SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. CSA S350-M 1980 Code of Practice for Safety in Demolition of Structures.

B. NFPA 241 Safeguarding Building Construction and Demolition Operations.

1.3 SUBMITTALS

A. Submit cleaning operation schedule.

B. Submit Shop Drawings for bracing and shoring signed and sealed by a licensed engineer.

C. Submit for review proposed method of substrate preparation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 PREPARATION

A. Disconnect electrical and mechanical systems in areas of selective demolition to rules and regulations of authorities having jurisdiction.

B. Post warning signs on equipment, which will remain in operation in areas of selective demolition.

C. Disconnect and cap mechanical services in accordance with requirements of local authority having jurisdiction or pay for having this work done by local authority.

D. Do not disrupt active or energized utilities in area of selective demolition.

3.2 DEMOLITION

A. Do work in accordance with CSA-S350.

B. Work of this Section is of selective nature. The work includes but not necessarily limited to removal and dismantling of:
   1. Remove concrete or portions of concrete where shown on Drawings.
   2. Remove and store, existing facing Tyndal Stone veneer at following locations.
      a. Where new building attached to an existing building at exterior walls.
      b. Where required to modify opening/s for doors, louvers and/or window at an existing exterior walls.
      c. Where shown on Drawings.
      d. Provide necessary support to keep un-demolished portion of an existing exterior walls intact/s.
   3. Relocate.
   4. Clean.

C. Demolish in manner to minimize dusting. Keep dusty materials wetted.

3.3 EXISTING CONDITIONS

A. Take over existing structure, with selective demolition work based on existing condition at time of examination prior to bidding. Carefully examine existing structure, equipment and conditions.

B. Protect existing to minimize damage to existing.

C. Make good existing finishes disturbed or otherwise damaged during selective demolition, by qualified tradesmen. Match existing materials and finishes.

D. Make good existing materials and finishes disturbed or otherwise damaged by alterations to mechanical and electrical equipment and piping. Match existing materials and finishes.

3.4 PROTECTION

A. Prevent movement, settlement, or damage of existing structure and adjacent structures, walks, paving and parts of existing building to remain in service.

B. Prevent debris from collecting and blocking mechanical and electrical systems, which will remain in operation.

C. Prevent dust from leaving the source and from entering mechanical and electrical system. Maintain water and electrical systems.

D. Where openings are scheduled in existing masonry, remove sufficient existing masonry units for toothing-in of new masonry units.

E. Protect interior of parts and items, which are not to be demolished, from exterior elements at all times.
   1. Maintain water and airtight enclosures.
   2. Provide thermal barrier to match existing exterior thermal barrier.
   3. Protect building service lines from damage.

F. Turn over to the City, dismantled items, which are in good condition, and store at location and as directed by the Contract Administrator.

3.5 CLEANING

A. After selective demolition clean existing substrates to sound, clean surface free from extraneous matter. Use only non-ionic surfactants.

B. Where openings are scheduled in existing masonry, remove sufficient existing masonry units for footing in of new masonry units.

C. Test clean area designated by the Contract Administrator. Use accepted, cleaned area as the standard for the remainder of the cleaning work.

3.6 DISPOSAL OF WASTE

A. Dispose waste off site at location acceptable to authorities having jurisdiction.

B. Remove waste from Site daily. Do not store on Site.

C. Do not use waste as fill.

3.7 CLEANING - MASONRY

A. Preparation
   1. Clean existing masonry to extent shown.
      a. Seal, pack with removable masking, or repair defective jointing and other openings in the work area to minimize water, dust or solvent infiltration of the masonry wall.
   2. Dry brush and if necessary scrape large accumulations of foreign matter from walls, ledges, cornices and the like. Use moderate pressure 345 kPa dry air blasts to remove as much loosely attached soil and dust as possible before commencing main cleaning operations. Exercise care when blasting around decorative material or extremely friable masonry.
   3. Wet the masonry surface soiling by soaking with a low-pressure misting system to swell and loosen soiling.
   4. Use as little water as possible; keep soiling moist. Avoid excessive wetting and soaking of the masonry. Ensure water used does not penetrate the building.
   5. Use nozzles that give a nebulized droplet spray. Maintain a constant nozzle distance from wall face. Vary nozzle pressure to suit cleaning requirements without damaging the masonry surfaces.
   6. Do not use strongly acidic water on carbonate material such as limestone or calcareous sandstones, or masonry bounded with lime mortar.
   7. Establish details of the setup of equipment, incorporate of other related and accepted cleaning methods, and degree of cleaning achieved at the beginning of the job during the test patch operations.
   8. Brush heavily soiled areas with natural bristle or nylon brushes and scrape with wood or plastic tools to loosen deposits and improve the action of the water misting.

9. Employ a final rinse-down with a pressurized water spray when the soiling reaches a state that allows easy removal without over-working of the masonry surface with the gun and without damaging the masonry.
10. Make the cleaned masonry surfaces free of foreign matter and uniform in appearance without streaks or variations caused in the cleaning process.
11. The finish of the masonry after cleaning generally to match the test-cleaned area. If excessive scaling or roughness occurs during cleaning operations, cease operations and notify the Contract Administrator promptly.
12. Ensure that manufacturer's proprietary materials for cleaning are free from materials detrimental to appearance or performance of the masonry facing.
13. At completion of the work, remove masking and protective covers and thoroughly clean the glass surfaces on the exterior of the building.

END OF SECTION

SECTION 02 81 11

ASBESTOS ABATEMENT – TYPE 1

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements and procedures for asbestos abatement of Type 1 (Low Risk) work related to chrysotile asbestos-containing materials of the type describe within.

1.2 REFERENCES

A. Canadian General Standards Board (CGSB).
   1. CAN/CGSB-1.205-2003, Sealer for Application of Asbestos-Fibre Releasing Materials.

B. Department of Justice Canada (Jus).
   1. Canadian Environmental Protection Act, 1999 (CEPA).

C. Health Canada/Workplace Hazardous Materials Information System (WHMIS).
   1. Material Safety Data Sheets (MSDS).

D. The Government of Manitoba, Workplace Safety and Health Division (WSH)
   1. Chapter W210 10/02, The Workplace Safety and Health Act, Manitoba Workplace Safety and Health Act and Regulation, 2015
   2. Guidelines for Working With Asbestos, 2008 (WSH)

E. Transport Canada (TC).
   1. Transportation of Dangerous Goods Act, 1992 (TDGA).

F. Underwriters' Laboratories of Canada (ULC).

1.3 SCOPE OF WORK

A. Refer to Item 1.3 of Section 02 82 13, Asbestos Abatement – Type 3.

B. Section 02 82 11, Asbestos Abatement – Type 1 defines procedures and requirements only for handling non-friable asbestos. Performance of such work is responsibility of each Section required to handle, cut, drill, or remove non-friable asbestos as necessary to perform work of their respective Sections. Such work shall be done in strict accordance with handling requirements specified in Section 02 82 11, Asbestos Removal – Type 1.

C. Demolish and dispose underground sanitary sewer and storm water pipes, which are asbestos containing materials as required to complete the Work. Laws of province of Manitoba shall govern this work.

D. Contractor shall observe all such laws and shall obtain and pay all permits, notices, fees, taxes, duties as may be required. Likewise, it is responsibility of contractor to comply with the *Manitoba Workplace Safety and Health Act and Regulation*.

E. Comply with requirements of this Section when performing following Work:
   1. Removal of Type 1 asbestos-containing materials as required to complete the Work.

F. Approximate locations and quantities are provided in Appendices - 2015 Asbestos Bulk Sampling Report (Pinchin Ltd., July 29, 2015). These values are for information purposes only. Prior to tender, the Contractor shall be solely responsible to obtain and verify quantities and locations on-site and confirm that all known asbestos-containing materials have been included in the lump sum bid.

G. Abate, load, transport and dispose of all known hazardous building materials including asbestos, requiring removal to complete the Work, prior to demolition. The City reserves the right to request modifications to the Contractors Abatement Plan as appropriate to meet minimum expectations of safety.

H. The Contractor shall be responsible for obtaining information regarding the types of materials identified by reviewing and understanding the information provided in the reports and reference drawings, and by reviewing the City Site to confirm and satisfy any assumptions made on the material types and quantities.

I. The Contractor shall include Type 1 asbestos abatement work in the Detailed Abatement Plan as described in Section 02 82 13, Asbestos Abatement – Type 3.

J. Removal of articles remaining in the Facility at commencement of the work is the responsibility of the Contractor.

K. Containment, removal, and disposal of materials on the property at commencement of the work is the responsibility of the Contractor. Measures and procedures for dust suppression, worker protection, and waste collection shall be provided to satisfy requirements of Section 01 35 13 Special Project Procedures and within the Detailed Abatement Plan outlined in item 1.3 F of this Section.

L. Maintain only emergency electrical and mechanical services passing through asbestos work area. All other services must be deactivated during abatement work.

M. Provide heat, water, and power where necessary to perform the work.

N. Provide necessary cranes, lifting devices, scaffolding, elevated work platforms, and safety equipment to adequately complete the work and maintain worker safety. The Contractor shall provide Engineer stamped drawings and approvals for scaffolding and work platforms where required by law and as otherwise specified.

O. All work will be subject to inspection and air monitoring inside and outside asbestos work area by the City's Contract Administrator. Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate complete cleanup of affected areas at no additional cost to the City.

P. Contractor to erect a project health and safety board. Health and safety board to contain contact information, MSDS's, Safety Policy, AHAs, project specifications, project reports, site specific environmental remediation strategy and action plan, etc.

Q. Notify Manitoba Workplace Safety and Health **at least 5 days** prior to beginning abatement work.

R. Ensure all necessary permits for asbestos abatement work, variance, demolition, etc. are posted at the Site prior to start of work.

1.4 DEFINITIONS

A. Refer to Item 1.4 of Section 02 82 13, Asbestos Abatement – Type 3.

1.5 SUBMITTALS

A. Refer to Item 1.5 of Section 02 82 13, Asbestos Abatement – Type 3.

1.6 REGULATIONS

A. Refer to Item 1.6 of Section 02 82 13, Asbestos Abatement – Type 3.

1.7 SUPERVISION

A. Refer to Item 1.7 of Section 02 82 13, Asbestos Abatement – Type 3.

1.8 QUALITY ASSURANCE

A. Refer to Item 1.8 of Section 02 82 13, Asbestos Abatement – Type 3.

1.9 DEFINITIONS

A. HEPA Filter: High Efficiency Particulate Aerosol filter at least 99.97 per cent efficient in collecting 0.3 micrometer aerosol.

B. Non Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure. Includes, but not limited to, following asbestos containing products: vinyl asbestos floor tiles, resilient sheet flooring, acoustic ceiling and wall tiles, gaskets, seals, packings, friction products, drywall joint compounds and asbestos cement panels, shingles and piping.

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

D. Authorized Visitor(s): The City's Third Party Inspector or person(s) representing regulatory agencies, and person(s) authorized by them.

E. Asbestos Work Area(s): Area(s) where work takes place which will, or may, disturb asbestos containing material.

1.10 SUBMITTALS

A. Refer to Item 1.2 of Section 02 82 13, Asbestos Abatement – Type 3.

1.11 REGULATIONS

A. Refer to Item1.6 of Section 02 82 13, Asbestos Abatement – Type 3.

1.12 SUPERVISION

A. Refer to Item1.7 of Section 02 82 13, Asbestos Abatement – Type 3.

1.13 QUALITY ASSURANCE

A. Refer to Item1.8 of Section 02 82 13, Asbestos Abatement – Type 3.

1.14 WORKER AND VISITOR PROTECTION

A. Respirators are not mandatory for work with non-friable asbestos containing materials, however, for this project, provide non-powered air half face respirator with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Provide proper instruction to workers in use of respirators including qualitative and quantitative fit testing. Replace filters as necessary, according to manufacturer's instructions. Workers shall not wear facial hair that affects seal between respirator and face. Contractor to post on job bulletin City instructions, procedures and information pertaining to abatement work.

B. Provide, and insist on using, facilities for washing of hands and face by every worker when leaving asbestos work area. Prohibit smoking, eating and drinking in asbestos work area.

PART 2 PRODUCTS

2.1 MATERIALS

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

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

C. Sprayer: Garden type portable manual sprayer, low velocity, capable of producing mist or fine spray.

D. Gryphlon Sheeting: 0.15 mm (6mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.

E. Tape: Tape suitable for sealing gryphlon to surface encountered under wet conditions using amended water and under dry conditions.

F. Amended Water: Water with non-ionic water wetting agent added.

PART 3 EXECUTION

3.1 PREPARATION

A. Before disturbing non friable asbestos materials except those used as flooring, cover floor and furnishings below work with gryphlon sheeting.

B. Wherever dust on surface within asbestos work area is likely to be disturbed, remove beforehand with HEPA vacuum or damp cloth.

3.2 REMOVAL OF VINYL ASBESTOS TILE

A. Start removal by wedging heavy-duty scraper in seam of two adjoining tiles and gradually forcing edge of 1 tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.

B. When first tile is removed, place it, without breaking into smaller pieces, into asbestos waste receptor.

C. Continue removal of tiles using hand tools and removing tiles intact wherever possible. When adhesive is spread heavily or is quite hard, it may prove easier to force scraper through tightly adhered areas by striking scraper handle with hammer using blows of moderate force while maintaining scraper at 25 to 30 degree angle to floor. When even this technique cannot loosen tile, removal can be simplified by heating tile with hot air gun or infrared heaters until heat penetrates through tile and softens adhesive. Do not use powered electric scrapers.

D. After removal of small area scrape up adhesive remaining on floor with hand scraper until only thin smooth film remains. Where deposits are heavy or difficult to scrape, hot air gun or infrared heaters may be used. Deposit scrapings into asbestos waste receptors. Do not dry scrape surface of adhering pieces of tile.

E. On completion of area, clean floor with HEPA vacuum.

3.3 REMOVAL OF OTHER NON FRIABLE ASBESTOS MATERIALS

A. Where possible wet material to be disturbed.

B. Place drop sheets on ground surfaces within work area and isolate exterior work area using yellow caution tape. Use hand scraping to remove material adhering to substrate.

C. Immediately place removed material in asbestos waste receptor. Clean surrounding surfaces and asbestos work area frequently with HEPA vacuum or with wet methods.

D. Dispose of drop sheets as asbestos waste. Do not reuse.

3.4 INSPECTION

A. Refer to Item 3.13 of Section 02 82 13, Asbestos Abatement – Type 3.

3.5 WASTE TRANSPORT AND DISPOSAL

A. Conform to requirements of national and provincial regulations and guidelines related to the transportation and disposal of hazardous waste.

B. Check with waste disposal facility to determine type of waste containers acceptable.

C. Waste disposal shall be sent to a disposal facility approved by the City.

D. Check with waste disposal facility to determine type of waste containers acceptable.

E. Ensure shipment of containers to waste disposal facility is taken by waste hauler licensed to transport asbestos waste.

F. Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide copies of bill of lading indicating acceptance of waste at waste disposal facility.

G. Co-operate with third party inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the City.

H. Ensure waste disposal facility is fully aware of hazardous material being dumped.

I. Ensure that containers used for disposal are locked and covered at all times.

END OF SECTION

SECTION 02 82 12

ASBESTOS ABATEMENT – TYPE 2

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements and procedures for asbestos abatement of Type 2 (Medium Risk) work related to chrysotile asbestos-containing materials of the type describe within.

1.2 REFERENCES

A. Canadian General Standards Board (CGSB).
   1. CAN/CGSB-1.205-2003, Sealer for Application of Asbestos-Fibre Releasing Materials.

B. Department of Justice Canada (Jus).
   1. Canadian Environmental Protection Act, 1999 (CEPA).

C. Health Canada/Workplace Hazardous Materials Information System (WHMIS).
   1. Material Safety Data Sheets (MSDS).

D. The Government of Manitoba, Workplace Safety and Health Division (WSH)
   1. Chapter W210 10/02, The Workplace Safety and Health Act, Manitoba Workplace Safety and Health Act and Regulation, 2015
   2. Guidelines for Working With Asbestos, 2008 (WSH)

E. Transport Canada (TC).
   1. Transportation of Dangerous Goods Act, 1992 (TDGA).

F. Underwriters' Laboratories of Canada (ULC).

1.3 SCOPE OF WORK

A. Refer to Item 1.3 of Section 02 82 13, Asbestos Abatement – Type 3.

B. Laws of province of Manitoba shall govern this work. Contractor shall observe all such laws and shall obtain and pay all permits, notices, fees, taxes, duties as may be required. Likewise, it is responsibility of contractor to comply with the *Manitoba Workplace Safety and Health Act and Regulation*.

C. Comply with requirements of this Section when performing following Work:
   1. Removal of Type 2 asbestos-containing materials as required to complete the Work.

D. Approximate locations and quantities are provided in Appendices - 2015 Asbestos Bulk Sampling Report (Pinchin Ltd., July 29, 2015). These values are for information purposes only. Prior to tender, the Contractor shall be solely responsible to obtain and verify quantities

and locations on-site and confirm that all known asbestos-containing materials have been included in the lump sum bid.

E. Abate, load, transport and dispose of all known hazardous building materials including asbestos, requiring removal to complete the Work, prior to demolition. The City reserves the right to request modifications to the Contractors Abatement Plan as appropriate to meet minimum expectations of safety.

F. The Contractor shall be responsible for obtaining information regarding the types of materials identified by reviewing and understanding the information provided in the reports and reference drawings, and by reviewing the City Site to confirm and satisfy any assumptions made on the material types and quantities.

G. The Contractor shall include Type 2 asbestos abatement work in the Detailed Abatement Plan as described in Section 02 82 13, Asbestos Abatement – Type 3.

H. Removal of articles remaining in the Facility at commencement of the work is the responsibility of the Contractor.

I. Containment, removal, and disposal of materials on the property at commencement of the work is the responsibility of the Contractor. Measures and procedures for dust suppression, worker protection, and waste collection shall be provided to satisfy requirements of Section 01 35 13, Special Project Procedures and within the Detailed Abatement Plan outlined in item 1.3 F of this Section.

J. Maintain only emergency electrical and mechanical services passing through asbestos work area. All other services must be deactivated during abatement work.

K. Provide heat, water, and power where necessary to perform the work.

L. Provide necessary cranes, lifting devices, scaffolding, elevated work platforms, and safety equipment to adequately complete the work and maintain worker safety. The Contractor shall provide Engineer stamped drawings and approvals for scaffolding and work platforms where required by law and as otherwise specified.

M. All work will be subject to inspection and air monitoring inside and outside asbestos work area by the City or the Contract Administrator. Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate complete cleanup of affected areas at no additional cost to the City.

N. Contractor to erect a project health and safety board. Health and safety board to contain contact information, MSDS's, Safety Policy, AHAs, project specifications, project reports, site specific environmental remediation strategy and action plan, etc.

O. Notify Manitoba Workplace Safety and Health **at least 5 days** prior to beginning abatement work.

P. Ensure all necessary permits for asbestos abatement work, variance, demolition, etc. are posted at the Site prior to start of work.

1.4 DEFINITIONS

A. Refer to Item 1.4 of Section 02 82 13, Asbestos Abatement – Type 3.

1.5 SUBMITTALS

A. Refer to Item 1.5 of Section 02 82 13, Asbestos Abatement – Type 3.

1.6 REGULATIONS

A. Refer to Item 1.6 of Section 02 82 13, Asbestos Abatement – Type 3.

1.7 SUPERVISION

A. Refer to Item 1.7 of Section 02 82 13, Asbestos Abatement – Type 3.

1.8 QUALITY ASSURANCE

A. Refer to Item 1.8 of Section 02 82 13, Asbestos Abatement – Type 3.

1.9 WORKER AND VISITOR PROTECTION

A. Instructions: Before entering asbestos work area(s), instruct workers and visitors in use of respirators, entry and exit from enclosures and all aspects of work procedures and protective measures. Instruction shall be provided by a person who is trained to competently perform this task.

B. Full Face Respirator: During wet removal and cleanup in enclosed asbestos work area workers, supervisors, and authorized visitors shall be supplied with and use powered air-purifying full-face respirator (PAPR) with N-100, R-100 or P-100 filters. Replace filters daily or test according to manufacturer's specifications and replace as indicated. Provide proper instruction to workers and visitors in use of respirators, cleaning, inspection, and storage and ensure all personnel and visitors are fit-tested using qualitative and/or quantitative techniques. Maintain respiratory protection equipment in proper functioning and clean condition. No supervisor, worker or authorized visitor shall wear facial hair which affects seal between respirator and face. Maintain respiratory protection equipment in proper functioning and clean condition, or remove from Site.

C. Protective Clothing: Provide workers and visitors in full-enclosure sites with full body coveralls with integral hoods. Once coveralls are worn in asbestos work area, dispose of as contaminated waste. Workers and visitors shall wear other protective apparel required by regulations, including but not limited to: hard hats, safety shoes, and hearing protection.

D. Before entering enclosure(s) put on respirator with new or tested filters, clean coveralls and head covers. Wear coveralls with hoods up at all times.

E. Workers may leave enclosure, only after all disturbance of asbestos-containing materials is complete and enclosure has been cleaned-up. When leaving enclosure workers and visitors use HEPA vacuum to clean exterior of respirator to remove visible contamination, and remove

gross contamination from coveralls and other protective equipment. Immediately upon leaving enclosure workers and visitors shall remove coveralls and wash face and hands thoroughly with soap and water; wet clean inside of respirator. Remove filters and dispose of or test filters according to manufacturer's specifications. Place coveralls and used filters in receptacles for disposal with other asbestos contaminated materials. Coveralls can be reused, to maximum of 8 hours wear, if coveralls remain inside work area.

F. Do not eat, drink, smoke or chew gum or tobacco except in established locations outside the Asbestos Work Area.

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

H. Compressed air shall not be used to clean up or remove dust from any surface.

PART 2 PRODUCTS

2.1 MATERIALS

A. Polyethylene Sheeting: 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.

B. Rip-Proof Polyethylene: 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.

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

D. Wetting Agent: Non-foaming surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Standard of Acceptance, Asbesto-Wet, distributed by Asbetec Distributors, or approved equal in accordance with B8, with approval from Contract Administrator.

E. Amended Water: Water with wetting agent added.

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

G. 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 5.

H. Sprayer: Garden-type portable manual sprayer, low velocity, capable of producing mist or fine spray.

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

PART 3 EXECUTION

3.1 FULL-ENCLOSURE ASBESTOS WORK AREAS

A. Move equipment, tools, and stored materials which can be moved without disturbing asbestos-containing materials.

B. Remove elements which can be removed without disturbing friable asbestos material.

C. If working from within building, arrange to disable the air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s) as required. Ensure air-handling systems remain disabled for duration of work.

D. Erect wood or metal framing between asbestos work area and remaining building area, as necessary to support polyethylene sheeting enclosures. Free standing enclosure shall have completely sealed polyethylene top.

E. Use sufficient layers to provide adequate protection. Protect floors with at least 1 layer of polyethylene sheeting. Where walls are protected with sheeting, cover floors first so that wall polyethylene overlaps floor layer by at least 300 mm (12 inches).

F. Where applicable clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

G. If enclosure is used for more than 1 shift, construct airlock for entry to and exit from enclosure. Clean enclosure prior to exiting at completion of each shift.

H. Establish negative pressure in asbestos work area as described in Section 02 82 13, Asbestos Abatement – Type 3. Operate negative pressure units or HEPA vacuums continuously from this time until completion of contaminated work.

I. Provide soap, water and towels for washing of worker's face and hands when exiting enclosure.

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

K. Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remainder of building.

3.2 MAINTENANCE OF ENCLOSURES

A. Maintain enclosures in tidy condition.

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

C. Visually inspect enclosures at beginning of each working period.

3.3 COMMENCE ASBESTOS REMOVAL OR CLEANUP WORK WHEN

A. Arrangements have been made for disposal of waste.

B. Asbestos work areas enclosures and parts of building required to remain in use are effectively segregated. Negative pressure equipment is operating continuously.

C. Tools, equipment and materials waste receptors are inside enclosure.

D. Arrangements have been made for work area security.

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

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

F. Proof of notification to MHS has been submitted.

G. The City's Third Party Inspector has been notified of intention to proceed and has reviewed enclosures and equipment.

3.4 ASBESTOS DISTURBANCE IN ENCLOSURE

A. Before commencing work, prepare Site as described in Items 3.1, 3.2 and 3.3.

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

C. Perform work required inside enclosure. Trades personnel may enter enclosure to perform Type 2 operations under the guidance of competent worker.

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

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

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

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

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

3.5 TEAR DOWN OF PROTECTION

A. When dismantling enclosure, carefully roll polyethylene toward centre of enclosure. As polyethylene is rolled away, immediately remove any visible debris with HEPA vacuum.

B. Place polyethylene sheeting seals, tape, cleaning material, coveralls, and other contaminated waste in asbestos waste receptors for transport. Remove any debris fallen behind plastic with HEPA vacuum.

C. Clean-up asbestos waste receptors and equipment used in work, and remove from asbestos work area(s) via drum and equipment decontamination enclosure systems, at appropriate time in sequence. Double bag waste immediately prior to transport from Site to disposal bin.

D. Final review may be carried out by Contract Administrator to ensure no dust or debris remains.

3.6 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

A. When clean-up is complete, reinstall items removed to facilitate asbestos related operation, in their proper positions. Reconstruction and reinstallation shall be by tradesmen qualified in work being reinstalled or reconstructed.

B. For buildings not scheduled for demolition, make good all damage at completion of work.

3.7 AIR MONITORING

A. Refer to Item 3.12 of Section 02 82 13, Asbestos Abatement – Type 3.

3.8 INSPECTION

A. Refer to Item 3.13 of Section 02 82 13, Asbestos Abatement – Type 3.

3.9 WASTE TRANSPORT AND DISPOSAL

A. Conform to requirements of national and provincial regulations and guidelines related to the transportation and disposal of hazardous waste.

B. Check with waste disposal facility to determine type of waste containers acceptable.

C. Waste disposal shall be sent to a disposal facility approved by the City.

D. Check with waste disposal facility to determine type of waste containers acceptable.

E. Ensure shipment of containers to waste disposal facility is taken by waste hauler licensed to transport asbestos waste.

F. Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide copies of bill of lading indicating acceptance of waste at waste disposal facility.

G. Co-operate with third party inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the City.

H. Ensure waste disposal facility is fully aware of hazardous material being dumped.

I. Ensure that containers used for disposal are locked and covered at all times.

END OF SECTION

SECTION 02 82 13

ASBESTOS ABATEMENT – TYPE 3

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements and procedures for asbestos abatement of Type 3 (High Risk) work related to chrysotile asbestos-containing materials of the type describe within.

1.2 REFERENCES

A. Canadian General Standards Board (CGSB).
   1. CAN/CGSB-1.205-2003, Sealer for Application of Asbestos-Fibre Releasing Materials.

B. Department of Justice Canada (Jus).
   1. Canadian Environmental Protection Act, 1999 (CEPA).

C. Health Canada/Workplace Hazardous Materials Information System (WHMIS).
   1. Material Safety Data Sheets (MSDS).

D. The Government of Manitoba, Workplace Safety and Health Division (WSH)
   1. Chapter W210 10/02, The Workplace Safety and Health Act, Manitoba Workplace Safety and Health Act and Regulation, 2015
   2. Guidelines for Working With Asbestos, 2008 (WSH)

E. Transport Canada (TC).
   1. Transportation of Dangerous Goods Act, 1992 (TDGA).

F. Underwriters' Laboratories of Canada (ULC).

1.3 SCOPE OF WORK

A. Laws of province of Manitoba shall govern this work. Contractor shall observe all such laws and shall obtain and pay all permits, notices, fees, taxes, duties as may be required. Likewise, it is responsibility of contractor to comply with the *Manitoba Workplace Safety and Health Act and Regulation*.

B. Comply with requirements of this Section when performing following Work:
   1. Removal of Type 3 asbestos-containing materials as required to complete the Work.

C. Approximate locations and quantities are provided in Appendices - 2015 Asbestos Bulk Sampling Report (Pinchin Ltd., July 29, 2015). These values are for information purposes only. Prior to tender, the Contractor shall be solely responsible to obtain and verify quantities and locations on-site and confirm that all known asbestos-containing materials have been included in the lump sum bid.

D. Abate, load, transport and dispose of all known hazardous building materials including asbestos, requiring removal to complete the Work, prior to demolition. The City reserves the right to request modifications to the Contractors Abatement Plan as appropriate to meet minimum expectations of safety.

E. The Contractor shall be responsible for obtaining information regarding the types of materials identified by reviewing and understanding the information provided in the reports and reference drawings, and by reviewing the City Site to confirm and satisfy any assumptions made on the material types and quantities.

F. Asbestos-containing materials and other designated substances that may be present in areas deemed inaccessible shall be included as a unit price in the Base Bid – Provisional Items to include abatement, loading, transporting and disposing of which will be quantified and paid for by the City for additional asbestos-containing materials or other Designated Substances identified after Third Party Inspector quantification and certification.

G. The Contractor shall provide a Detailed Abatement Plan that outlines a site and building specific environmental remediation strategy, ensuring all potential hazards and building related environmental impacts are considered during the abatement process. The Detailed Abatement Plan shall include the following:

Abatement Plan Type	**Deliverable Requirement**	**Abatement Plan Requirements**
Detailed Abatement Plan	Issue two weeks after award of work. No document size limit. Provide a table of contents and clearly identify sections by using section dividers	1) In addition to the requirements listed in the accepted Preliminary Abatement Plan listed above, provide additional details related to the proposed abatement methods and procedures. Include drawings and other supporting documents to further define isolation boundaries, equipment work paths, decontamination areas, and overall site operation over the course of the project.
		2) Provide Activity Hazard Analysis (AHA) forms for all abatement work types, including but not limited to: heat stress, cold weather work, confined space entry, aerial lift operation, hot work, cutting, torching, grinding, large equipment use, waste handling, and other varied measures and procedures.

Abatement Plan Type	Deliverable Requirement	Abatement Plan Requirements
		3) Outline an Emergency Response Plan which shall include all steps to follow in case of an emergency on the removal sites. The plan shall include the way to access, emergency decontaminate, and evacuate the site.
		4) Inspection, monitoring and sampling protocols will be designed by the Contract Administrator based on the Preliminary Abatement Plan and will be implemented into the final Abatement Plan upon approval by the Contract Administrator.
		5) The Detailed Abatement Plan will be reviewed by the City, Contract Administrator and the City's Third Party Inspector. and is subject to review by other Stakeholders. No application for extra funds will be entertained by the City for additional costs incurred as associated with plan reviews, plan changes, meetings, revisions, and addition inspection provisions and requirements.

H. Removal of articles remaining in the Facility at commencement of the work is the responsibility of the Contractor.

I. Containment, removal, and disposal of materials on the property at commencement of the work is the responsibility of the Contractor. Measures and procedures for dust suppression, worker protection, and waste collection shall be provided to satisfy requirements of Section 01 35 13 Special Project Procedures and within the Detailed Abatement Plan outlined in item 1.3 F of this Section.

J. Maintain only emergency electrical and mechanical services passing through asbestos work area. All other services must be deactivated during abatement work.

K. Provide heat, water, and power where necessary to perform the work.

L. Provide necessary cranes, lifting devices, scaffolding, elevated work platforms, and safety equipment to adequately complete the work and maintain worker safety. The Contractor shall provide Engineer stamped drawings and approvals for scaffolding and work platforms where required by law and as otherwise specified.

M. All work will be subject to inspection and air monitoring inside and outside asbestos work area by the City's Contract Administrator. Any contamination of surrounding areas, indicated

by visual inspection or air monitoring, shall necessitate complete cleanup of affected areas at no additional cost to the City.

N. Contractor to erect a project health and safety board. Health and safety board to contain contact information, MSDS's, Safety Policy, AHAs, project specifications, project reports, site specific environmental remediation strategy and action plan, etc.

O. Notify Manitoba Workplace Safety and Health at least 5 days prior to beginning abatement work.

P. Ensure all necessary permits for asbestos abatement work, variance, demolition, etc. are posted at the Site prior to start of work.

1.4 DEFINITIONS

A. Air Lock: Temporary chamber sealed with polyethylene sheeting; curtained doorways constructed at either end with a minimum of 6 feet (2.0 metres) separation; minimum width is 36 inches (900 mm).

B. Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

C. Asbestos-Containing Materials (ACMs):
   1. a friable material containing 0.1% or greater asbestos, including fallen materials and settled dust.
   2. a non-friable material containing 1.0% or greater asbestos, including fallen materials and settled dust.

D. Asbestos Waste Container: An impermeable container acceptable to the waste disposal facility and regulations. New Materials Only. Labelled as required. Comprised of one of the following:
   1. A 6 mil (0.15 mm) sealed polyethylene bag, inside a second 6 mil (0.15 mm) sealed polyethylene bag.
   2. A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation and disposal.
   3. A sealed Glove Bag, inside a 6 mil (0.15 mm) sealed polyethylene bag.
   4. A sealed Glove Bag, inside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation, and disposal.

E. Asbestos Work Area: Area where work takes place, which will, or may, disturb ACM.

F. Authorized Visitors: The City, Contract Administrator or the City's Third Party Inspector and persons representing regulatory agencies.

G. 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 long 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.

H. DOP Test: A testing method used to determine the integrity of the Negative Pressure unit using dioctyl phthalate (DOP) HEPA filter leak test.

I. Fitting: Any elbow, valve, tee, reduction, etc. that is present on a pipe system.

J. Flexible Ducting: Tubing with metal reinforcement or approved equal in accordance with B8; diameter to equal negative air discharge.

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

L. 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.

M. Mechanical Systems: Components that make up a building's plumbing, heating, ventilation, or process systems including but not limited to piping, fittings, vessels, pumps, tanks, ducts, air-handling units, processing equipment, etc.

N. Milestone Inspection: Inspection of the Asbestos Work Area at defined point in the removal operation.

O. 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. .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 negative air pressure device to continuously monitor and automatically record pressure differences.

P. Negative Pressure Device: Contractor to supply and install electronic Negative Pressure Recorder complete with digital print out for precise real time monitoring of negative pressure levels. Standard of acceptance – Omniguard III by Engineering Solutions Inc., approved equal in accordance with B8.

Q. Occupied Area: Any area of the building outside the Asbestos Work Area.

R. Personnel: All Contractors' employees, subcontractors employees, supervisors, and authorized visitors.

S. Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting of 0.15 mm (6 mil) minimum thickness with tape along edges around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by lock-down agents, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.

T. Type 1 Work: as described in WSH Guideline for Working with Asbestos.

U. Type 2 Work: as described in WSH Guideline for Working with Asbestos.

V. Type 3 Work: as described in WSH Guideline for Working with Asbestos.

1.5 SUBMITTALS

A. Prior to Commencing Work:
   1. Site-Specific Health and Safety Plan for the removal of all Hazardous Materials from the Facility.
   2. Preliminary and Detailed Abatement Plan
   3. Submit proof of Contractor's Asbestos Liability Insurance.
   4. Names and credentials of the:
      a. Overall Asbestos Abatement Superintendent.
      b. Shift Superintendents.
      c. Workers.
   5. Submit proof satisfactory to Asbestos Abatement Monitoring & Inspection Agent that employees have had instruction on hazards of asbestos exposure, respirator use, dress, entry and exit from Asbestos Work Area, and aspects of work procedures and protective measures.
   6. Submit proof that supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Asbestos Abatement & Inspection Agent. Minimum of one supervisor for every ten workers. Worker’s Compensation Board status and transcription of insurance.
   7. Documentation including test results, fire and flammability data, and Material Safety Data Sheets for chemicals or material used in the course of the project including but not limited to:
      a. Sealing Agent (Encapsulant).
      b. Wetting Agent.
      c. Lock-down agent.
      d. Rip-proof polyethylene.
      e. Other chemicals or materials proposed for use in the course of the asbestos abatement project.
   8. Submit Provincial and/or local requirements for Notice of Project Form.
   9. Proposed schedule for each phase of the work providing the following for each separate Asbestos Work Area:
      a. Duration of abatement work in each Asbestos Work Area.
      b. Proposed average daily work force.
      c. Milestone inspection dates.
   10. Submit proof satisfactory to Asbestos Abatement Monitoring & Inspection Agent that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

1.6 REGULATIONS

A. Comply with Federal, Provincial and local requirements including “Manitoba Guidelines for Working With Asbestos.”

B. The Worker's Compensation Act, Safety Regulations Governing Building, Construction and Demolition.

C. Workplace Health and Safety Act, (most recent edition).

D. Contractor shall ensure that:
   1. Measures and procedures prescribed under the Workplace Health and Safety Act are carried out.
   2. Every employee and every worker on project complies with applicable act and regulations.
   3. Health & safety of workers and public is protected.
   4. All material handling and associated equipment conform to and are operated in accordance with "Workplace Hazardous Materials Information System" (WHMIS).
   5. Advise the City whenever work is expected to be hazardous to employees and/or public.
   6. Contractor may be requested to provide information on their health & safety record.

1.7 SUPERVISION

A. Provide onsite, an Overall Asbestos Superintendent, with authority to oversee all aspects of the work, including but not limited to, estimating and negotiation of changes to the contract, update of submission requirements, scheduling, manpower and equipment requirements, and direct communication and coordination with the City, the Contract Administrator, or the City’s Third Party Inspector.

B. Provide onsite, in addition to the Overall Asbestos Superintendent, and for each work shift, a Shift Superintendent who has authority regarding all aspects related to manpower, equipment, and production.

C. Supervisory personnel must hold a recognized certificate proving attendance at an asbestos removal training course (two-day minimum duration) acceptable to the City and have supervised a minimum of five other asbestos abatement/demolition projects in similar size and/or complexity.

D. The Overall Asbestos Superintendent or the Shift Superintendent must be on site at all times during work that is at risk of disturbing ACM. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the City.

E. Replace supervisory personnel with approved replacements within three working days of a written request from the City. The City reserves the right to request replacement of supervisory personnel without explanation.

F. Asbestos Abatement Contractor cannot replace supervisory personnel without written approval from the City.

1.8 QUALITY ASSURANCE

A. Ensure work proceeds to schedule, and meets all requirements of this Section. Perform work so that airborne asbestos, asbestos waste, or water runoff do not contaminate areas outside the asbestos work area. The Contract Administrator or Third Party Inspector is empowered to order a shutdown of work when a leak or breech of isolation has occurred or is likely to occur.

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

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

D. All work of this section involving electrical, mechanical, carpentry, glazing, etc. shall be performed by licensed persons experienced and qualified for the work required.

E. The City, Contract Administrator, or Third Party Inspector will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The City, Contract Administrator or Third Party Inspector will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, their Subcontractors or their agents, employees, or other persons performing any of the work.

1.9 WORKER AND VISITOR PROTECTION

A. Instructions: Before entering asbestos work area, instruct workers and visitors in use of respirators, dress, showers, entry and exit from asbestos work areas, and all aspects of work procedures and protective measures. Instruction shall also include training in hazards of asbestos exposure and be provided by a person who is trained to competently perform this task.

B. Full Face Respirator: During wet removal and cleanup in enclosed asbestos work area workers, supervisors, and authorized visitors shall be supplied with and use powered air-purifying full-face respirator (PAPR) with N-100, R-100 or P-100 filters. Replace filters daily or test according to manufacturer's specifications and replace as indicated. Provide proper instruction to workers and visitors in use of respirators, cleaning, inspection, and storage and ensure all personnel and visitors are fit-tested using qualitative and/or quantitative techniques. Maintain respiratory protection equipment in proper functioning and clean condition.

C. Protective Clothing: Provide workers and visitors in full-enclosure sites with full body coveralls with integral hoods. Once coveralls are worn in asbestos work area, dispose of as contaminated waste. Workers and visitors shall wear other protective apparel required by regulations, including but not limited to: hard hats, safety shoes, and hearing protection.

D. Before entering asbestos work area(s) remove street clothes in clean change room and put on respirator with new or tested filters, clean coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.

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

F. Following showering, proceed to clean change room, dry off and dress in street clothes. Store respirators in fashion to allow them to be put on prior to entering asbestos work area at start of next shift without contaminating clean area. If re-entry to asbestos work area is to take place after having left for eating or drinking, follow procedures in item 1.9 D.

G. Removal of waste and equipment from holding room of waste decontamination enclosure system shall be performed by workers entering from outside. These workers shall wear clean coveralls and half-face, asbestos approved, respirator as specified in item 1.9 B and 1.9 C. No worker shall use this system as means to leave or enter asbestos work area.

H. Do not eat, drink, smoke or chew gum or tobacco except in established locations outside the Asbestos Work Area.

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

J. Compressed air shall not be used to clean up or remove dust from any surface.

PART 2 PRODUCTS

2.1 MATERIALS

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

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

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

D. Wetting Agent: Non-foaming surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Standard of Acceptance, Asbesto-Wet, distributed by Asbetec Distributors, approved equal in accordance with B8.

E. Amended Water: Water with wetting agent added.

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

G. 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 5.

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

I. Protective Coveralls: Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material Tyvek by Dupont or nonwoven material Kleenguard by

J. Encapsulant: Serpiflex Shield or approved equal in accordance with B8 upon approval from Contract Administrator.

PART 3 EXECUTION

3.1 PREPARATION

A. Full-enclosure Asbestos Work Area(s):
   1. The Contractor is responsible to move all equipment, tools, furnishings, and stored materials without disturbing asbestos-containing materials.
   2. Deactivate air handling and ventilation systems supplying or exhausting from asbestos work area(s). Schedule this shut-down with Contract Administrator and the City.
   3. All wall and horizontal surfaces not scheduled for demolition and removal shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.
   4. If necessary, caulk and seal ducts and duct shafts to remain in service as required, to make airtight. Cut and cap supply ducts with rigid sheet metal caps and seal. Perform work at appropriate time under contaminated conditions if necessary.
   5. Seal off openings such as doorways, windows, vents, service holes in walls and grilles to non-operating ducts with polyethylene sheeting with tape or with polyurethane foam as appropriate.
   6. Cover wall and floor surfaces not scheduled for demolition and removal with polyethylene sheeting sealed with tape. Provide two separately sealed layers of reinforced polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (two) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12 inches) up walls then cover walls to overlap floor sheeting. Provide additional protection for floors likely to be damaged by amended water, by covering floor with rip-proof polyethylene sheeting sealed with tape.

7. Cover with polyethylene sheeting, motors, heating units, fire apparatus, door closers, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings which are not being removed from asbestos work area and which could be damaged and/or which cannot be readily cleaned at completion of this work. Pre-clean surfaces potentially contaminated with asbestos, with HEPA vacuum or damp cloth prior to installing protection.
8. Install plywood enclosures, covered with rip-proof polyethylene sheeting to protect equipment or fixtures scheduled to be salvaged in asbestos work area(s) that may be damaged.
9. Establish negative pressure in asbestos work areas in buildings not scheduled for demolition and removal. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area. Vent units to outside of building by removing, and later replacing, windows, and/or providing flexible ducting. Locate vents to discharge air away from building access points or sidewalks. Do not discharge air into building interior. Leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment. Venting of exhaust air through occupied area shall be in rigid airtight ductwork. Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascal (-0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.
10. Negative pressure to be measured with a device at regular intervals. Measurements to be posted on health and safety board on a daily basis.
11. Where required, remove and replace windows for the exhausting of negative air units for each Type 3 work area.
12. Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
13. Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Provide ground fault electrical system where application of amended water is required for wetting asbestos-containing materials. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
14. Provide temporary lighting in asbestos work area to levels that will permit work to be done safely and well.
15. Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use.

3.2 WORKERS' DECONTAMINATION ENCLOSURE SYSTEM

A. Construct workers' decontamination enclosure at entrance to each asbestos work area. Worker decontamination enclosure system shall comprise three interconnecting rooms as listed in items 3.2 B, 3.2 C, and 3.2 D. Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.

B. Equipment and Access Room: Build room between shower room and asbestos work area. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be reworn in asbestos work areas. Equipment and access room shall be large enough to

accommodate specified facilities, and other equipment needed, and at least one worker allowing sufficient space to undress comfortably. Minimum size 3 square metres (30 sq. ft.).

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

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

3.3 WASTE AND EQUIPMENT DECONTAMINATION ENCLOSURE SYSTEM

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

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

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

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

3.4 CONSTRUCTION OF DECONTAMINATION ENCLOSURES

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

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

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

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

3.5 MAINTENANCE OF ENCLOSURES

A. Maintain enclosures in tidy condition.

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

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

3.6 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL

A. Arrangements have been made for disposal of waste.

B. Asbestos work areas and decontamination enclosures are effectively segregated. Negative pressure equipment is operating continuously.

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

D. Arrangements have been made with the City's Third Party Inspector for work area security.

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

CAUTION

Asbestos Hazard Area

No Unauthorized Entry

Wear assigned protective equipment

Breathing asbestos dust may cause serious bodily harm.

F. Proof of notification to MHS has been submitted.

G. The City's Third Party Inspector has been notified of intention to proceed and has reviewed enclosures, equipment and procedures.

3.7 CONTAMINATED PREPARATION FOR FULL-ENCLOSURE ASBESTOS WORK AREA

A. Before performing any contaminated work, prepare Site as described in item 3.1, 3.2, 3.3, 3.4, 3.5, and 3.6.

B. Where required, using full protective procedures including amended water and HEPA vacuum, install upper seals as necessary to allow polyethylene sheeting to be fastened to structure. Each of two sheets forming wall of enclosure shall be fastened separately to deck using tape, spray adhesive, rapid setting foam or other suitable method. Provide suitable framing to support polyethylene sheeting. Seal holes in existing perimeter walls, columns, deck etc., to ensure an airtight asbestos work area.

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

D. Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene sheeting. Seal joints and holes in un-insulated HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene sheeting.

3.8 REMOVAL

A. In areas of wet removal of spray or trowel applied material, spray asbestos with amended water using airless spray equipment. Saturate asbestos to substrate to prevent release of airborne fibres during removal. Fully saturated asbestos may be scraped directly into waste containers or may be allowed to fall to floor.

B. Remove, under contaminated conditions, bulkheads and non-load bearing walls necessary to allow complete removal of friable asbestos. Remove all or parts of walls sufficiently to remove asbestos within wall or enclosure.

C. Any replacement of blocks, bricks or other masonry removed to allow access to asbestos shall be replaced by the Contractor. Clean and seal seams and openings in surface of ducts prior to disposal.

D. Remove asbestos-containing pipe and fitting insulation in layers, while maintaining all exposed surfaces of insulation or lagging in wet condition. Full saturation of insulation will not be required if material is immediately bagged and not allowed to fall to floor.

E. Seal ends of pipe and duct insulation at perimeters of asbestos work area with heavy coat of high temperature sealer.

F. Place asbestos waste in asbestos waste receptors. If drums are used for waste disposal, drums shall be sealed and cleaned in waste decontamination enclosures. If double plastic bags are used, inner bag shall be cleaned of gross contamination and placed in a clean 6 mil outer plastic bag in container cleaning room immediately prior to transfer from Site.

G. Treat all materials removed to expose asbestos, as asbestos-contaminated waste unless such materials are specified to be reused.

3.9 CLEAN-UP

A. Clean surfaces with brushes and vacuum or wet-sponge to remove visible dust and debris.

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

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

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

3.10 DISMANTLING OF PROTECTION

A. Following cleaning specified in 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 94-113 approved equal in accordance with B8, proceed with final cleanup.

B. Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear half face piece respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.

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

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

E. Clean asbestos work area(s), equipment and access area, washing/showering room, and other enclosures that may have been contaminated during work.

F. Clean asbestos waste receptors and equipment used in work and remove from asbestos work area(s) via drum and equipment decontamination enclosure system, at an appropriate time in sequence.

G. Remove hoardings, temporary lighting, equipment and facilities provided for work. A final review may be carried out by the City’s Third Party Inspector to ensure that no dust or debris

remains. Asbestos abatement contractor responsible for inspecting and cleaning all adjacent spaces to the asbestos abatement work area. Adjacent work areas to be left free of construction related dust and debris.

3.11 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

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

B. For buildings not scheduled for demolition, make good all damage at completion of work.

3.12 AIR MONITORING

A. The City's Third Party Inspector will arrange for air samples to be taken from commencement of work until completion of cleaning operations, both inside and outside of asbestos work area(s) enclosures in accordance with NIOSH methods.

B. Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the NIOSH method 7400.

C. Co-operate with the Asbestos Abatement Contractor in collection of air samples, including providing workers to wear sampling pumps for up to full-shift periods. Asbestos Abatement Contractors forces must exercise care with Asbestos Abatement Contractor's equipment. The City reserves the right to back charge the Contractor for re-sampling of samples damaged by tampering or abuse. In addition, the Contractor will be responsible for the cost of testing equipment repairs resulting from the actions of the Contractor's forces.

D. If air monitoring or visual inspection shows that areas outside current asbestos work area(s) enclosure or decontamination facilities are contaminated above 0.01 fibre/cc., clean these areas in same manner as that applicable to asbestos work areas, at no cost to the City. The area will be considered contaminated until visually inspected and air monitoring results are less than 0.01 fibres/cc.

E. If air monitoring in work areas shows airborne fibre levels exceed normal levels for wet removal, workers shall use positive pressure supplied air respirators with full-face piece.

F. If final air sampling by the City's Contract Administrator shows that levels in completed asbestos work area do not exceed 0.01 fibres/cc. as determined by NIOSH 7400 Method - "A" counting rules, proceed with dismantling of enclosures.

G. Clearance level is < 0.01 f/cc. Clearance sampling will only be conducted in structures scheduled to remain in place or as directed by the City.

3.13 INSPECTION

A. From commencement of work until completion of clean-up operations, the City's Third Party Inspector will be present on a part-time basis.

B. Be fully responsible for coordination of all Work.

C. Provide access to the Inspector to carry out necessary reviews/inspections
   1. After the abatement work has been completed, the work shall be inspected by a City's Inspector. Any discrepancies found shall be reported in writing. Contractor shall rectify discrepancies identified before proceeding.

D. The following Milestone Inspections will take place at Contractor's cost:
   1. Milestone Inspection A – Clean Site Preparation: Inspection of preparations and set-up prior to contaminated work in the Asbestos Work Area.
   2. Milestone Inspection B – Contaminated Perimeter Preparation: Inspection of preparations at perimeter of Asbestos Work Area.
   3. Milestone Inspection C – Before Bulk Removal: Inspection of Asbestos Work Area prior to start of major ACM removal.
   4. Milestone Inspection D – Visual Clearance: Inspection of Asbestos Work Area after removal of all asbestos but prior to application of lock-down agent.
   5. Milestone Inspection E – Air Monitoring Clearance: Inspection and air monitoring after the application of lock-down agent but prior to removal of polyethylene from within the Asbestos Work Area.
   6. Milestone Inspection F – Dismantling Inspection: Inspection after removal of polyethylene prior to dismantling perimeter seal and decontamination facility.

E. In addition to the Milestone Inspections, inspection of the Asbestos Work Area will be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the specification and governing authorities. Any deviations from these requirements, which have not been approved in writing, may result in a stoppage of work, at no additional cost to the City.

F. The Asbestos Abatement Contractor is empowered by the City to inspect adherence to specified procedures and materials, and to inspect for final cleanliness and completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified should be at no additional cost.

G. If the Asbestos Work Area is found unacceptable by the standards specified or required by governing authorities, the work required to meet the standards and obtain consent to proceed from the Asbestos Abatement Contractor, shall be performed at no additional cost to the City.

H. The Asbestos Abatement Contractor is empowered by the City to order a shutdown of work when a leakage of asbestos from the controlled Asbestos Work Area has occurred or is likely to occur. These conditions include, but are not limited to, failure of negative pressure systems, inadequate wetting, failure of the perimeter enclosure, water leaks, etc. Additional labour or materials to rectify these or other unsatisfactory conditions shall be at no cost to the City.

I. Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

J. Inspection and air monitoring performed as a result of Asbestos Abatement Contractor's failure to perform satisfactorily regarding quality, safety, or schedule shall be back-charged to the Contractor.

3.14 WASTE TRANSPORT AND DISPOSAL

A. Conform to requirements of national and provincial regulations and guidelines related to the transportation and disposal of hazardous waste.

B. Check with waste disposal facility to determine type of waste containers acceptable.

C. Waste disposal shall be sent to a City approved disposal facility.

D. Ensure shipment of containers to dump is taken by waste hauler licensed to transport asbestos waste.

E. Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide copies of bill of lading indicating acceptance of waste at waste disposal facility.

F. Co-operate with provincial inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the City.

G. Ensure waste disposal facility is fully aware of hazardous material being disposed.

H. Ensure that containers used for disposal are locked and covered at all times.

END OF SECTION