Project Authority within 24 hours of incident.

1.7 TRANSPORTATION

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

- .2 If exporting hazardous waste to another country, ensure compliance with Federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Co-ordinate transportation and disposal with Project Authority.
 - .2 Ensure compliance with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
 - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label container(s) with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide photocopy of shipping documents and waste manifests to Project Authority.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Project Authority.
 - .9 Report discharge, emission, or escape of hazardous materials immediately to Project Authority and appropriate provincial authority. Take reasonable measures to control release.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Only bring on site quantity of hazardous materials required to perform work.
- .2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 - EXECUTION

3.1 DISPOSAL

- .1 Dispose of hazardous waste materials in accordance with applicable Federal and Provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
- .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
- .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal.
 - .2 Hazardous waste burned for energy recovery.
 - .3 Lead-acid battery recycling.
 - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following Work:
 - .1 Disturbance of non-friable asbestos containing plaster to facilitate the removal of all non asbestos containing building materials including flooring, duct work, piping, conduit, drywall, framing etc... Approximately 32,000 square feet of drywall is to be removed. Contractor is responsible for verifying the quantities.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.14 – Health and Safety for Contaminated Sites.
- .2 Section 02 41 21 – Deconstruction of Structures
- .3 Section 02 81 01 – Hazardous Materials
- .4 Section 02 82 00.03 – Asbestos Abatement Type 3 Operations

1.3 RELATED DOCUMENTS

- .1 Designated Substances Survey, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., October 2013, Ref. No.: 04-0074-13-051.
- .2 Plaster Investigation, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., November 2014, Ref. No.: 04-0074-14-028

1.4 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA Standard Z94.4-11, Selection, Use and Care of Respirators.
- .2 Department of Justice Canada
 - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Occupational Health and Safety Act (OHSA)
 - .1 Ontario Regulation 278/05, Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations.
 - .2 Ontario Regulation 213/91, Regulation for Construction Projects.
 - .3 Ontario Regulation 860/90, Workplace Hazardous Materials Information System (WHMIS) Regulation.
 - .4 Ontario Regulation 833/90, Control of Exposure to Biological and Chemical Agents.
- .6 Ontario Ministry of Labour (MOL)
 - .1 A Guide to the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations, November 2007.

1.5 DEFINITIONS

- .1 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.
- .2 Asbestos Containing Materials (ACMs): materials that contain 0.5 percent or more asbestos by dry weight.
- .3 Asbestos Work Area: area where work takes place which will, or may disturb ACMs.
- .4 Authorized Visitors: designated representative(s), and representative(s) of regulatory agencies.
- .5 Competent worker and/or person: 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 Provincial, Federal, and local laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .6 Consultant: EHS Partnerships Limited.
- .7 Contractor: Asbestos Abatement Contractor.
- .8 Friable Materials: material that when dry can be crumbled,

pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

- .9 Glove Bag: prefabricated glove bag as follows:
 - .1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.
 - .2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.
 - .3 Equipped with reversible double pull double throw zipper on top and at approximately mid-section of the bag.
 - .4 Straps for sealing ends around pipe.
- .10 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any dimension at 99.97% efficiency.
- .11 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .12 Occupied Area: any area of building or work site that is outside Asbestos Work Area.
- .13 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .14 Project Authority: Communications Research Centre designate
- .15 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for scope of work.

1.6 SUBMITTALS

- .1 Contractor shall submit proof to Consultant that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.
- .2 Contractor shall submit proof to Consultant of Contractor's Asbestos Liability Insurance.
- .3 Contractor shall submit to Consultant necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.

- .4 Contractor shall submit to Consultant proof that all asbestos workers and/or supervisor(s) have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing if required.
- .5 Contractor shall submit to Consultant proof that employees required to don respirators have valid respirator training and fitting and testing. Workers must be fit tested with respirator that is personally issued if respirators are used. Respirator training and fit testing is valid for two years and must be provided by a competent person.
- .6 Contractor shall submit to Consultant Worker's Compensation Board status and transcription of insurance.
- .7 Contractor shall submit to Consultant documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
 - .1 Encapsulants;
 - .2 Amended water;
 - .3 Slow drying sealer;
 - .4 All additional controlled products.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at the time work is performed.
- .2 Health and Safety:
 - .1 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - .1 Respirator personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to 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. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker,

or after each use when used by more than one worker. The respirator 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. The employer to establish written respiratory protection program including procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to 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.

.2 Disposable type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing 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. It includes suitable footwear, and it to be repaired or replaced if torn.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Before leaving Asbestos Work Area, the worker must decontaminate their protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.

.5 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

.6 Visitor Protection:

.1 Provide protective clothing and approved fit-tested respirators to Authorized Visitors to work areas.

.2 Visitors must be trained in the use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures

to be followed when entering into and exiting the
Asbestos Work Area.

**1.8 WASTE
MANAGEMENT AND
DISPOSAL**

- .1 Waste bins to be placed on the grassy area adjacent to stairwell to right of room 107 of Building 2A. Bins must be kept a minimum of 10ft away from the building.
- 2 Contractor is responsible for maintaining access to the bins including required snow removal and repairing any damaged caused by the bins.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .4 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial and Municipal regulations. Dispose of asbestos waste in sealed double-bagged 0.15mm thickness bags or leak proof drums. Label containers with appropriate warning labels.
- .5 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

**1.9 EXISTING
CONDITIONS**

- .1 The report listed in item 1.3 must be reviewed prior to conducting the works detailed in this specification. Contact the Project Authority to acquire a copy of this report for review.
- .2 Contractor shall notify Consultant of designated and hazardous substances discovered during work and not apparent from specifications, or report pertaining to Work. Do not disturb such material until instructed by Consultant in writing.

1.10 SCHEDULING

- .1 Hours of Work: perform work involving asbestos during normal working hours.
- .2 No later than ten (10) days prior to mobilization to the site, Contractor must provide Consultant with schedule in writing.

1.11 INSTRUCTIONS

- .1 Before beginning Work, provide Consultant satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, at minimum:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Drop and Enclosure Sheets:
 - .1 Polyethylene: 0.15 mm thick.
 - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in concentration to provide thorough wetting of asbestos containing material.
- .3 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm 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 thick sealable polyethylene bag.
 - .3 Labeling requirements: affix preprinted cautionary asbestos warning, in both official languages, that is visible when ready for removal to disposal site.
- .4 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.
- .5 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

- .1 Sealer: flame spread and smoke developed rating less than 50.

PART 3 - EXECUTION

3.1 SUPERVISION

- .1 Minimum of one Supervisor for every ten workers is required.
- .2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos-containing materials.

3.2 PROCEDURES

- .1 Before beginning work make arrangements with Consultant to conduct pre-contamination inspection(s) of work area(s). Asbestos abatement operations may only commence when Contractor has received notice from the Consultant to proceed.
- .2 Before beginning Work, at each access to Asbestos Work Area, install warning signs in both official languages in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used: 'CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.
 - .3 Before beginning Work remove visible dust from surfaces in work area where dust is likely to be disturbed during course of work.
 - .1 Use HEPA vacuum or damp cloths where damp cleaning does not create hazard and is otherwise appropriate.
 - .2 Do not use compressed air or dry sweeping to clean up or remove dust from any surface.
 - .4 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
 - .1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in work areas where dust or contamination cannot otherwise be safely contained.
 - .2 When removing asbestos containing material and walls themselves do not enclose work area erect an enclosure of

polyethylene sheeting around work area, and seal ventilation ducts to and from work area.

- .5 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas at the contractor's expense.
- .6 Cleanup:
 - .1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.
 - .2 Place dust and asbestos containing waste in sealed dust tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.
 - .3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.
 - .4 Seal and remove double bagged waste from site. Dispose of 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 guidelines and regulations for asbestos disposal are followed.
 - .5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.
 - .6 The passenger elevator may be used for waste transfer however the contractor assumes all responsibility for any maintenance, or repairs required to the elevator during the abatement activities
- .7 Following asbestos material removal and prior to removing work area control measures make arrangements with the Consultant to conduct post-contamination inspection(s). Work area control measures must remain in place until notification is provided to the contractor stating that work has been completed and control measures may be removed.

3.3 AIR MONITORING

- .1 From beginning of Work until completion of cleaning operations, Consultant may take air samples at any time.
 - .1 Contractor will be responsible for monitoring inside enclosure in accordance with applicable Provincial Occupational Health and Safety Regulations.

- .2 If air monitoring shows that areas outside Asbestos Work Area(s) are contaminated, enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area at the contractor's expense.
- .3 Contractor shall ensure that respiratory safety factors are not exceeded.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following Work:
 - .1 Removal and off-Site disposal of approximately 15,000 square feet of asbestos containing plaster located throughout floors one through three of Building 2A.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.14 – Health and Safety for Contaminated Sites.
- .2 Section 02 41 21 – Deconstruction of Structures
- .3 Section 02 81 01 – Hazardous Materials
- .4 Section 02 82 00.02 – Asbestos Abatement Type 2 Operations

1.3 RELATED DOCUMENTS

- .1 Designated Substances Survey, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., October 2013, Ref. No.: 04-0074-13-051.
- .2 Plaster Investigation, Building 2A, Shirley's Bay Campus, Ottawa, Ontario, EHS Partnerships Ltd., November 2014, Ref. No.: 04-0074-14-028

1.4 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA Standard Z94.4-02, Selection, Use and Care of Respirators.
- .2 Department of Justice Canada
 - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Occupational Health and Safety Act (OHSA)
 - .1 Ontario Regulation 278/05, Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations.
 - .2 Ontario Regulation 213/91, Regulation for Construction Projects.
 - .3 Ontario Regulation 860/90, Workplace Hazardous Materials Information System (WHMIS) Regulation.
 - .4 Ontario Regulation 833/90, Control of Exposure to Biological and Chemical Agents.
- .6 Ontario Ministry of Labour (MOL)
 - .1 A Guide to the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations, November 2007.
- .7 Ontario Environmental Protection Act (OEPA)
 - .1 Guideline C-6, Handling, Transportation and Disposal of Asbestos Waste in Bulk.
 - .2 Ontario Regulation 347, as amended, Waste Management.

1.5 DEFINITIONS

- .1 Airlock: system for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated area, typically consisting of two curtained doorways at least 2 m apart.
- .2 Amended Water: water with a non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.
- .3 Asbestos Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Areas: area where work takes place which will, or may disturb ACMs.
- .5 Authorized Visitors: designated representative(s), and representative(s) of regulatory agencies.
- .6 Competent worker and/or person: 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 Provincial, Federal, and local laws and with the provisions of the regulations that apply to the work.
- .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .7 Consultant: EHS Partnerships Limited.
- .8 Contractor: Asbestos Abatement Contractor.
- .9 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.
- .10 DOP Test: testing method used to determine integrity of Negative Pressure unit using dioctyl phthalate (DOP) HEPA-filter leak test.
- .11 Friable Materials: material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .12 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .13 Negative pressure: system that extracts air directly from work area, filters such extracted air through High Efficiency Particulate Air filtering system, and discharges this air directly outside work area to exterior of building.
 - .1 System to maintain minimum pressure differential of 5 Pa relative to adjacent areas outside of work areas, be equipped with alarm to warn of system breakdown, and be equipped with instrument to continuously monitor and automatically record pressure differences.
- .14 Non-Friable Materials: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .15 Occupied Areas: any area of building or work site that is

outside Asbestos Work Area.

- .16 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.
- .17 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

1.6 SUBMITTALS

Prior to Site mobilization the contractor must submit the following documentation to the Consultants satisfaction:

- .1 Proof that suitable arrangements have been made to dispose of asbestos containing waste in accordance with requirements of authority having jurisdiction.
- .3 Proof of Contractor's Asbestos Liability Insurance.
- .4 Proof of Certificate of Approval (C of A) or Provisional C of A that authorizes the transportation of asbestos waste in bulk from the Contractor or Certified waste hauler retained to transport and dispose of waste.
- .5 Submit proof that all asbestos workers have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene, entry and exit from Asbestos Work Area, aspects of work procedures and protective measures while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.
- .6 Submit proof that supervisory personnel have attended asbestos abatement supervisory course approved by Consultant. Minimum of one supervisor for every ten workers.
- .7 Submit Worker's Compensation Board status and transcription of insurance.
- .8 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
 - .1 Encapsulants;

- .2 Amended water;
 - .3 Slow drying sealer;
 - .4 All additional controlled products.
- .9 Proof that employees have valid respirator training and fit testing. Workers must be fit tested with respirator that is personally issued. Respirator training and fit testing is valid for two years and must be provided by a competent person.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial and local requirements pertaining to asbestos provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
- .1 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area includes:
 - .1 Respirator personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to 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. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator 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. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to 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.
 - .2 Disposable type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be

provided by the employer and worn by every worker who enters the work area, and the protective clothing 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. It includes suitable footwear, and it to be repaired or replaced if torn. Requirements for each worker:

- .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters that have been tested as satisfactory, clean coveralls and head covers before entering Equipment and Access Rooms or Asbestos Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
- .2 Remove gross contamination from clothing before leaving work area then proceed to Equipment and Access Room and remove clothing except respirators. Place contaminated work suits in receptacles for disposal with other asbestos - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. Still wearing the respirator proceed naked to showers. Using soap and water wash body and hair thoroughly. Clean outside of respirator with soap and water while showering; remove respirator; remove filters and wet them and dispose of filters in container provided for purpose; and wash and rinse inside of respirator. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.
- .3 After showering and drying off, proceed to clean change room and dress in street clothes at end of each day's work, or in clean coveralls before eating, smoking, or drinking. If re-entering work area, follow procedures outlined in

paragraphs above.

.4 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers must not use this system as means to leave or enter work area.

.3 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual asbestos abatement.

.5 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

.7 Visitor Protection:

.1 Provide protective clothing and approved fit-tested 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.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Waste bins to be placed on the grassy area adjacent to stairwell to right of room 107 of Building 2A. Bins must be kept a minimum of 10ft away from the building.
- 2 Contractor is responsible for maintaining access to the bins including required snow removal and repairing any damaged caused by the bins.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .4 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial and Municipal regulations. Dispose of asbestos waste in sealed double-bagged 0.15mm thickness bags or leak proof drums. Label containers with appropriate warning labels.

- .5 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.9 EXISTING CONDITIONS

- .1 The report listed in item 1.3 must be reviewed prior to conducting the works detailed in this specification. Contact the Project Authority to acquire a copy of these reports for review.
- .2 Contractor shall notify Consultant of designated and hazardous substances discovered during work and not apparent from specifications, or report pertaining to Work. Do not disturb such material until instructed by Consultant in writing.

1.10 SCHEDULING

- .1 Hours of Work: perform work involving asbestos during normal working hours.
- .2 No later than ten (10) days prior to mobilization to the site, Contractor must provide Consultant with schedule in writing.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Drop and Enclosure Sheets:
 - .1 Polyethylene: minimum 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
 - .2 FR polyethylene: minimum 0.15 mm thick, woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.
- .3 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in concentration to provide thorough wetting of asbestos containing material.
- .4 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm 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 thick sealable polyethylene bag.
- .3 Labeling requirements: affix preprinted cautionary asbestos warning, in both official languages, that is visible when ready for removal to disposal site.
- .5 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.
- .6 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
- .7 Sealer: flame spread and smoke developed rating less than 50.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Work Areas:
- .1 Shut off and isolate air handling and ventilation systems to prevent fibre dispersal to other building areas during work phase. Seal and caulk joints and seams of active return air ducts within Asbestos Work Area.
- .2 Preclean moveable furniture and carpeting within proposed work area using HEPA vacuum and remove from work area.
- .3 Preclean fixed casework, plant, and equipment within proposed work area, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
- .4 Clean proposed work area using, where practicable, HEPA vacuum cleaning equipment. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, compressed air or vacuuming using other than HEPA vacuum equipment.
- .5 The spread of dust from the work area to be prevented by:
- .1 Using enclosures of polyethylene or other suitable material that is impervious to asbestos (including, if the enclosure material 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.
- .2 Using curtains of polyethylene sheeting or other suitable material that is impervious to asbestos, fitted on each side of each entrance or exit from the work area.
- .6 Put negative pressure system in operation and operate

continuously from time first polyethylene is installed to seal openings until final completion of work including final cleanup. Provide continuous monitoring of pressure difference using automatic recording instrument. The system to maintain a negative air pressure of 0.02 inches (5 Pa) of water, relative to the area outside the enclosed area. The 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.

.7 Seal off openings such as corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

.8 Cover floor and wall surfaces with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors. Cover floors first so that polyethylene extends at least 300 mm up walls then cover walls to overlap floor sheeting.

.9 Build airlocks at entrances to and exits from work area so that work area is always closed off by one curtained doorway when workers enter or exit.

.10 At each access to work areas install warning signs in both official languages in accordance with O. Reg. 278/05.

.11 After work area isolation, remove heating, ventilating, and air conditioning filters, pack in sealed plastic bags 0.15 mm minimum thick and treat as contaminated asbestos waste. Remove ceiling - mounted objects such as lights, partitions, other fixtures not previously sealed off, and other objects that interfere with asbestos removal, as directed by Consultant. Use localized water spraying during fixture removal to reduce fibre dispersal.

.12 Maintain emergency and fire exits from work area, or establish alternative exits satisfactory to Authority having jurisdiction.

.13 Where application of water is required for wetting asbestos containing materials, shut off electrical power, provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

.14 After preparation of work area and Decontamination Enclosure Systems, for the removal of all other asbestos containing materials, remove within work area and dispose of as contaminated waste in specified containers. Spray asbestos debris and immediate work area with amended water to reduce dust, as work progresses.

.2 Worker Decontamination Enclosure System:

.1 Worker Decontamination Enclosure System includes Equipment and Access Room, Shower Room, and Clean Room, as follows:

- .1 Equipment and Access Room: build Equipment and Access Room between Shower Room and work area, with two curtained doorways, one to Shower Room and one to work area. Install portable toilet, waste receptor, and storage facilities for workers' shoes and protective clothing to be reworn in work area. Build Equipment and Access Room large enough to accommodate specified facilities, other equipment needed, and at least one worker allowing him /her sufficient space to undress comfortably.
 - .2 Shower Room: build Shower Room between Clean Room and Equipment and Access Room, with two curtained doorways, one to Clean Room and one to Equipment and Access Room. Provide one shower for every five workers. Provide constant supply of hot and cold or warm water. Provide soap, clean towels, and appropriate containers for disposal of used respirator filters.
 - .3 Clean Room: build Clean Room between Shower Room and clean areas outside of enclosures, with two curtained doorways, one to outside of enclosures and one to Shower Room. Provide lockers or hangers and hooks for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
- .3 Container and Equipment Decontamination Enclosure System:
- .1 Container and Equipment Decontamination Enclosure System consists of Staging Area within work area, Washroom, Holding Room, and Unloading Room. Purpose of system is to provide means to decontaminate waste containers, scaffolding, waste and material containers, vacuum and spray equipment, and other tools and equipment for which Worker Decontamination Enclosure System is not suitable.
 - .1 Staging Area: designate Staging Area in work area for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal to Washroom. Equip Staging Area with curtained doorway to Washroom.
 - .2 Washroom: build Washroom between Staging Area and Holding Room with two curtained doorways, one to Staging Area and one to Holding Room. Provide high - pressure low - volume sprays for washing of waste containers and equipment. Pump waste water through 5 micrometre filter system before directing into drains. Provide piping and connect to water sources and drains.

- .3 Holding Room: build Holding Room between Washroom and Unloading Room, with two curtained doorways, one to Washroom and one to Unloading Room. Build Holding Room sized to accommodate at least two waste containers and largest item of equipment used.
- .4 Unloading Room: build Unloading Room between Holding Room and outside, with two curtained doorways, one to Holding Room and one to outside.
- .4 Construction of Decontamination Enclosures:
 - .1 Build suitable framing for enclosures or use existing rooms where convenient, and line with polyethylene sheeting sealed with tape. Use two layers of FR polyethylene on floors.
 - .2 Build curtained doorways between enclosures so that when people move through or when waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.
- .5 Separation of Work Areas from Occupied Areas:
 - .1 Separate parts of building required to remain in use from parts of building used for asbestos abatement by means of airtight barrier system constructed as follows:
 - .1 Build suitable floor to ceiling lumber or metal stud framing, cover with polyethylene sheeting sealed with tape, and apply 9 mm minimum thick plywood. Seal joints between plywood sheets and between plywood and adjacent materials with surface film forming type sealer, to create airtight barrier.
 - .2 Cover plywood barrier with polyethylene sealed with tape, as specified for work areas.
- .6 Maintenance of Enclosures:
 - .1 Maintain enclosures in tidy condition.
 - .2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
 - .3 Visually inspect enclosures at beginning of each working period.
 - .4 Install manometer to monitor negative air pressure.
- .7 Do not begin Asbestos Abatement work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 For wet stripping techniques, arrangements have been made for containing, filtering, and disposal of waste water.
 - .3 Work area and decontamination enclosures and parts of building required to remain in use are effectively segregated.
 - .4 Tools, equipment, and materials waste containers are on hand.
 - .5 Arrangements have been made for building security.

.6 Warning signs are displayed where access to contaminated areas is possible.

.7 Notifications have been completed and other preparatory steps have been taken.

3.2 SUPERVISION

- .1 Minimum of one Supervisor for every ten workers is required.
- .2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos containing materials.

3.3 ASBESTOS REMOVAL

- .1 Before beginning work make arrangements with Consultant to conduct pre-contamination inspection(s) of work area(s). Asbestos abatement operations may only commence when Contractor has received notice from the Consultant to proceed.
- .2 Spray asbestos material with water containing specified wetting agent, using airless spray equipment capable of providing "mist" application to prevent release of fibres. Saturate asbestos material sufficiently to wet it to substrate without causing excess dripping. Spray asbestos material repeatedly during work process to maintain saturation and to minimize asbestos fibre dispersion.
- .3 Remove saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed pack material in sealable plastic bags 0.15 mm minimum thick and place in labelled containers for transport.
- .4 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure that containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls. The passenger elevator may be used for waste transfer however the contractor assumes all responsibility for any maintenance, or repairs required to the elevator during the abatement activities.
- .5 After completion of stripping work, wire brushed and wet

sponged surfaces from which asbestos has been removed to remove visible material. During this work keep surfaces wet.

- .6 After wire brushing and wet sponging to remove visible asbestos, wet clean entire work area including Equipment and Access Room, and equipment used in process. After inspection by Consultant apply continuous coat of slow drying sealer to surfaces of work area. Allow at least 8 hours with no entry, activity, ventilation, or disturbance other than operation of negative pressure units during this period.
- .7 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .8 Cleanup:
 - .1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.
 - .2 Place dust and asbestos containing waste in sealed dust tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.
 - .3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.
 - .4 Seal and remove double bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial 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 guidelines and regulations for asbestos disposal are followed.
 - .5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.
- .9 Following asbestos material removal and prior to removing work area control measures make arrangements with the Consultant to conduct post-contamination inspection(s). Work area control measures must remain in place until notification is provided to the contractor stating that work has been completed and control measures may be removed.

3.4 FINAL CLEANUP

- .1 Following cleaning specified above, and when air sampling shows that asbestos levels on both sides of seals do not exceed 0.01 fibres/cc as determined by membrane filter

method at 400-500X magnification phase contrast illumination, as described in NIOSH Method 7400 or equivalent, proceed with final cleanup.

- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible asbestos containing particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Include in clean-up Work areas, Equipment and Access Room, Washroom, Shower Room, and other contaminated enclosures.
- .5 Include in clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.
- .6 As work progresses, and to prevent exceeding available storage capacity on site, remove sealed and labelled containers containing asbestos waste and dispose of to authorized disposal area in accordance with requirements of disposal authority. Ensure that each shipment of containers transported to dump is accompanied by Contractor's representative to ensure that dumping is done in accordance with governing regulations.

3.5 AIR MONITORING

- .1 Final air monitoring to be conducted as follows: After Asbestos Work Area has passed visual inspection and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period has passed, Consultant will perform air monitoring within Asbestos Work Area by aggressive methods.
 - .1 Final air monitoring results must show fibre levels of less than 0.01 f/cc.
 - .2 If air monitoring results show fibre levels in excess of 0.01 f/cc, re-clean work area and apply another acceptable coat of lock-down agent to surfaces.
 - .3 Repeat as necessary until fibre levels are less than 0.01 f/cc.
 - .4 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

3.6 INSPECTION

- .1 Perform inspection of Asbestos Work Area to confirm compliance with specification and governing authority requirements. Deviation(s) from these requirements that have not been approved in writing by Consultant may result in Work stoppage, at no cost to Owner.
- .2 Consultant will inspect Work for:
 - .1 Adherence to specific procedures and materials.
 - .2 Final cleanliness and completion.
 - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.
- .3 When asbestos leakage from Asbestos Work Area has occurred or is likely to occur Departmental Representative or Consultant may order Work shutdown.
 - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

END OF SECTION