

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 01013 - SUMMARY OF THE WORK - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Job Site Notices and Permits

Equal Employment Opportunity
Material Safety Data Sheets for Encapsulant, Glues, Etc.
U.S. EPA 10 Day Notification
State of Delaware DNREC 10 Day Notification
Prevailing Wage Determination
Emergency Planning Procedures

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project name is: Asbestos Abatement / Decontamination at Old Laurel Middle School

**1. Project Location: Old Laurel Middle School,
801 S. Central Ave.,
Laurel, DE 19956**

2. Owner: Laurel School District, 1160 S. Central Ave.,
Laurel, Delaware 19956

B. Contract Documents, dated September 25, 2015, were prepared for the Project by Batta Environmental Associates, Inc., Delaware Industrial Park, 6 Garfield Way, Newark, Delaware 19713-5817. Conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

1. Asbestos Abatement / Decontamination at Old Laurel Middle School - Specification BEA # 741214

2. Any addenda to the Specification.

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- C. Work to be Performed Prior to Work Under this Contract:** The building owner will remove all removable property prior to use by the Contractor. All HVAC systems must be shut down in the work area where abatement will occur prior to initiating the abatement phase. All electric sources near/in containments will be disconnected/tagged/locked out.
- D. Work to be Performed Subsequent to Work Under This Contract:** Upon completion of asbestos removal and subsequent decontamination of the affected areas, asbestos contractor will ensure the areas are clear of any project equipment and will repair any damage incurred during the abatement process.
- E. The Work** (in support of planned demolition) consists of:
- Removal of asbestos containing
 - Built-up Roofing
 - Mechanical Roof Flashings
 - Terra Cotta Roof Cap Caulk
 - Building Caulk
 - Window / Louver Caulk
 - Window Glazing Putty
 - Light Heat Shields
 - Vibration Dampers
 - Pipe Insulation and Fittings
 - Chalk / Cork / Acoustic Mastics
 - Sink Caulk
 - Sink Undercoating
 - Floor Tiles
 - Floor Tile Mastic

Removal locations are shown on Contract Documents prepared by the Owner's Representative, Batta Environmental Associates, Inc., Specifications and Drawings dated September 25, 2015.

- F. The Work** will be constructed under a single prime contract (note: re-installation is not part of this contract).
- G. Work will not begin until a certified Project Monitor is on site. The Project Monitor must be on site at all times during asbestos abatement related activities. The contractor may not begin or continue work without a representative from a certified professional services firm present.**

H. REMOVAL PROCEDURES

1. Roofing Materials , Exterior Caulks, and Window Glazing Putty

NOTE: The following work involves work on the roof and exterior of the building. During roof and exterior related work the abatement Contractor will follow all current OSHA regulations when working at heights and near the roofs edge. **During the performance of exterior and roofing work on low-pitched roofs with a ground to eave height greater than 6 feet, workers engaged in such work shall be protected from falling from all unprotected sides and edges of the roof as follows:**

ROOF EDGE MATERIALS HANDLING AREAS AND MATERIALS STORAGE.

Workers working in a roof edge materials handling or materials storage area located on a low-pitched roof with a ground to eave height greater than 6 feet shall be protected from falling by the use of an Motion-stopping-safety (MSS) system along all unprotected roof sides and edges of the area, or other OSHA approved methods.

(i) When guardrails are used at hoisting areas, a minimum of four feet of guardrail shall be erected on each side of the access point through which materials are hoisted.

(ii) A chain or gate shall be placed across the opening between the guardrail section when hoisting operation are not taking place.

(iii) When guardrails are used at bitumen pipe outlets, a minimum of four feet of guardrail shall be erected on each side of the pipe.

(iv) When safety belt systems are used, they shall not be attached to the hoist.

(v) When safety belt systems are used they shall be rigged to allow the movement of workers only as far as the roof edge.

(vi) Materials may not be stored within six feet of the roof edge unless guardrails are erected at the roof edge.

(vii) Materials which are piled, grouped, or stacked shall be stable and self-supporting.

TRAINING

(i) The employer shall provide a training program for all employees engaged in roofing work so that they are able to recognize and deal with the hazards of falling associated with working near a roof perimeter. The employees shall also be trained in the safety procedures to be followed in order to prevent such falls.

(ii) The employer shall assure that employees engaged in roofing work have been trained and instructed in the following areas:

(a) The nature of fall hazards in the work area near a roof edge;

(b) The function, use, and operation of the MSS or other system used, and the safety monitoring systems to be used;

(c) The correct procedures for erecting, maintaining and disassembling the systems to be used;

(d) The role of each employee in the safety monitoring system when each system is used;

(e) The limitations on the use of mechanical equipment; and

(f) The correct procedures for the handling and storage of equipment and materials.

(iii) Training shall be provided for each newly hired employee, and for all other employees maintain proficiency in the areas listed above.

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- a) Install a **REMOTE three stage decon**, equipped with **shower** at either a **secure and central location** in the building, in a mobile vehicle that can be relocated to be convenient to all the various removal locations, or in a secure and weatherized exterior structure able to be relocated to be convenient to all the various removal locations. Reference section **01563** for specific requirements for **decontamination units**.
- b) **Regulate** the **exterior work areas** with **red danger - asbestos barrier tape** and **asbestos hazard signs** where removal of asbestos containing materials will take place. **Perimeter of regulated area** shall be at least **10 feet** out from the location of the removal in all directions. Install **6 mil polyethylene drop cloths that extend out the same distance as the height of the work, and a minimum of at least 10 feet, from the removal in all directions. For any operations utilizing high pressure water or large volumes of water as part of the removal process, all work areas shall have dyked catchments (in addition to the drop cloths) that are sufficient in construction to capture the water and retain it for filtering / disposal, not allowing it to overflow onto the ground.**
- c) For **roofing removal** along **perimeter** of roof, **regulate ground area** along regulated roof area with **red danger - asbestos barrier tape** and **asbestos hazard signs** and **6 mil polyethylene drop cloths** that extends outward the equivalent distance as the height of the work, with a minimum of at least **10 feet** out from removal, in all directions.
- d) Once the **work area** is **properly regulated**, and has been **inspected** and **approved** by the owner's representative, then **removal** may **begin**.
- e) The contractor shall follow **proper removal procedures** at all times. All asbestos containing materials shall be **continually wetted** with **amended water** during removal procedures. **Dry removal of asbestos will not be permitted.** High Pressure water may be utilized in the removal of caulks, but containment of the splash back and excess water must be achieved. Contaminated water may be used to wet materials in waste bags or filtered the same as shower water and disposed of.
- f) All asbestos **caulk and small roofing** debris shall be regularly **cleaned** up and **stored** in **industry standard waste bags, drums**, or other appropriate containers with **NESHAP labels** affixed to them. All **asbestos caulk waste** shall be **double bagged** with a **clear transparent bag** on the **outside** and a regular **black bag** on the **inside** for verification of double bagging. All **ACM waste** will be **bagged out** at the **end** of **each workday** and **stored** in a **lockable container**.
- g) Windows with ACM Glazing Putty May be removed whole and bagged or wrapped with 6 mil polyethylene for disposal.

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- h) Asbestos **roofing** debris may either be **bagged** as mentioned above or **deposited** into a lined (single layer of 6 mil or greater poly sheeting) **open top dumpster** through the use of a **chute**. If a chute is used then **ample amended water** shall be sprayed at the **outlet** of the **chute** throughout the work shift. The area around the dumpster shall be regulated with **red danger - asbestos barrier tape** and **asbestos hazard signs** at least **10 feet** out from the dumpster on all sides. **Asbestos hazard signs** shall be posted on all **four sides** of the dumpster and the dumpster shall be **covered** with a **secure tarp** at the end of each and every shift. The materials should be thoroughly wetted and maintained in a wet condition, and rewetted prior to removal of the dumpster from site for disposal. If a chute is used, it shall be cleaned and decontaminated following use prior to taking it down, or disposed of as asbestos contaminated waste.
- i) Remove **caulks** and **roofing materials** from surfaces until **no visible debris** remains. **Respiratory protection** for **removal** of caulks and roofing materials shall be **Full Face PAPR Respiratory Protection with HEPA filtration**.
- j) After complete **removal** and **final cleaning** of all **asbestos containing materials** throughout each work area, the **owner's representative** and **contractor's supervisor** will **inspect** the work area. Once the **work area passes a visual inspection** and contains **no visible asbestos debris**, then **lock-down encapsulation** of the **work area** shall occur **prior** to running **final air tests**.
- k) **Final air tests** will be **NOT** be performed on **exterior work areas** unless **requested** by the **building owner**. Upon the **building owner's request** the **owner's representative** will run **final air tests** using **PCM** clearance sampling protocol.

2. Floor Tile, Pipe Insulation & Fittings, In-place Mastics, & Vibration Dampers

- a) Install a **three stage decon**, equipped with **shower** at the entrance to each containment. The decon will be erected in such a manner as to allow for separate **equipment room/bag-out** off to the side. (**Two-stage decons** may be **installed** at the **entrance** to **smaller work areas** with another three-stage decon used as a **remote decon**. **Double tyvek suits** shall be worn in two-stage work areas with the **first suit** being removed in the **two-stage** and the **second** in the **three-stage remote decon**.) Reference section **01563** for specific requirements for **decontamination units**.
- b) Set up **HEPA filtered air filtration devices**, (AFDs) in the work areas and have them running during pre-clean and prep stages. All **exhaust** from HEPA machines must be **vented outside** the building. **Plywood barriers** (3/4" minimum) will be used to **secure windows** where **flex duct** from HEPA machines is **exhausted**.
- c) **Pre-clean** the work area **prior** to **installing criticals** in position. Install **two (2)** distinct layers of **6 mil polyethylene criticals**, on all exterior doorways, operable windows, HVAC registers, louvers, sinks, electric panels, and any other openings that lead outside the work area.

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- d) Construct a **containment** consisting of **one (1) layer of 6 mil polyethylene walls & ceilings** in each work area, with floors in all areas without floor tile removal. Install a **Plexiglas viewing window** at least 18" by 18" and approximately 5' from the ground at a location where the work area(s) can be viewed from outside the containment.
- e) After the containment is completed, **establish** proper **negative pressure** using **High Efficiency Particulate Air (HEPA) filtered local exhaust systems units**. Establish and maintain a pressure differential of at least **-0.02 inches of water** measured on a strip chart recorder or other approved method. The Contractor shall supply a differential pressure **manometer** that is capable of **monitoring and recording** on a **strip chart**. The manometer shall be equipped with an **automatically activated alarm system**, which will sound a warning if the differential pressure drops below the preset value. All strip charts will be turned in to the Owner's Representative at the completion of the project. (For areas with less than 50 SF of ACM material removal, the use of a portable manometer to verify initial negative pressure differential followed by visual confirmation only of the negative pressure differential during the balance of the time the containment is in use is acceptable.) **WORK WILL NOT BEGIN OR CONTINUE UNLESS AN ADEQUATE DIFFERENTIAL PRESSURE IS ACHIEVED AND MAINTAINED.**
- f) Once **negative pressure** is **sufficient** (-0.02" or better), and the containment has been **inspected** and **approved** by the owner's representative, then **removal** may **begin**.
- g) The contractor shall follow **proper removal procedures** at all times. All asbestos containing materials shall be **continually wetted** with **amended water** during removal procedures. **Dry removal of asbestos will not be permitted**. All **asbestos debris** shall be regularly **cleaned up** and **stored** in **industry standard waste bags, drums**, or other appropriate containers with **NESHAP labels** affixed to them. All **asbestos waste** shall be **double bagged** with a **clear transparent bag** on the **outside** and a regular **black bag** on the **inside** for verification of double bagging. All **ACM waste** will be **bagged out** at the **end** of **each workday** and **stored** in a **lockable container**.
- h) Remove **floor tile** from work area until no visible debris remain on the floor. Lockers and Cabinets will need to be removed in some areas to access the floor tile. Any lockers or cabinets removed before abatement without disturbing the ACM Floor Tile may be disposed of as construction debris. If removed after abatement begins they must be decontaminated or disposed of as asbestos contaminated debris. **Floor tile mastic** is **not** included **in the scope of work** for most work areas. Where removal of Floor Tile mastic is indicated, it shall be removed until there is no instance where material remains in sufficient quantity to collect a bulk sample from. **Pipe Insulation and Fittings** are to be **glove bagged** and or **Wrapped and Cut**. (Any gross removal must be done inside two layer containments and would require the use of Type C respiratory protection.) **Respiratory protection for removal of floor tile, glove-bagging, and wrap and cut**, shall be **Full Face PAPR Respiratory Protection with HEPA filtration**.

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- i) In-place **Mastics on walls** and such where acoustic panels or tiles, boards, or other materials are adhered to walls and ceilings will be removed using **mechanical or high pressure water** to remove the mastics from the building surfaces. The ACM is to be **completely removed from the pores** of the substrate without regard to the resulting surface since the building is to be demolished. The panels, tiles, or boards are to be either cleaned of any remaining debris or bagged or wrapped for disposal as contaminated waste. **Respiratory protection for removal of mastics** shall be **Full Face PAPR Respiratory Protection with HEPA filtration**.
- j) Remove **vibration dampers** from air handling units either through **mechanical disassembly or cutting** of the metal ductwork. **Avoid cutting vibration damper cloth to minimize fiber release. Soak** vibration damper with **amended water** before saw cutting procedures and **wet wipe** all **surfaces** of ductwork within 2 feet of the **vibration dampers** after removal is completed. **Respiratory protection for removal of vibration dampers** shall be **Full Face PAPR Respiratory Protection with HEPA filtration**.
- k) After complete **removal and final cleaning** of all **asbestos containing materials** throughout each work area, the **owner's representative** and **contractor's supervisor** will **inspect** the work area. Once the **work area passes a visual inspection** and contains **no visible asbestos debris**, then **lock-down encapsulation** of the **work area** shall occur **prior** to running **final air tests**.
- l) **Final air tests** will be performed by the **owner's representative** using **PCM** clearance sampling protocol. **Tear down** of the containment will not proceed until **final air tests** have **passed** and been **documented** by the **owner's representative**.

3. Light Heat Shields, Sinks and Sink Caulk, & Mastics on Stored Boards

- a) Utilize an existing **remote three stage decon**, equipped with **shower** located on site. **Double tyvek suits** shall be worn in these work areas with the **first suit** being removed at the exit from the regulated area and the **second** in the **three-stage remote decon**. Reference section **01563** for specific requirements for **decontamination units**.
- b) Set up **HEPA filtered air filtration devices**, (AFDs) in the work areas and have them running during the prep stages. All **exhaust** from HEPA machines must be **vented outside** the building. **Plywood barriers** (3/4" minimum) will be used to **secure windows** where **flex duct** from HEPA machines is **exhausted**.

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- c) For work areas not already contained for other asbestos materials removal, construct a **regulated area** consisting of **Asbestos Hazard Barrier Tape** and **Asbestos Danger Signs** at least 5 feet outward from the materials being removed. Install a drop cloth under or in front of the materials being removed.
- d) Once localized **negative pressure** has been established, and the regulated area has been **inspected** and **approved** by the owner's representative, then **removal** may **begin**.
- e) The contractor shall follow **proper removal procedures** at all times. All asbestos containing materials shall be **continually wetted** with **amended water** during removal procedures. **Dry removal of asbestos will not be permitted**. The lights may be removed whole and bagged or the **Heat Shield** material may be removed from the fixture and the fixture cleaned. **Sinks** are to be manually disconnected or the countertop to which they are fastened may be cut, and the sinks are to be bagged or wrapped for disposal as asbestos contaminated waste. **Sink Caulk**, if not cut away during sink removal may be wet scrapped and the debris bagged for disposal. **Boards with mastics** on them may be bagged or wrapped and disposed of as contaminated waste. All **asbestos waste and debris** shall be regularly **cleaned** up and **stored** in **industry standard waste bags, drums**, or other appropriate containers with **NESHAP labels** affixed to them. All **asbestos waste** shall be **double bagged** with a **clear transparent bag** on the **outside** and a regular **black bag** on the **inside** for verification of double bagging. All **ACM waste** will be **bagged out** and **stored** in a **lockable container**.
- f) **Respiratory protection** for removal of **Light Heat Shields, Sinks, sink caulk, and boards with ACM mastics** shall be **Full Face PAPR Respiratory Protection with HEPA filtration**.
- g) After complete **removal** and **final cleaning** of all **asbestos containing materials** throughout each work area, the **owner's representative** and **contractor's supervisor** will **inspect** the work area. Once the **work area passes a visual inspection** and contains **no visible asbestos debris**, then **lock-down encapsulation** of the **work area** shall occur **prior** to running **final air tests**.
- h) **No Final air tests** will be performed in these areas, unless they are within an area with other ACM being removed that requires finals. **Tear down** of the containment will not proceed until **final air tests** have **passed**, OR the Project Monitor approves the cleaning as visually complete, and been **documented** by the **owner's representative**.

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●SELECTED HIGHLIGHTED STANDARD REQUIREMENTS AND SAFETY ITEMS

(This list includes items from throughout the specification which are particularly important and are being emphasized to ensure awareness of and compliance with them during the project.)

- **DOCUMENTS AND INFORMATION REQUIRED ON SITE** – The following information MUST be on site in order for any prep or abatement activities occur: EPA 10 Day Notification, Supervisor and Worker Badges, Current Medical Clearance and Fit Test Records, Safety Procedures, Evacuation Plan, Emergency Phone Numbers, MSDS/SDS information, Worker Acknowledgement Certificates, and Equipment Certification.
- **BADGE REQUIREMENTS** - All workers must have a current State of Delaware Asbestos Supervisor or Worker Badge on site in order to work on this project – **no exceptions**.
- **MINIMUM WORK FORCE** – A minimum of three (3) personnel, including one (1) supervisor and two (2) workers or supervisors will be on site at ALL times when abatement related work under this specification is occurring, unless waived in writing by Facilities Management. Examples of exceptions to this are during mobilization and de-mobilization.
- **PPE FOR ALL REMOVAL ACTIVITIES** – Tyvek or equivalent coveralls/suits with pull over hoods & feet. Respiratory protection will be HEPA filtered Powered Air Purifying Respirators (PAPR). For any gross removal of friable materials, respiratory protection will be Supplied Air Respirators with Type “C”, Grade “D” air.
- **BACK-FLOW PROTECTION DEVICES** - Back-Flow Protection Devices are **required to be used each time** the contractor makes **temporary water connections or taps in to a public water system** (owner’s water supply) to supply his work area, or decon shower (hot & cold) per section 01503 of specification.
- **GROUND FAULT PROTECTION** - Contractor shall use GFCI protection on all electrical connections for this Project. The contractor may use a temporary distribution panel with GFCI breakers or outlets, or use 3-wire extension cord with GFCI to connect to existing electrical outlets in facility.
- **TOOLS & EQUIPMENT** - All tools & equipment must meet OSHA standards or must be removed from site.
- **ELECTRICAL LIGHTS, TOOLS & EQUIPMENT** -Electrical lights, and electrical tools and equipment in the work area shall be **water resistant with 3-wires (or a double insulated piece of equipment with a manufacturer’s OEM two prong cord if approved for use in damp locations)** and equipment in the work area shall be **grounded and utilize a GFCI**.
- **FIRE EXTINGUISHERS** - Contractor shall provide a minimum of one fire extinguisher for every 2,500 SF of containment and one fire extinguisher outside the containment near the decon.

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- **FIRST AID KIT** – Contractor shall provide a stocked first aid kit in accordance with 29 CFR 1926.
- **DECONTAMINATION UNITS** - units will be constructed in accordance with **section 01563** of this specification.
- **DANGER SIGNS** -Proper OSHA Danger signs will be posted at all the entrances to the regulated areas.
- **DECONTAMINATION UNIT WASTE WATER** - will be disposed of in accordance with **section 01563** of this specification.
- **WASTE BAGS** - All **ACM waste bags** must be **double-bagged, goose necked, sealed with duct tape**, and affixed with **NESHAP labels** prior to placing in waste container. For materials to be disposed of as Non-Friable waste, BOTH bags must be clear. For all other asbestos waste, the first (interior) bag must be black, yellow, or other solid color, with the second (exterior) bag being clear. This will enable verification of the use of two bags without requiring opening of packaged waste.
- **STOP WORK ORDER** - If at any time the Contractor is found to not be in compliance with the guidelines of this specification then a STOP WORK ORDER will be issued. Work will cease until corrective measures are taken to bring the work practices back in compliance and work may not continue until approval is granted by the Owner's Representative. (Per Delaware Code Chapter 78, Title 16- Asbestos)
- **FINAL AIR TEST RESULTS** - for **PCM** clearance, analysis results will be achieved within four (4) hours from the time the samples are collected. For **TEM** clearance, analysis results will be achieved within twenty-four (24) hours from the time the samples are collected. Aggressive air sampling protocol will be employed. The abatement contractor will supply leaf blowers & fans for aggressive sampling.
- **IF CLEARANCE TESTING FAILS** - then the Contractor may be charged for the cost of additional air testing.
- **LAND FILL & CHAIN OF CUSTODY** - The building owner directs the contractor to utilize an **EPA approved** landfill to dispose of the asbestos waste. The contractor is to provide the owner's representative with the **completed waste manifest / chain of custody** as well as the **landfill receipts**. Transportation and disposal of asbestos waste shall occur within forty-five (45) days of removal.
- **VEHICLES OR TRANSPORTATION CONTAINERS** – All vehicles or transportation containers used for transportation of asbestos waste (i.e. dumpsters) will be lined on the inside sides and the floor of the waste area with one (1) layer of 6-mil plastic sheeting to be removed and properly disposed of with the load of asbestos waste.

**SUMMARY OF THE WORK - ASBESTOS ABATEMENT / DECONTAMINATION - 01013- 10
AT OLD LAUREL MIDDLE SCHOOL - BEA # 741214**

1.3 ASBESTOS-CONTAINING MATERIALS:

The Work of this contract involves activities that will disturb asbestos-containing materials (ACM). The location and type of ACM known to be present at the worksite is set forth in the Schedule of Asbestos-Containing Materials at the end of this section. If any other ACM or PACM is found, notify the Owner, or Owner's Representative about the location and quantity of the ACM or PACM within 24 hours of the discovery.

1.4 ASBESTOS HEALTH RISK:

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM, take appropriate continuous measures as necessary to protect all building occupants from the risk of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

1.5 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy.

2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Use of the Existing Building: Maintain the existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1. Smoking: Smoking or open fires will not be permitted within the building enclosure or on the premises.

2. Toilet Rooms: Except for toilet rooms designated for use by the Contractor's personnel, use of existing toilets within the building by the Contractor's personnel will not be permitted.

1.6 OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy:** The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. The Owner's Representative will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner occupancy.

1.7 AIR MONITORING BY THE OWNER:

- A. The Owner has contracted for air monitoring.** Air monitoring may be conducted both outside and inside of the work area during the work, and for clearance sampling at the end of the project
- 1. Outside of the Work Area:** The Owner's air monitoring firm may sample air outside of the work area to detect faults in the work area isolation such as:
 - a.** Contamination of the building outside of the work area with airborne asbestos fibers,
 - b.** Failure of filtration or rupture in the differential pressure system,
 - c.** Contamination of air outside the building envelop with airborne asbestos fibers.
 - 2. Inside the Work Area:** The Owner's air monitoring firm may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring is to detect airborne asbestos concentrations that may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- B. Work area clearance:** Clearance air sampling by the Owner's air monitor at the completion of asbestos abatement work is described in Section 01711 Project Decontamination.
- C. Air monitoring** required by OSHA is the responsibility of the Contractor and is not covered in this section.

1.8 SCHEDULE OF AIR SAMPLES BY OWNER:

A. Sample cassettes: Samples will be collected on 25 mm. cassettes as follows:

- 1. **PCM:** 0.8 micrometer mixed cellulose ester.
- 2. **TEM:** 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

B. Number and Volume of Samples: The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the Owner's Representative may vary depending upon job conditions and the analytical method used.

C. Sample Volume and Sensitivity:

- 1. **PCM:** The sample volumes collected by the Owner's air monitor will be determined by the following formula:

$$\frac{(\# \text{ fibers in sample} - \# \text{ fibers in blank}) 385\text{mm}^2}{(\text{Vol. in Liters})(1000)(0.00785\text{mm}^2)(\# \text{ fields})} = \text{fibers/cc}$$

Where Number of fibers = Actual # of fibers observed/100 fields, with a minimum of 5.5 fibers/100 fields, based on a limit of detection (LOD) of 7 fibers/mm² on the filter.

Area of 100 fields = 0.785mm²
Total Filter Area = 385mm²
Limit Value = as specified in the schedules of samples below

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- a. For purposes of this specification, the sample volume calculated above will be considered to be of sufficient size so that there is a 95% level of confidence that the value measured by each individual sample at the limit of detection (LOD) is less than or equal to the limit values specified below.
- b. For purposes of this specification, the Limit of Detection (LOD) is defined as 7 fibers/mm² on the filter or 5.5 fibers/100 fields.
- c. For purposes of this specification overloaded samples will be considered as exceeding the applicable limit value.

2. TEM: Analytical Sensitivity of 0.05 structures/cc as set forth in the AHERA regulation.

D. Base Line (pre-samples):

1. Before Start of Work: The Owner will secure air samples to establish a base line.

2. PCM Samples

Location Sampled	# Samples	Limit Value (F/cc)	Appx. Vol. (L)	Rate (L/m)
Inside Each Work Area	1	0.01	1,000	1-10
Outside Each Work Area	1	0.01	1,000	1-10

3. TEM Samples:

Location Sampled	# Samples	Analytical Sensitivity (Structures/cc)	Appx. Vol. (L)	Rate (L/m)
Inside Each Work Area	1	0.005	1,300	1-10
Outside Each Work Area	1	0.005	1,300	1-10

- 4. Base Line:** a level expressed in fibers per cubic centimeter which is twenty-five percent greater than the largest of the following:
- a. Average of the PCM samples collected outside each Work Area
 - b. Average of the PCM samples collected outside the building
 - c. 0.01 fibers per cubic centimeter

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- 5. Samples collected for TEM analysis** will be held without analysis. These samples will be analyzed under the conditions and terms set forth in "Fibers Counted" and "Affect On Contract Sum".

E. Daily:

- 1. From start of work** of Section 01526 Temporary Enclosures through the work of Section 01711 Project Decontamination, the Owner may take samples.
- 2. Sample volume and sensitivity:** inside the work area may vary depending upon conditions in the work area. If samples are overloaded at the sample volume required for a limit value equal to the Stop Action Levels or Immediate Stop Action Levels given later in this section, the level is considered to have been exceeded.

3. PCM Samples:

Location Sampled	# of Samples	Limit Value (F/cc)	Appx. Vol. (L)	Flow Rate (LPM)
Each Work Area	1	0.01	1,000	1-10
Outside Each Work Area at Critical Barrier	1	0.01	1,000	1-10
Clean Room	1	0.01	1,000	1-10
Equipment Decon.	1	0.01	1,000	1-10
Outside Building	1	0.01	1,000	1-10
Output of Pressure Differential System	1	0.01	1,000	1-10

- F. Additional samples** may be taken at Owner's or Owner's Representative discretion. If airborne fiber counts exceed allowed limits additional samples may be taken as necessary to monitor fiber levels.

1.9 ANALYTICAL METHODS USED BY THE OWNER:

- A. The following methods** will be used by The Owner in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume sampling.
 - 1. Phase Contrast Microscopy (PCM)** will be performed using the NIOSH 7400 method.
 - 2. Transmission Electron Microscopy (TEM)** will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

1.10 LABORATORY TESTING BY OWNER:

- A. The services of a testing laboratory** may be employed by the Owner to perform laboratory analyses of the air samples. A technician will be at the job site, and samples will be sent daily by carrier for next day delivery so that verbal reports on air samples can be obtained within 24 hours.
- B. A complete record** of all air monitoring and results will be furnished to the Owner's Representative, the Owner, and if requested, the Contractor.
- C. The Contractor will have access** to all air monitoring tests and results upon request.
- D. Written Reports:** of all air monitoring tests will be posted at the job site on a daily basis.

1.11 FIBERS AND STRUCTURES

A. Fibers Counted: The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.

- 1. Large Fibers:** "Airborne Fibers" referred to above include all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission or scanning electron microscopy demonstrates to the satisfaction of the Designer that non-asbestos fibers are being counted. "Airborne Fibers" counted in samples analyzed by transmission electron microscopy shall be asbestos fibers, greater than 5 microns in length. For purposes of stop action levels, subsequent to analysis by electron microscopy, the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by PCM by the proportion of fibers that are asbestos as determined by TEM (a number equal to, asbestos fibers counted, divided by all fibers counted in the electron microscopy analysis).
- 2. Small Structures:** "Airborne Fibers" referred to above include asbestos structures (fibers, bundles, clusters or matrices) of any diameter and any length greater than 0.5 microns.

1.12 ADDITIONAL TESTING:

- A. The Contractor may conduct** air monitoring and laboratory testing. If he elects to do this, the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner.

1.13 PERSONAL MONITORING:

- A. Owner will not perform** air monitoring for the Contractor to meet Contractor's OSHA requirements for personal sampling or any other purpose.

1.14 MISCELLANEOUS PROVISIONS

A project checklist has been provided in Appendix C of this specification package. This checklist is not intended to take the place of any regulations, specifications or directions, but is supplied to assist the Contractor.

The following inspections must be performed during the project phases indicated.

- 1- Pre-cleaning: A visual inspection of all pre-cleaned surface areas must be **performed by the Contractor's supervisor and the Owner's representative simultaneously.** This inspection will occur prior to the installation of polyethylene covering of walls, floors, and other surfaces.
- 2- Post removal: A visual inspection of each work area must be performed following successful clearance air sampling and prior to commencing tear-down. **This inspection is to be performed by the Contractor's supervisor and the Owner's representative simultaneously.**
- 3- Substantial completion: After each project is complete, including any applicable demolition, re-insulation, or cleaning, a final inspection will be **performed by the Contractor's supervisor and the Owner's representative simultaneously** before turning the work area over to the Owner.

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Ten-day notifications are required for EPA Region III as well as to the State of Delaware (DNREC). If due to the immediacy of an emergency it becomes necessary to perform work within the notification period, the Owner's Representative will contact the proper authorities to request a waiver of the ten day period. All Contractors, workers, and supervisors must be State of Delaware Certified. (See Section 01098).

All **electric power** shall be shut down/tagged/locked out in the work area that is possible. The Owner will supply temporary electrical source. Contractor is responsible for temporary panel from Owner's source and making proper electrical connections as well as to disconnect existing lighting fixtures. Protect each circuit with a Ground Fault Circuit Interrupter (GFCI) of proper size located in the temporary panel. Outlet type GFCI devices may be used when approved by the Owner's Representative.

Temporary water service - Contractor will make connection to cold water supply and ensure proper back-flow protection. Hot water heater, if required, will be supplied by the Contractor (See Section 01503).

Contractor must ensure the **integrity of the enclosure** and decontamination facility. Inspection windows are required for each enclosure where feasible. (See Section 01526).

All workers must have their current **State of Delaware Asbestos Worker Badge** as well as a copy of their current **medical (respiratory fitness form)**, in order to work at the project site (this includes set-up and tear down, no exceptions).

Contractor will provide **extra, new respirators, disposable overalls, head covers, and footwear covers for use by authorized visitors**. All decontamination procedures are to be strictly adhered with. A signed copy of the **Certificate of Workers Acknowledgment** must be obtained from each worker (See Section 01560).

Three stage personnel **decontamination units** are required for each contained work area, unless a remote three stage decon is set up on site and utilized along with a two stage decon when authorized for small work areas. An equipment decontamination unit consisting of the following arrangement of rooms, Clean Room, Holding Room, Wash Room for the removal of equipment and material from the Work Area, is required. Personnel are not to enter or exit the Work Area through the Equipment Decontamination Unit (See Section 01563).

The Contractor is to provide a **list of products** he intends to use during this project (See Section 01601). Substitutions for specified products will be considered if received within 3 weeks prior to beginning work affected by the substitution. Requests received less than 3 weeks before commencement of affected work may be considered or rejected at the discretion of the Owner's representative (See Section 01632).

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Final Cleaning - before requesting inspection for Certification of Substantial Completion, the work area as well as any affected areas must be cleaned and in a condition suitable to the Building Owner or Owner's Representative (See Section 01712).

Areas designated as contaminated - after complete removal of asbestos-containing material, all affected surfaces shall be decontaminated using a combination of HEPA vacuum and wet cleaning techniques. All non-visible asbestos residue shall be locked down with a coating of American Coatings Corp. 22-P Penetrating Encapsulant or equivalent product applied in strict accordance with the manufacturer's directions.

Work area clearance - Clearance air sampling (interior removal work areas only) will incorporate aggressive PCM air sampling techniques. The Contractor will encapsulate prior to running final clearance samples. PCM air samples will be run after completion of a visual inspection and work area encapsulation. PCM analytical results will be available within 4 hours of sample collection or sooner if needed. In the event that any final clearance samples fail, the abatement contractor may be responsible for the cost associated with re-running those samples. (See Section 01711).

All asbestos-containing material shall be wetted with amended water during abatement. **DRY REMOVAL OF ASBESTOS WILL NOT BE TOLERATED.** (Section 02081)

*** The Building Owner directs the contractor to utilize any EPA approved landfill to dispose of the asbestos waste. The Contractor is to provide the Owner's Representative with the completed chain of custody as well as the landfill receipts (See Section 02084).**

The work includes the removal of asbestos-containing materials according to the requirements of the following specification section sections in the sequence indicated:

General and Administrative Requirements are set forth in the following specification sections:

01013 Summary of the Work - Asbestos Abatement

01043 Project Coordination - Asbestos Abatement

01097 Reference Standards and Definitions - Asbestos Abatement

01601 Materials and Equipment - Asbestos Abatement

01632 Product Substitutions

01701 Project Closeout - Asbestos Abatement

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Abatement Work requirements are set forth in the following specification sections, listed here according to the sequence of the work:

01098 Codes, Regulations and Standards - Asbestos Abatement: sets forth governmental regulations and industry standards which are included and incorporated herein by reference and made a part of the specification. This section also sets forth those notices and permits which are known to the Owner and which either must be applied for and received, or which must be given to governmental agencies before start of work.

01503 Temporary Facilities - Asbestos Abatement: Sets forth the support facilities needed such as electrical and plumbing connections for the decontamination unit.

01560 Worker Protection - Asbestos Abatement: Describes the equipment and procedures for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

01562 Respiratory Protection: Sets forth the procedures and equipment required for adequate protection against inhalation of airborne asbestos fibers.

01563 Decontamination Units: Explains the setup and operation of the personnel and material decontamination units.

Asbestos Removal Work Procedures are described in the following specification sections:

02081 Removal of Asbestos-Containing Materials

02084 Disposal of Asbestos Containing Waste Material

02085 Resilient Floor Covering Manufacturer Recommended Work Practices

02087 Resilient Flooring Removal – Aggressive Asbestos Abatement

Decontamination of the Work Area after completion of abatement work is described in the following sections:

01701 Project Closeout: details the closeout procedures to end the project once abatement work is complete including final paperwork requirements.

01711 Project Decontamination: describes the sequence of cleaning and decontamination procedure to be followed during removal of the sheet plastic barriers isolating a work area.

01712 Cleaning and Decontamination Procedures: sets forth procedures to be used on contaminated objects and rooms which are not part of an abatement work area.

PLAN OF ACTION:

Submit a detailed plan of the procedures proposed for use in complying with the requirements of this specification. Include in the plan the **location and layout of decontamination areas**, the sequencing of asbestos work, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site, disposal plan including location of approved disposal site, and a detailed description of the methods to be employed to control pollution. Expand upon the use of portable **HEPA ventilation system including planned placement to ensure maximum movement of air through the entire work area**, closing out of the building's HVAC system, method of removal to prohibit visible emissions in work area, and packaging of removed asbestos debris. **The plan must be submitted at or before the Pre-Work Meeting and approved by the Owner's Representative prior to commencement of work.**

Include written contingencies for:

- Fire
- Accident
- Power Failure
- Negative Air System Failure

INSPECTION:

Prior to commencement of work, inspect areas in which work will be performed. Prepare a listing of damage to structure, surfaces, and equipment or of surrounding properties that could be misconstrued as damage resulting from the work. **Photograph or videotape existing conditions as necessary to document conditions.** Submit to Owner's Representative prior to starting work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 STOP ACTION LEVELS:

A. Inside Work Area: Maintain an average airborne count in the work area of less than the Stop Action Level given below for the type of respiratory protection in use. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify the Owner's Representative. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by the Owner's Representative.

Stop Action Level (F/cc)	Immediate Stop Level (F/cc)	Minimum Respirator Required	Protection Factor
0.5	2.5	PAPR	100 / 1000
1.0	5.0	SUPPLIED AIR – GRADE "D"	1000

1. If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time cease all work except corrective action. Notify Owner's Representative. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized in writing by Owner's Representative.

B. Outside Work Area: If any air sample taken outside of the Work Area exceeds the base line established in Part 1 of this section, immediately and automatically stop all work except corrective action. The Owner's Representative will determine the source of the high reading and so notify the Contractor in writing.

1. If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

a. Immediately erect new critical barriers as set forth in Section 01526 Temporary Enclosures to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (e.g. wall, ceiling, floor).

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- b.** Decontaminate the affected area in accordance with Section 01712 Cleaning & Decontamination Procedures.
 - c.** Require that respiratory protection as set forth in Section 01562 Respiratory Protection be worn in affected area until area is cleared for re-occupancy in accordance with Section 01711 Project Decontamination.
 - d.** Leave Critical Barriers in place until completion of work and insure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.
 - e.** If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth in Section 01563 Decontamination Units at entry point to affected area.
 - f.** After Certification of Visual Inspection in the Work Area remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Section 01711 Project Decontamination.
- 2.** If the high reading was the result of other causes initiate corrective action as determined by the Owner's Representative.
- a.** Due to construction activities occurring outside the regulated work area there is likely to be high air sample counts outside the work area due to this work activity. Baseline samples should be used to establish a basis to determine what the affect that construction activity has on the air samples. Background counts should be during construction activity prior to the start of this project, or when construction activity begins. **The Owner's Representative should take special note of nearby construction activities such as concrete cutting or welding, and the impact they may have on PCM or TEM air results.**

3.2 STOP WORK:

A. If the Owner or Owner's Representative presents a written stop work order, immediately and automatically conform to that stop work order, while maintaining temporary enclosures and pressure differential. After being presented with a stop work order, immediately initiate the following actions:

- 1.** Cease all asbestos removal activities, or any other activities that disturbs ACM.
- 2.** Repair any fallen, ripped or otherwise failed work area isolation measures.
- 3.** Maintain in operation all work area isolation measures including those required by Sections 01526 Temporary Enclosures, 01513 Temporary Pressure Differential & Air Circulation System, 01563 Decontamination Units.
- 4.** Maintain all worker protections including those required by Sections 01560 Worker Protection - Asbestos Abatement, and 01562 Respiratory Protection.
- 5.** Fog the air in the work area with a mist of amended water to reduce airborne fiber levels.

Do not recommence work until authorized in writing by the Owner's Representative.

SCHEDULE OF ASBESTOS-CONTAINING MATERIALS

Base Bid

Material	Quantity	% ASB
Built-up Roofing - Gym	8,000 SF	15% Chrysotile
Mechanical Roof Flashings	650 LF	2% Chrysotile
Terra Cotta Roof Cap Caulk	250 LF	10% Chrysotile
Building Caulk (Add., Gym, Out.)	1,900 LF	10% Chrysotile
Window / Louver Caulk	600 LF	5-10% Chrysotile
Window Glazing Putty	25 EA	3% Chrysotile
Light Heat Shields	18 EA	10% Chrysotile
Vibration Dampers	160 LF	80% Chrysotile + 3% Amosite
Pipe Insulation w/ debris	5 SF	30% Chrysotile
Pipe Insulation & Fittings	1,400 LF	10-15% Chrysotile + 3% Amosite
Chalk, Cork and acoustic Mastics	150 SF	2-5% Chrysotile
Sink Caulk	8 LF	12% Chrysotile
Sink Undercoat	3 EA	5% Chrysotile
Floor Tile Single Layer	5,175 SF	3-8% Chrysotile
Floor Tile Double Layer	3,500 SF	3-8% Chrysotile
Floor Tile Mastic	1,100 SF	4% Chrysotile
Mastic on stored boards	100 SF	5% Chrysotile

Alternate #1 (original 1921 structure)

Material	Quantity	% ASB
Mechanical Roof Flashings	180 LF	2% Chrysotile
Building Caulk (Add., Gym, Out.)	1,800 LF	10% Chrysotile
Boiler Gasket	5 LF	60% Chrysotile
Sink Undercoat	1 EA	5% Chrysotile
Pipe Insulation & Fittings	1 LF	10-15% Chrysotile + 3% Amosite
Floor Tile Double Layer	2,300 SF	3-8% Chrysotile
Floor Tile Single Layer	800 SF	3-8% Chrysotile

END OF SECTION 01013