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**Asbestos-Containing Material  
Abatement Specification**

**Oakwood Jr./Sr. High School  
1200 Far Hills Avenue  
Oakwood, Ohio 45419**

**Prepared for:**

**Oakwood City Schools  
20 Rubicon Road  
Oakwood, Ohio 45409  
937.297.5332**

**Prepared by:**



A handwritten signature in black ink, reading "George S. Beaudion".

**George S. Beaudion  
State of Ohio Certified Asbestos Project Designer #60164**

**February 2020**

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## **SPECIAL CONDITIONS**

- I. All references to the Owner in these Specifications shall be interpreted as Oakwood City Schools and any designated representatives.
- II. The Contractor shall secure, pay for, and maintain in full force and effect until no longer necessary, all licenses, regulatory notifications, permits and permissions required by Federal and State law, city ordinance, statute, or regulations and any rules or regulations of any service company that may assert control of any operation under this Contract. Copies of the above shall be filed prior to commencement of work.
- III. The Contractor shall maintain a temporary office on-site which he or his authorized agent shall man each workday. Copies of permits, Specifications marked up to date with all revisions and required regulations shall be kept in said office ready for use at all times. Said office shall have (at all times) a fully stocked first aid cabinet available for use for the Contractor's employees.
- IV. In performing the Contract, the Contractor may utilize the existing electric and water service at the Owner's cost. Temporary electrical connections must be performed by a certified electrician approved by the Owner. The Contractor shall be responsible for the safe conveyance of water and electricity to the project areas and for any resulting damage from such conveyance. All sources of water and electricity conveyance shall be subject to the Owner's approval. NOTE: There may be areas in the building where the Contractor shall be required to supply portable generator(s) for an electrical source. Bidding Contractors are advised to walk the site and become familiar with conditions of each work area prior to submission of their bid.
- V. The Contractor is required to staff the project with at least one (1) Ohio Environmental Protection Agency certified Asbestos Hazard Abatement Specialist to act in the supervisory capacity and as the OSHA competent person per 29 CFR 1926.1101. The Supervisor/competent person must be onsite at all times during the project. All other workers must be certified, at a minimum, as an Ohio Environmental Protection Agency Asbestos Worker. Certification cards must be onsite at all times.
- VI. Prior to initiation of abatement activities, all workers must possess valid medical examination results from a licensed physician stating that the worker is capable of performing asbestos abatement, (i.e., wearing a respirator) and valid fit test results from within the past twelve (12) months for the respirator being worn by the worker.
- VII. The Contractor is responsible for security of the work area and preventing unauthorized entry. The Contractor shall restrict access to Contractor personnel directly involved with the work, authorized Owner's Representatives, and regulatory inspectors legally entitled to inspect the work.
- VIII. All of the Contractor's employees shall abide by Federal, State, and local laws and by the Owner's policies while on the premises.
- IX. All of the Contractor's employees are restricted to those areas of the building and property directly included in the Project. Entry to all other areas is prohibited. Any employee whose conduct is judged unfit by the Owner and/or Consultant shall not be permitted to work on this project.
- X. The Contractor shall not encumber the site with materials or equipment and shall confine stockpiling of materials to the work area indicated. Storage of materials in public accesses and hallways shall not be permitted.
- XI. No other Contractors shall be permitted to execute their work in the work areas until the asbestos abatement work is completed.

- XII. Complete waste disposal documentation must be submitted to the Owner after landfill receipt. Documentation must show date/time that the waste left the job site to date/time waste was disposed of at the landfill identified on the EPA notification. Any layovers between leaving the job site (i.e., stored on the Contractor's property, etc.) and disposal date must be documented as well.
- XIII. The Contractor is responsible for submitting a final report to the Owner within thirty calendar days from the time of Substantial Completion. The contents of this final report shall contain all information required by the Consultant's "Final Documentation Audit" found in Appendix A.
- XIV. Contractor must prove that all workers are U.S. citizens or that workers have a valid visa.
- XV. In the event the Contractor utilizes non-English speaking workers, all required warning signs, Hazard Communications, etc., must be written in the language of the non-English speaking worker. At a minimum, one worker per work crew and/or work shift must speak English in order to communicate effectively with the Owner, Owner's Representatives, and/or Emergency Response personnel.
- XVI. Oakwood City Schools has retained the services of a Consultant to manage the project described herein. The Consultant shall represent the Owner in all phases of the work at the discretion of the Owner. The Contractor shall regard the Consultant's direction as authoritative and binding as provided herein, in matters including, but not limited to, the following:
  - a. Pre-construction submittals
  - b. Approval of work areas
  - c. Review of air and visual monitoring results
  - d. Completion of the various segments of the work
  - e. Final completion of the work
  - f. Post-project submittals
- XVII. The Abatement Contractor shall be required to follow the Phasing Plan outlined on drawings. Drawings shall be provided to all bidding Abatement Contractors.
- XVIII. The Abatement Contractor shall be required to submit their bid(s) on their respective letterhead.
- XIX. The Abatement Contractor shall be required to submit an additional mobilization cost(s). This Mobilization cost shall reflect that a portion of the work outlined in the Phasing Drawings, Phase 1 can be performed over Oakwood Schools Holiday (spring) break. Holiday (spring) break for Oakwood Schools runs from March 30, 2020 through April 3, 2020.
- XX. The Abatement Contractor shall be required to submit with their bid(s) a unit cost for all asbestos-containing materials listed in this specification and/or in the March 2019 Inspection Report. Unit cost shall be applied in the event of any additional asbestos-containing materials not scheduled to be abated are added in the scope of the work.
- XXI. Abatement during the summer break 2020 consist of all specified materials scheduled to be abated in the Phase 1 work area. Phase 1 area is outlined in blue and red on the drawing provided in this specification.
- XXII. This specification is a part of the bid documents developed by Danis. In the event of discrepancies, the most stringent will apply.

**END OF SECTION**

## TECHNICAL ASBESTOS ABATEMENT SPECIFICATIONS

### PART 1 - WORK TO BE PERFORMED

#### 1.1 DESCRIPTION OF WORK

The project involves the selective demolition and proper removal of asbestos-containing materials within specified areas of Oakwood Jr/Sr High School, 1200 Far Hills Avenue, Oakwood, Ohio 45419.

The scope of work includes:

- Removal of asbestos-containing pipe insulation, fitting insulation, tank insulation, acoustical ceiling plaster, transite panels, HVAC paper insulation, window glazing/bedding/caulking, exterior door frame caulking, removal of lights attached to canvas/horsehair ceiling in Auditorium.

NOTE 1: This specification encompasses all materials that **may** potentially be removed during the renovation project. The specific scope of work will be defined by Danis.

NOTE 2: All Bidders are solely and totally responsible for verifying and quantifying the actual amount of materials listed.

NOTE 3: Construction of elevated platform in the auditorium shall be the responsibility of Danis. Construction of the contained work area on the platform shall be the responsibility of the Abatement Contractor.

NOTE 4: Bidding Contractors shall include in their bid(s) two (2) unit cost per square foot concerning the removal of acoustical plaster in the cafeteria. A unit cost reflecting just scraping the asbestos-containing material from the hard plaster and a unit cost reflecting removal of the ceiling in its entirety.

#### 1.2 OWNER'S REPRESENTATIVE

This project will be coordinated through Tod Scott, Operations Coordinator, Oakwood City Schools 937.205.2626, and Mr. George Beaudion, m.a.c. Paran Consulting Services 513.383.6091.

#### 1.3 PROJECT TIME SCHEDULE

<u>Activity</u>	<u>Effective Date(s) and Time(s)</u>
Pre-bid meeting: (@ project site)	See Advertisement. <u>Enter thru Jr. HS office near stadium side of the building. Office entrance is across the plaza area.</u>
Sealed bids due:	See Advertisement
Award of project:	See Milestone Schedule
Work start date:	June 1, 2020. Phase 1 area
Substantial completion:	July 1, 2020. Phase 1 area. <u>Several areas in phase 1 must be completed prior to this date.</u>

Monday through Friday 8-hour work shifts (day shifts) for all work or more as required to meet the milestone schedule.

## **PART 2 - GENERAL**

### **2.1 SCOPE AND CONTRACTOR RESPONSIBILITIES**

- 2.1.1 Work Specified - The Contractor shall furnish all labor, materials, employee training, services, insurance, bonds, regulatory notifications and/or permits, and equipment required to perform this Work in accordance with requirements of this Specification. The Contractor shall furnish all said items to complete removal and decontamination of all asbestos-containing materials specified and as defined.
- 2.1.2 Contractor Responsibilities - In addition to the removal of asbestos-containing materials, the Contractor is responsible for the following: 1) The Contractor shall take all reasonable precautions necessary to protect persons and property from injury or damage during the performance of this contract; 2) The Contractor shall be responsible for any injury to himself, his employees, as well as for any damage to personal and Oakwood City Schools property that occurs during the performance of this contract that is caused by their employee's fault or negligence; 3) The Contractor shall be responsible for protection of all electrical and/or fire alarm systems during demolition and/or abatement activities; 4) The Contractor shall be responsible for all demolition (and disposal) required, including but not limited to: hard plaster, drywall, suspended ceilings, air handler units, cabinets, carpet, etc., in order facilitating the removal process of all specified asbestos-containing materials; 5) The Contractor shall be responsible for disposal of all non asbestos-contaminated building materials removed in order to facilitate asbestos 6) The Contractor shall be responsible for and shall maintain personal liability and property damage insurance having coverage for a limit as required by the laws of the State of Ohio.

### **2.2 INDEMNIFICATION**

- 2.2.1 Patent Indemnification - The Contractor shall pay all license fees and royalties and assume all cost incidents to the use in the performance of work or the incorporation in the work of any invention, design, process, product or device which is the subject of patent rights held by others. The Contractor shall indemnify and hold harmless the Owner, Consultant, and anyone directly or indirectly employed by them from and against all claims, damages, losses and expenses, including attorneys' fees and court and arbitration cost arising out of any infringement of patent rights incident to the use in performance of the work of any invention, design, process, product or device specified or not specified in the Contract documents, and shall defend all such claims in connection with any alleged infringement of such rights.

### **2.3 TERMINOLOGY AND DEFINITIONS**

- 2.3.1 Abatement - Procedures to control fiber release from asbestos-containing materials, i.e., removal, encapsulation, or enclosure.
- 2.3.2 Air Lock - A system for permitting ingress or egress without permitting air movement between a contaminated area or an uncontaminated area, typically consisting of two contained doorways at least 6 feet (2 meters) apart.
- 2.3.3 Air Monitoring - The process of measuring the fiber content of a specific volume of air in a stated period of time. Phase contrast microscopy in accordance with NIOSH Method No. 7400 is the prescribed method of sampling and analysis.
- 2.3.4 Air Sampling Technician - A person trained and experienced in air sampling techniques and schemes that performs air sampling under the direction of the Environmental Project Manager or C.I.H.

- 2.3.5 Amended Water - Water to which a surfactant has been added.
- 2.3.6 Asbestos Hazard Emergency Response Act (AHERA) - Congressional Act which requires local education agencies to identify friable and non-friable asbestos-containing building materials (ACBM) in public and private elementary and secondary schools; submit management plans to the Governor of their state; implement management plans in a timely manner; and maintain complete records of any action involving the disturbance of ACBM.
- 2.3.7 Authorized Visitor - The building owner or his representatives, air sampling technician, asbestos project manager, Consultant, or a representative of any regulatory or other agency having jurisdiction over the project.
- 2.3.8 Barrier - Plastic sheeting and/or other materials used along with the floors, ceilings, and walls of a structure to form an isolated Work environment that separates the contaminated work area from the uncontaminated area.
- 2.3.9 Bridging Encapsulant - A liquid designed to form a tough membrane over the surface of asbestos-containing materials.
- 2.3.10 Building Owner – Oakwood City Schools or their authorized representative(s).
- 2.3.11 Clean Room - An uncontaminated area or room that is part of the workers' decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment.
- 2.3.12 Competent Person - A Contractor's employee (typically the foreman or superintendent) by virtue of his education and experience who is capable of operating an asbestos hazard abatement project in accordance with current EPA, OSHA, and NIOSH regulations, and standard Work practices established for asbestos removal. Duties of the competent person are as defined in 29 CFR 1926.1101.
- 2.3.13 Consultant - A Certified Industrial Hygienist (C.I.H.), the designated Consultant, or an Industrial Hygiene Technician under the supervision of the C.I.H. or the Consultant.
- 2.3.14 Contaminated - Containing or coated with asbestos.
- 2.3.15 Curtained Doorway - A device to allow ingress or egress from one room to another while minimizing air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily formed doorway, securing the vertical edge of one sheet along one vertical side of the doorway, and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Two curtained doorways spaced a minimum of 6 feet (2 meters) apart form an air lock.
- 2.3.16 Decontamination Enclosure System - A series of connected rooms, with curtained doorways between any two adjacent rooms, for the decontamination of workers or of materials and equipment. A decontamination enclosure system always contains at least one airlock.
- 2.3.17 Encapsulant - A liquid material that can be applied to asbestos-containing materials or cleaned substrates following the removal of asbestos-containing materials to control the possible release of residual asbestos fibers from the material by creating a membrane over the surface.
- 2.3.18 Encapsulation - All herein specified procedures necessary to coat asbestos-containing materials with a penetrating or bridging encapsulant to control the possible release of asbestos fibers into the ambient air.

- 2.3.19 Environmental Project Manager - An individual qualified by virtue of experience, designated as the Owner's representative; and responsible for supervising the on-site Consultant and ensuring compliance with the Project Specifications.
- 2.3.20 Equipment Decontamination Enclosure System - A decontamination enclosure system for materials and equipment, typically consisting of a designated area of the work area, a washroom, a holding area, and an uncontaminated area.
- 2.3.21 Equipment Room - A contaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.
- 2.3.22 Facility Component - Any pipe, duct, boiler, tank, fan, engines, or furnace at or in a facility, or any structural member of a facility.
- 2.3.23 Fixed Object - A piece of equipment or furniture in the work area that cannot be removed from the work area.
- 2.3.24 Glovebag Technique - A method with limited applications for removing small amounts of asbestos-containing material from HVAC ducts, piping runs, valves, joints, elbows, and other uneven surfaces in an uncontaminated (plasticized) work area. The glovebag assembly is a manufactured or fabricated device consisting of a glovebag (typically constructed of 6-mil transparent plastic); two inward-projecting, long-sleeve, rubber gloves; one inward-projecting water wand sleeve; an internal tool pouch; and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process. All workers who are permitted to use the glovebag technique must be highly trained, experienced, and skilled in this method.
- 2.3.25 HEPA Filter - A highly-efficiency particulate air (absolute) filter capable of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 micrometer in length.
- 2.3.26 HEPA Vacuum - High-efficiency particulate air (absolute) filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters should be 99.97 percent efficient for retaining 0.3-micrometer particles or larger.
- 2.3.27 Holding Area - A chamber between the washroom and an uncontaminated area in the equipment decontamination enclosure system. The holding area comprises an air lock.
- 2.3.28 Movable Object - A piece of equipment or furniture in the work area that can be removed from the work area.
- 2.3.29 Negative Pressure Ventilation System - A local exhaust system capable of maintaining a detectable pressure differential across containment barriers relative to adjacent unsealed areas.
- 2.3.30 NESHAPS - The National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).
- 2.3.31 NIOSH - The National Institute for Occupational Safety and Health.
- 2.3.32 OSHA - Occupational Safety and Health Administration.
- 2.3.33 Penetrating Encapsulant - A liquid designed to saturate the material, thereby binding asbestos fibers to one another and to other substances in the material.
- 2.3.34 Polyethylene - 6-mil plastic sheeting used to cover floors, walls, etc., as herein specified.



- 2.3.35 Removal - All herein specified procedures necessary to strip or clean up asbestos-containing materials from designated areas and to dispose of these materials at an acceptable disposal site.
- 2.3.36 Shower Room - A room between the clean room and the equipment room in the worker decontamination enclosure system, with hot, and cold or warm running water and suitably arranged for complete showering during decontamination. The shower room comprises an airlock between contaminated and clean areas.
- 2.3.37 Staging Area - Either the holding area or an area near the waste-transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.
- 2.3.38 Stripping - All herein specified procedures necessary to remove asbestos-containing materials or asbestos-contaminated materials from their substrate or from any component of the facility.
- 2.3.39 Substrate - The underlying surface or material (piping, duct, boilers, tanks, chase floors, etc.) to which asbestos-containing material has been applied.
- 2.3.40 Surfactant - A chemical wetting agent added to water to improve penetration.
- 2.3.41 Thermal System Insulation - Insulation used to prevent heat loss from pipes, boilers, tanks, breeching, heat exchangers, etc.
- 2.3.42 Washroom - A room between the work area and the holding area in the equipment decontamination enclosure system. A washroom comprises an air lock.
- 2.3.43 Wet Cleaning - The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools that have been dampened with water, and then disposing of these cleaning tools as asbestos-contaminated waste.
- 2.3.44 Work Area - Designated rooms, spaces, or areas of the project in which asbestos abatement actions are to be undertaken or which may be contaminated as a result of such abatement actions. A contained work area is one that has been sealed, plasticized, and equipped with a decontamination enclosure system. An isolated work area is a controlled-access work area that has been isolated by plastic curtains and in which the openings to the outside are sealed with plastic sheeting. An isolated work area is not an airtight containment area and is not equipped with a decontamination enclosure system.
- 2.3.45 Worker Decontamination Enclosure System - A decontamination enclosure system for workers, typically consisting of a clean room, a shower room, and an equipment room.

## 2.4 APPLICABLE REFERENCE DOCUMENTS

The current issue of each document shall govern. If there is a conflict among requirements or with these Specifications, the more stringent requirement shall apply.

- 2.4.1 Regulations - Compliance is required in strict accordance with applicable Federal, State, municipal, and local regulations.
- 2.4.1.1 Title 29, Code of Federal Regulations, Section 1910.1001, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.
- 2.4.1.2 Title 29, Code of Federal Regulations Section 1926.1101, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.
- 2.4.1.3 Title 29, Code of Federal Regulations Section 1926.139, General Industry Standard for Respiratory Protection.

- 2.4.1.4 Title 29, Code of Federal Regulations Section 1926.59, Construction Industry Standard for Hazard Communication.
- 2.4.1.5 Title 29, Code of Federal Regulations Section 1910.1200, General Industry Standard for Hazard Communication.
- 2.4.1.6 Title 29, Section 1910.1000, Occupational Safety and Health Standards.
- 2.4.1.7 Title 40, Code of Federal Regulations, Part 61, Subpart A and M, National Emissions Standards for Hazardous Air Pollutants, U.S. Environmental Protection Agency (EPA).
- 2.4.1.8 Title 40, Code of Federal Regulations, Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, U.S. Environmental Protection Agency (EPA).
- 2.4.1.9 Title 40, Code of Federal Regulations, Part 761, Polychlorinated Biphenyls (PCB's).
- 2.4.1.10 Ohio Revised Code, Chapter 3710.
- 2.4.1.11 Title 49, Code of Federal Regulations, Hazardous Materials Transportation Regulations, U.S. Department of Transportation (DOT).
- 2.4.2 Codes and Standards
- 2.4.2.1 ANSI - American National Standards Institute, ANSI Z 9.2, Fundamentals Governing the Design and Operation of Local Exhaust Systems.
- 2.4.2.2 NEC - National Electric Code. Any Work involving electrical equipment in a facility or wet environments shall be performed in strict accordance with the National Electric Code.

## 2.5 AIR MONITORING

- 2.5.1 Asbestos Exposure Monitoring Schedule and Sampling Strategy- At a minimum, the Contractor's air monitoring schedule and sampling strategy for asbestos-related work shall be conducted as follows:

### ASBESTOS EXPOSURE MONITORING SCHEDULE

Phase of Abatement Project	When to Sample	Type of Sample	Minimum # of Samples	Location
PREPARATION	Each day of operation	Personal	1	Inside work area
		Excursion	1	Inside work area
REMOVAL	Each day of operation	Personal	1	Inside work area
		Excursion	1	Inside work area
DECONTAMINATION	Each day of operation	Personal	1	Inside work area
		Excursion	1	Inside work area

NOTE: At a minimum, one out of four workers involved in asbestos hazard abatement activities shall be monitored during all preparation, gross removal, decontamination and load-out phases of this Project. Short-term excursion samples shall also be collected per activity and/or at the request of the Consultant.

## 2.5.2 Methods of Collection and Analysis

- 2.5.2.1 All air monitoring shall be conducted in accordance with 29 CFR 1926.1101. The sampling period shall be 7 to 8 hours, except on abbreviated work shifts. The flow rate for the sampling pump shall be 0.5 to 2.5 liters/minute. Sampling pumps shall be calibrated daily to ensure proper flow-rates.
- 2.5.2.2 All pertinent personal exposure sampling data shall be completed in full on a daily basis with all required entries and calculations.
- 2.5.2.3 All samples collected by the Contractor or his representative shall be submitted at the end of each work shift for analysis. Completed data sheets must be submitted to the laboratory along with each day's filter samples. Sampling results shall be reported to the Contractor within twenty-four hours of their collection.
- 2.5.2.4 The minimum number of employees and areas to monitor indicated shall not be interpreted as the total number of samples to be collected and analyzed each day. Multiple personal or area samples may have to be collected during the 7 to 8 hour work shift to accurately characterize a worker's exposure level. The number of samples collected shall depend on the degree of airborne contamination in the work area and the effectiveness of work practices and engineering controls. Overloaded filter samples or filter holder cassettes containing loose particulate matter are unacceptable. The air samples must be properly collected and representative of actual concentrations in each work area.

## 2.6 PERSONNEL PROTECTION

- 2.6.1 Worker Instruction - Prior to commencement of work, the workers shall be instructed and made knowledgeable about all aspects of the written respiratory protection program, hazards of asbestos exposure, decontamination procedures, entry and exit procedures, protective clothing requirements, safe work practices, and shall have received the OSHA required medical examination, per 29 CFR 1926.1101.
- 2.6.2 Respiratory Equipment - Workers shall be provided with personally issued and marked respiratory protection equipment approved by NIOSH and suitable for the asbestos exposure level in the work area according to OSHA Standard 29 CFR 1926.1101. At a minimum, all workers performing abatement activities in total containment work areas shall wear powered air purifying respirators (PAPR'S) equipped with NIOSH approved HEPA filter cartridges suitable for asbestos exposure. Half face negative pressure respirators shall be permitted for all final cleaning activities, modified negative pressure containments, and during negative pressure glove bag removal activities. Sufficient filter cartridges for replacement shall be provide as required by the worker, applicable regulations, or as bound into this specification.
- 2.6.3 Protective Clothing - Workers shall be provided with sufficient sets of protective full-body clothing per OSHA Standard 1926.1101. Such clothing shall consist of full-body coveralls and headgear. Eye protection and hard hats shall be provided as required. Non-disposable protective clothing and footwear shall be left in the contaminated equipment room until the end of the asbestos abatement work, at which time such items shall be disposed of as asbestos waste or shall be thoroughly cleaned of all asbestos or asbestos-containing material. Note: Workers shall be permitted to wear only rubber boots in contained work areas; no other type of footwear shall be permitted.

- 2.6.4 Visitor Protection - Authorized visitors shall be provided with suitable respirators with new filters or cartridges and protective clothing, headgear, eye protection, and footwear whenever they are required to enter the work area, to a maximum of three (3) sets per day. Authorized visitors for this project include regulatory agencies, Consultant, and the Owner's Representatives who are certified to enter a regulated work area.
- 2.6.5 Protection Procedures - The Contractor shall provide and post, in the equipment room and the clean room, the decontamination and work procedures to be followed by workers.
- 2.6.6 Worker Protection Procedures
- 2.6.6.1 Each worker and authorized visitor shall, upon entering the job site: remove street clothes in the clean change room and put on a respirator with new filters and clean protective clothing before entering the equipment room or the work area; except workers that intend to re-wear contaminated protective clothing stored in the equipment room (entering the equipment room wearing only respirator).
- 2.6.6.2 Each worker and authorized visitor shall, each time they leave the work area: remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove all clothing except respirators; still wearing the respirator, proceed naked to the showers; clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash; if the filters require replacement, remove filters, wet them, and dispose of them in the container provided for that purpose; and wash and rinse the inside of the respirator.
- 2.6.6.3 Following showering and drying off, each worker and authorized visitor shall proceed directly to the clean change room for re-dressing into street clothes, or into a clean disposable suit if the exit is for a short break period and re-entry is shortly expected.
- 2.6.6.4 Contaminated work footwear shall be stored in the equipment room when not in use in the work area. After the asbestos abatement process is completed, footwear shall be disposed of as contaminated waste or cleaned thoroughly inside and out with soap and water before being removed from the work area or from the equipment and access area. Contaminated protective clothing shall be stored in the equipment room for reuse or placed in receptacles for disposal with other asbestos-contaminated materials.
- 2.6.6.5 Workers shall not eat, drink, smoke, chew gum, or chew tobacco at the work site except in the established clean room or outside the building. NOTE: No smoking is permitted inside any areas of the building.
- 2.6.6.6 Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos-containing or contaminated material, and until final cleanup is completed and final clearance given.

## 2.7 EQUIPMENT REMOVAL PROCEDURES

- 2.7.1 Cleaning - Clean external surfaces of contaminated containers and equipment thoroughly by wet mopping, or using a HEPA-filtered vacuum before moving such items into the decontamination enclosure system washroom for final cleaning and removal to uncontaminated areas. Ensure that personnel do not leave work areas through the equipment decontamination enclosure system.

## 2.8 EMERGENCY PRECAUTIONS

- 2.8.1 Prepare a written contingency plan for emergencies including fire, accident, power failure, pressure differential system failure, supplied air system failure (if applicable), or any other event that may require modification or abridgment of decontamination or work area isolation procedures. Include in the plan specific procedures for decontamination or work area isolation.
- 2.8.2 The Contractor shall be responsible for providing a minimum of one fire extinguisher, rated not less than 2A, for each three thousand square feet of containment area in accordance with 29 CFR 1926.150. Travel distance from any point inside the work area to the nearest fire extinguisher shall not exceed seventy-five feet. NOTE: 1) Substitution of a fire extinguisher with a half-inch garden hose not exceeding seventy-five feet in length shall be permitted provided the number of hoses is equivalent to the required number of fire extinguishers; 2) Hose(s) attached to the decontamination unit shall not serve as a fire extinguisher; and 3) All contained work areas shall be marked (with high visibility paint) on the lower sections of the walls to aid in escape in the event of a fire.
- 2.8.3 Employees shall be trained in evacuation procedures in the event of work area emergencies.
  - 2.8.3.1 For non-life-threatening situations, employees injured or otherwise incapacitated shall decontaminate themselves following normal procedures with assistance from fellow workers, if necessary, before exiting the work area to obtain proper medical treatment.
  - 2.8.3.2 For life-threatening injury, worker decontamination shall take least priority after measures to stabilize the injured worker, remove him from the work area, and secure proper medical treatment.
- 2.8.4 Before the Contractor starts abatement activities, the local police and fire departments should be informed of the danger of entering a contaminated work area. The Contractor shall make every effort to help these agencies form plans of action should their personnel need to enter contaminated work areas, and to assist during emergencies.
- 2.8.5 Telephone numbers of all emergency response personnel shall be prominently posted in the clean/change room outside the worker decontamination enclosure system along with location of the nearest telephone.
- 2.8.6 All accidents involving personal injury, property loss, or "near miss" incidents shall be immediately reported to the Owner and/or his representative(s).

## 2.9 SITE SECURITY

- 2.9.1 The Contractor shall post warning signs at designated entrances to each work area as required by 29 CFR 1926.1101.
- 2.9.2 The work area is to be restricted to authorized, trained, and protected personnel only. These may include the Contractor's employees, employees of Subcontractors, Owner's employees and representatives, State and local inspectors, and any other designated individuals.
- 2.9.3 Entry into the work area by unauthorized individuals shall be reported immediately to the Owner's representative by the Contractor.
- 2.9.4 The Contractor shall have control of site security of the work area during abatement activities in order to protect work efforts and equipment. The Owner shall maintain building security of the facility after work hours.
- 2.9.5 Parking must be approved by Oakwood City Schools.

## **PART 3 - MATERIALS AND EQUIPMENT**

### **3.1 MATERIALS**

- 3.1.1 Material Delivery - All materials shall be delivered clean, in proper working order, and shall bear the name of the manufacturer and brand. Safety Data Sheets shall be required for all materials brought on-site by the Contractor.
- 3.1.1.1 All materials subject to damage shall be stored off the ground, away from wet or damp surfaces, and under sufficient cover to prevent damage or contamination.
- 3.1.1.2 Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with asbestos shall be disposed of in accordance with this Specification.
- 3.1.2 Polyethylene - Polyethylene for all uses shall be a minimum of 6-mil thick. All polyethylene shall be sized in appropriate lengths and widths to minimize the frequency of joints.
- 3.1.2.1 Polyethylene used for worker decontamination enclosure systems shall be black in color.
- 3.1.3 Tape - Must be capable of sealing joints of adjacent plastic sheets, capable of attaching plastic sheets to finished or unfinished surfaces of dissimilar materials, and capable of adhering under dry and wet conditions, including use of amended water.
- 3.1.4 Surfactant - A surfactant shall consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of 1 ounce surfactant to 5 gallons of water, or according to manufacturer's Specifications.
- 3.1.5 Impermeable Containers - Must be suitable for receiving and retaining any asbestos-containing and/or contaminated materials. Metal or fiber drums with tight-fitting lids are required for all asbestos-containing wastes, i.e., metal lath, wire, metal jackets, etc. Plastic bags, 6-mil thick, are acceptable for friable asbestos, fiberglass insulation without metal components that could tear the bags. All asbestos-containing waste shall be labeled in accordance with 29 CFR 1926.1101, 49 CFR Parts 171 and 172 and 40 CFR Part 61, Subpart M.
- 3.1.6 Encapsulants - Encapsulating sealants shall be bridging or penetrating sealants such as Cafco "Bond Seal," or an approved equivalent.
- 3.1.6.1 Encapsulants selected for use by the Contractor shall be one of those demonstrating effective performance under the tests conducted by Battelle Laboratories for EPA.
- 3.1.6.2 The encapsulant shall not add any toxic substances to the asbestos-containing material and should not break down under direct flame impingement to release any toxic gases or an undue amount of smoke.
- 3.1.6.3 The encapsulant shall be capable of adhering to the substrate surface.
- 3.1.6.4 The encapsulant shall be applicable with minimum effort and skill.
- 3.1.6.5 The encapsulant shall have impact resistance, flexibility, and resistance to penetration in withstanding physical contact.
- 3.1.6.6 The encapsulant shall be water insoluble when cured.
- 3.1.6.7 The encapsulant shall be nontoxic and free of toxic fumes during application.

- 3.1.6.8 The encapsulant shall have sufficient aging characteristics to withstand normal atmospheric changes for a minimum of 6 years.
- 3.1.7 Warning Labels and Signs - As required by 29 CFR 1926.1101.
- 3.1.8 Glovebags - Two types of glovebags shall be considered suitable for this Project.
- 3.1.8.1 Polyethylene glovebag - This special prefabricated device is designed for the controlled removal of asbestos-containing materials from pipes and other nonplanar structures and consists of a minimum 7-mil, clear, polyethylene plastic bag (approximately 50 in. wide by 64 in. long) with integral impermeable arms and latex gloves. Each bag shall be equipped with internal attached tool pouch and entry port for insertion of wetting tube and/or HEPA-vacuum hose nozzle.
- 3.1.8.2 Polyvinyl chloride glovebag - This prefabricated device is designed for the controlled removal of asbestos-containing materials from pipes or other nonplanar surfaces and consists of a minimum 10-mil, clear, polyvinyl chloride (PVC) bag with integral 10-mil-thick PVC gloves, elasticized valve/port, and tool pouch. Each bag shall be equipped with a reversible, double-throw zipper on top to facilitate installation on pipes and progressive movement along the pipes. Reusable nylon straps (1 inch thick) with metal-tightening buckles shall be used for sealing the ends of the bags around pipe and/or insulation. Specially designed bags shall be used around "T" fittings and horizontal and vertical pipe configurations. PVC-zippered expansion strips shall be used to enclose large diameter pipes.
- 3.1.9 Plexiglas - The Contractor shall install Plexiglas in doorways or openings adjacent to the work area to enable observations by the Owner and his representatives without entering the work area. The Plexiglas partitions shall be a minimum size of 12"x12". The number of partitions shall be based on availability and size of the area and as requested by the Owner and their representatives.
- 3.1.10 Other Materials - The Contractor shall provide all other materials, such as lumber, nails, and hardware, that may be required to construct and dismantle the decontamination units and the barriers that isolate the work area.

## 3.2 TOOLS AND EQUIPMENT

- 3.2.1 The Contractor shall provide suitable tools and equipment for all phases of work for this Project.
- 3.2.1.1 Air movement equipment - High efficiency particulate air (absolute) filtration equipment in compliance with ANSI Z 9.2, Local Exhaust Ventilation. No air movement system or air equipment shall discharge asbestos fibers outside the work area into the building.
- 3.2.1.2 Each HEPA filter shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 micron dioctylphthalate (DOP) particles. Testing shall be in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Each filter shall bear a UL586 label to indicate the ability to perform under special conditions. Each filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
- 3.2.1.3 A negative air pressure differential shall be established in the work area by means of mechanical exhaust equipment in order to keep airborne fibers confined to the work area, decrease humidity and temperature, reduce fiber levels in the work area, and achieve acceptable final air monitoring results. The mechanical equipment shall exhaust through a HEPA filter to the outside of the building. The equipment shall remain in operation twenty-four hours a day until decontamination of the work area and final air sampling and analysis is completed.

- 3.2.1.4 Backup air filtration devices shall be available at the site in the event of unit failure and need for substitution.
- 3.2.2 Airless Sprayer - An airless sprayer shall be used for the application of amended water and encapsulants.
- 3.2.3 Scaffolding and Ladders - Scaffolding and ladders shall be used as required to accomplish work specified in Part 1 and shall meet or exceed all applicable OSHA requirements and safety regulations.
- 3.2.4 Vacuums - All vacuums utilized to clean up asbestos-containing materials in the work area shall be equipped with HEPA filters. NOTE: All HEPA equipped vacuums used on this project shall be thoroughly decontaminated prior to being brought on site.
- 3.2.5 Miscellaneous Tools and Equipment - The Contractor shall provide all other tools suitable for the stripping, removal, and encapsulation of asbestos-containing materials. These tools include, but are not limited to, scrapers, wire cutters, brushes, sprayers, sponges, utility knives, flexible wire saws, shovels, and brooms.
- 3.2.6 Use of Owner's Tools and Equipment - No tools or equipment of the Owner shall be used by the Contractor, unless permission in writing is granted by the Owner's representatives.
- 3.3 WATER SERVICE
- 3.3.1 Temporary Water Service Connection - All connections to the Owner's water system shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, all connections and fittings shall remain in place for use by the Owner.
- 3.3.2 Water Hoses - Employ heavy duty, abrasion resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each work area. Provide fittings as required to allow for connections. NOTE: Any leaking hoses shall be immediately repaired and/or removed from the project.
- 3.3.3 Water Heater - If hot water is not available at the building, provide at least one (1) UL rated 40-gallon electric hot water heater to supply hot water to the decontamination unit. Provide with relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA, NECA, and UL standards.
- 3.4 ELECTRICAL SERVICE
- 3.4.1 General - Comply with applicable NEMA, NECA, and UL standards and governing regulations for materials and layout of temporary electrical service. NOTE: All modifications and/or connections made to the buildings' electrical system shall be performed by a certified electrician at the consent of the Owner.
- 3.4.2 Lockout - Lockout all existing power to or through the work area as described below. Unless specifically noted otherwise, existing power and lighting circuits to the work area are not to be used. All power and lighting to the work area and decontamination facilities are to be provided from temporary electrical panel described in article 3.4.3.



- 3.4.2.1 Lockout power to circuits running through work area where feasible by switching off all breakers servicing these circuits. Label breakers with tape over breaker with notation "DANGER - circuit being worked on." Sign and date danger tag. Lock panel and have keys under the sole control of electrician and Supervisor. If circuits cannot be shut down for any reason, label energized power and lighting circuits, and equipment with tags reading "DANGER - Live Electric, Electrocution Hazard.
- 3.4.3 Electrical Distribution System - Temporary electric panels equipped with ground fault circuit interrupters (GFCI's) shall be installed outside of the enclosed work areas with sufficient circuits to support all AFD's, lighting, electric tools, and air sampling equipment inside and outside of the enclosed work area. All temporary electrical power shall comply with the requirements of the National Electric Code for Wet Environments. Provide only UF non-metallic sheathed cable.
- 3.4.4 Electric Tools - Electrical tools and equipment shall meet all applicable codes and regulations. GFCI's shall be used at all times for electrical equipment.
- 3.4.5 Electrical Power Cords - Use only grounded extension cords; use "hard service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.
- 3.4.6 Lamps and Light Fixtures - Provide general service incandescent or halogen lamps of wattage indicated or required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures. Provide lighting fixtures suitable for wet environments.
- 3.5 TEMPORARY LIGHTING
  - 3.5.1 Where natural lighting does not meet the required light level, provide one (1) 200 watt halogen light per every 500 square feet of floor area. In stairways and at ladder runs, provide one 100 watt incandescent lamp per story, located so as to illuminate each landing and flight. Provide sufficient temporary lighting to ensure proper workmanship everywhere, by combined use of daylight, general lighting, and portable plug-in task lighting.
- 3.6 FIRE EXTINGUISHERS
  - 3.6.1 Provide Type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires. In other locations, provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

## PART 4 - EXECUTION

### 4.1 SEQUENCE OF EXECUTION

#### 4.1.1 Full Negative Pressure Enclosure (pipe insulation, fitting insulation, horsehair, acoustical plaster)

4.1.1.1 Shut down and lock out electric power to all work areas where applicable. Provide temporary power and lighting and ensure the safe installation of temporary power services and equipment, as specified in applicable electrical code requirements. Provide ground-fault interrupt circuits as a power source for all electrical equipment. All modifications to the building's electrical system shall be performed by a certified electrician at the consent of the Owner. The power service shall not violate the integrity of the area isolation. Auxiliary lighting used in the work area shall be moisture proof.

4.1.1.2 Seal all other openings from the work area, including but not limited to: doorways; windows; diffusers, return and relief grilles, and any other HVAC openings; and any other penetrations, with two layers of 6-mil polyethylene sheeting sealed with tape. The work areas shall be demarcated with construction barrier tape and caution signs.

4.1.1.3 Introduce scaffolding and other large equipment that will not pass through the work area isolation structure.

4.1.1.4 Where the work area terminates either in a corridor which is in use or adjacent to other occupied areas of the building, neither of which is separated from the work area by existing building construction (e.g., doors, walls, etc.), the Contractor shall install two 6 mil polyethylene barriers, each air tight and at least 3 feet apart. In addition to these plastic barriers, the Contractor shall construct temporary framed partition(s) consisting of full height wood studs and 1/2" plywood to prohibit access to the contaminated work area, except through the approved decontamination system(s). If the barriers will abut asbestos-containing material, then the barriers shall be installed after installation of the work area isolation structure.

4.1.1.5 Cover floor and wall surfaces with two layers of 6-mil polyethylene sheeting sealed with tape. Apply anti-slip materials to steps (if applicable) so that the polyethylene film can be firmly anchored to avoid shifting layers of sheeting. Install floor polyethylene a minimum of 10" up the walls and overlap with the wall sheeting. Where appropriate, provide support for the wall polyethylene to reduce tension on tape and to ensure that the sheeting will not fall during the course of the work. Care shall be exercised to provide an air and watertight seal of the floor to wall sheeting joints, and at openings such as doors and windows. NOTE: The Contractor shall not be permitted to substitute the two layers of 6-mil poly sheeting with one layer of 10-mil poly sheeting. The polyethylene sheeting shall be installed as follows:

- floors - two (2) layers of 6-mil
- walls - two (2) layers of 6-mil

4.1.1.6 Install Plexiglas viewing windows where feasible as directed by the Consultant.

4.1.1.7 Install HEPA-filtered air filtration devices (AFD) into the work area and vent exhaust ducts through openings to the outside atmosphere. The following formula shall be used to calculate the number of AFD's required:

$$\text{\#AFD's} = \frac{\text{length} \times \text{width} \times \text{height of work area}}{15 \text{ minutes} \times \text{AFD capacity (in CFM)}}$$

Accomplish the negative pressure by exhausting a sufficient number of HEPA filtered fan units from the work area to the outside building air using disposable flex duct in lengths no greater than 50 feet (if exhaust locations exceed 50 feet, "booster" or additional in-line units may be required). AFD exhausting onto pedestrian walkways is prohibited.

Continuously maintain the work area at an air pressure that is lower than that of any surrounding outside area (negative pressure). This negative pressure, when measured across any physical or critical barrier, must equal or exceed a static pressure of -0.02 inches of water. Provide a manometer with a dial or strip recorder to measure and record the pressure differential across the barrier at all times. The negative pressure shall be maintained for the duration of the project until clearance air sampling results is obtained meeting the clearance criteria. NOTE: Should negative pressure drop below -0.02 inches of water, the Contractor shall immediately stop all work in the contained area(s) until the required pressure is achieved.

- 4.1.1.8 Establish a contiguous three chamber decontamination unit in accordance with OSHA 29 CFR 1926.1101 and Article 4.2 with functional shower.
- 4.1.1.9 Pre clean fixed and immovable objects and/or contaminated furniture and materials within the work area using HEPA-equipped vacuums and/or wet cleaning methods as appropriate, and enclose with polyethylene film and seal with tape.
- 4.1.1.10 Pre-clean contaminated furniture and materials within the work area using HEPA-equipped vacuums and/or wet cleaning methods as appropriate. Remove any decontaminated furniture and materials from the work area and store or discard as directed by the Owner. NOTE: Stationary items in the work area(s) may be inspected by the on-site Consultant prior to allowing the Contractor to seal them with polyethylene film and tape.
- 4.1.2 Modified Negative Pressure Enclosure (floor tile, floor tile mastic, step treads, ceiling tile adhesive, transite) -
  - 4.1.2.1 The buildings existing electrical outlets may be utilized in all modified negative pressure enclosures providing all Contractors electrical equipment needed to perform the work be attached to portable ground fault circuit interrupter (GFCI's).
  - 4.1.2.2 Seal all other openings from the work area, including but not limited to: doorways; windows; diffusers, return and relief grilles, and any other HVAC openings; and any other penetrations, with two layers of 6-mil polyethylene sheeting sealed with tape. NOTE: Splash guards shall be constructed prior to removal of floor tile mastic.
  - 4.1.2.3 Introduce scaffolding and other large equipment that will not pass through the work area isolation structure.
  - 4.1.2.4 Install HEPA-filtered air filtration devices (AFD) into the work area and vent exhaust ducts through openings to the outside atmosphere.
  - 4.1.2.5 Pre-clean fixed and immovable objects and/or contaminated furniture and materials within the work area using HEPA-equipped vacuums and/or wet cleaning methods as appropriate, and enclose with polyethylene film and seal with tape.
  - 4.1.2.6 Pre-clean contaminated furniture and materials within the work area using HEPA-equipped vacuums and/or wet cleaning methods as appropriate. Remove any decontaminated furniture and materials from the work area and store or discard as directed by the Owner.
  - 4.1.2.7 Establish a three chamber decontamination unit in accordance with OSHA 29 CFR 1926.1101 and Article 4.2 with functional shower. The decontamination unit is not required to be contiguous to the removal area.

4.1.3 Regulated Work Area Removal (glove bag removal, door caulking, window glazing, fire doors, roof flashing tar, roof flashing caulk, and roofing materials) -

4.1.3.1 Place OSHA approved warning signs and barrier tape, demarcating area from unauthorized entrance.

4.1.3.2 Place one layer of 6-mil polyethylene sheeting on floor and/or ground to act as a drop cloth to collect possible debris generated by the abatement procedure.

NOTE: Floor polyethylene is not required for roofing material removal.

4.1.3.3 Establish a three chamber decontamination unit in accordance with OSHA 29 CFR 1926.1101 and Article 4.2 with functional shower. The decontamination unit is not required to be contiguous to the removal area.

## 4.2 ASSOCIATED WORK AREA COMPONENTS

### 4.2.1 Decontamination Enclosure Systems

4.2.1.1 General - Build suitable framing and/or use existing rooms connected with framed-in tunnels, if necessary, and line with plastic sealed with tape at all lap joints for all enclosures and decontamination enclosure systems rooms. Either existing rooms outside of the work area or specially framed and sealed temporary areas shall be used for the decontamination enclosure system. Convenience and proximity to the work area shall be the determining factors. In all cases, access between contaminated and uncontaminated rooms or areas shall be through an airlock, as described in Section 2.3.

4.2.1.2 Worker Decontamination Enclosure System - Construct a worker decontamination enclosure system contiguous to the work area that consists of three totally enclosed chambers as follows:

- An equipment room with two curtained doorways: one to the work area and one to the shower room.
- A shower room with two curtained doorways; one to the equipment room and one to the clean room. One shower shall be provided for every ten (10) workers or fraction thereof as required by 29 CFR 1910.141. To ensure against potential leakage, a metal pan with a minimum three-inch lip shall be installed underneath each shower facility. Ensure soap is available at all times in the shower room. The shower waste water shall be drained, collected, and filtered through a system with at least 5 to 10 micron particle size collection capability. NOTE: A system containing a series of several filters with progressively smaller pore sizes is recommended to avoid rapid clogging of filtration system by large particles. All expended filters shall be discarded as contaminated waste. Filtered water may be discharged to a sanitary or storm sewer drain.
- A clean room with one curtained doorway into the shower and one entrance or exit to uncontaminated areas of the building. The clean room shall have sufficient space for storage of workers' street clothes, towels, and other uncontaminated items.

NOTE 1: The chambers of the decontamination unit shall be built large enough to facilitate proper personnel decontamination and efficient load outs of asbestos-containing waste and/or demolition debris. The enclosure shall be large enough for workers to change in privacy. The shower area itself shall be constructed on site and shall be required to have a wood or plastic grading so at no time the worker will be standing in contaminated water. The showerhead shall be firmly attached to the shower unit. There shall be no deviation to this

requirement. The decontamination unit shall be thoroughly cleaned (every day) prior to the Contractor leaving the job site.

NOTE 2: Use black plastic for the walls and curtains of the worker decontamination enclosure system to ensure the privacy of the workers. The top shall be covered with clear plastic to allow existing light into the decontamination enclosure.

#### 4.2.2 Air Filtration System

4.2.2.1 Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

4.2.2.2 Visually inspect enclosures at the beginning, during and following each work shift.

4.2.2.3 A pressure differential between the outside and inside work area shall be maintained at all times while abatement activity is in progress. The Contractor shall not allow any airflow out of the work area except through HEPA filtered air filtration devices.

4.2.2.4 The pressure differential shall be maintained so that the movement of tools, equipment, employees and waste containers through the decontamination enclosure systems do not result in airflow out of the work area.

#### 4.3 ASBESTOS REMOVAL AND DECONTAMINATION PROCEDURES

4.3.1. Full Negative Pressure Containment (pipe insulation, fitting insulation, tank insulation, horsehair with canvas jacketing, acoustical plaster, HVAC paper insulation) -

4.3.1.1 After isolation of the work area is completed as specified, the asbestos-containing material should be wetted with amended water before removal. Small sections of the material shall be removed, wetted again with amended water, and immediately placed into approved disposal containers. All surfaces of the remaining components (including but not limited to steel and/or concrete decking, concrete and/or block walls, etc.) shall be thoroughly wet cleaned with power washer, sponges, cloths, or brushes. No visible asbestos-containing material shall remain. Containers that become full shall be sealed and labeled for transportation to an approved disposal site.

#### 4.3.2 Glove Bag Removal Procedure -

4.3.2.1 Glove bags shall be used in strict accordance with OSHA 29 CFR 1926.1101. Glove bag work shall be conducted by two person teams per glove bag. Each glove bag shall only be used once and may not be moved. In the event of area contamination (i.e., breached glove bag, improper work practice, etc.) the Contractor shall immediately stop work and isolate the immediate work area (as determined by the Owner or Owner's Representative). The Contractor shall then immediately proceed with cleaning of the entire isolated area(s) using HEPA-filtered vacuuming followed by wet wiping of all surfaces.

4.3.2.2 Glove bags shall be of 6-mil thickness and shall be seamless at the bottom. Cover floor in the vicinity of the work area and six (6) feet beyond with 6-mil polyethylene sheeting. Prior to installing the glove bag, completely cover all loose and friable materials adjacent to the glove bag operation with two layers of 6-mil polyethylene or encapsulate to render material intact.

4.3.2.3 Install the glove bag so that it completely covers the circumference of the pipe where the work is to be performed.

4.3.2.4 Modifications of glove bags shall not be permitted. Install per the manufacturer's instructions. All glove bags must be smoke tested, and all detectable leaks sealed prior to performing glove bag removal work.

- 4.3.2.5 Keep materials wet at all times during the removal process utilizing amended water. Immediately repair any leaks which occur during removal. Following removal of the materials, wash all materials down into the lower compartment of the glove bag. Thoroughly rinse the interior of the bag and encapsulate the interior of the bag and the substrate where the material has been removed.
- 4.3.2.6 Evacuate the air from inside the glove bag using a HEPA vacuum. With the removed insulation in the bottom of the bag, twist the bag several times and tape above the lower compartment to contain the material in the bottom of the bag. Remove the glove bag and promptly place in approved disposal container.
- 4.3.2.7 At the time of generating this Abatement Specification, wrap and cut removal procedures of piping with asbestos-containing insulation was not approved. If such procedures are granted during this project, the Abatement Contractor shall follow all established guidelines and regulations pertaining to the wrap and cut removal procedures. Approval to perform wrap and cut removal procedures shall be the responsibility of the Owner and/or Danis.
- 4.3.3 Floor Tile/Mastic Removal -
- 4.3.3.1 After isolation of the work area is completed as specified, mist the floor tile with amended water prior to scraping it from the substrate. The floor tile shall be removed using wood handle scrapers. Once the floor tile has been removed from the substrate, it shall be placed into reinforced bags (i.e., rice bags) then placed into approved disposal containers. Once all floor tile has been removed, the mastic shall be dissolved using a commercially available solvent. Wood chips and/or wood shavings should be used to absorb the dissolved mastic prior to collection. Once the floor tile mastic has been removed, the mastic and wood shavings shall be placed into approved disposal containers. The floor surface shall be visibility clean with no mastic left in corners or around door frames.
- 4.3.4 Step Tread Removal -
- 4.3.4.1 After isolation of the work area is completed as specified, mist the step tread with amended water prior to scraping it from the substrate. The step tread shall be removed using wood handle scrapers. Once the step tread has been removed from the substrate, it shall be placed into reinforced bags (i.e., rice bags) then placed into approved disposal containers.
- 4.3.5 Ceiling Tile Adhesive Removal -
- 4.3.5.1 After isolation of the work area is completed as specified, the ceiling tiles shall remove from the ceiling, the adhesive wetted with amended water, and the adhesive removed using hand scrapers. Once the adhesive has been removed from the ceiling, the adhesive shall be placed into approved disposal containers. No visible pieces of adhesive shall remain. Note: Ceiling tile with adhesive attached shall be disposed of as asbestos-containing material.
- 4.3.6 Transite Removal -
- 4.3.6.1 After isolation of the work area is completed as specified, the transite shall be wetted with amended water and removed in a manner that minimizes breakage. Once the transite has been removed, it shall be wrapped in two layers of 6-mil poly sheeting and properly labeled for disposal as asbestos-containing waste. No visible pieces of transite shall remain.

#### 4.3.7 Door Caulking Removal -

After isolation of the work area is completed as specified, the door shall be removed and wrapped in two layers of 6-mil polyethylene sheeting and properly labeled for disposal as asbestos-containing waste. All remaining caulking on the door frames shall be scraped from the substrate and placed into approved disposal containers. No visible pieces of caulking shall remain.

#### 4.3.8 Window Glazing/Bedding Removal -

After isolation of the work area is completed as specified, the window shall be removed and wrapped in two layers of 6-mil polyethylene sheeting and properly labeled for disposal as asbestos-containing waste.

#### 4.3.9 Fire Door Removal -

After isolation of the work area is completed as specified, the fire door shall be removed in a manner that minimizes damage. Once the fire door has been removed, it shall be wrapped in two layers of 6-mil polyethylene and properly labeled for disposal as asbestos-containing waste.

#### 4.3.10 Roofing Materials/Roof Flashing Tar/Roof Flashing Caulk -

4.3.10.1 Wet methods shall be used during removal of the roofing/tar/caulking materials, unless such wet methods are not feasible, or will create safety hazards.

4.3.10.2 Cutting machines, or manual cutting with axes and prybars, shall be continuously misted with water during use, unless a competent person determines that misting substantially decreases worker safe.

4.3.10.3 All dust resulting from the cutting operation shall be HEPA vacuumed along the cut line, or removed by wet sweeping.

4.3.10.4 Asbestos-containing material that has been removed from the roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist.

4.3.10.5 Upon being lowered, unwrapped roofing material shall be transferred to a double lined 6-mil polyethylene disposal container. Asbestos warning signs shall be prominently posted on the disposal container during loading operations.

4.3.10.6 Any asbestos-containing roofing/tar material that is not intact shall be lowered to the ground in leak proof containers (e.g., doubled 6 mil polyethylene disposal bags, double 6 mil polyethylene wrapped, etc.), as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall be kept wet, placed within leak proof waste bags, or wrapped in 6 mil polyethylene sheeting.

#### 4.3.11 Auditorium Ceiling Light(s) Removal -

4.3.11.1 After isolation of the work area is completed as specified, the ceiling lights and frames shall be removed by first cutting the canvas/horsehair material around the circumference of the frame in such a manner to not disturb and/or cause further damage to the canvas material. The Abatement Contractor shall have a worker on top of the auditorium ceiling assisting in the removal of the lights. Once the light and frame has been removed, the worker on top of the ceiling shall install a critical barrier over the hole. At that time the Abatement Contractor shall seal all exposed edges with a bridging encapsulate. Included in the scope of the work the Abatement Contractor shall be required to cut (4) additional (4' x 4') openings for future ductwork. Areas will be outlined by Danis.

#### 4.4 REMOVAL AND DISPOSAL OF CONTAMINATED WASTE

- 4.4.1 Fill disposal containers to a level that workers can handle safely and with ease.
- 4.4.2 As disposal containers are filled, seal and move them to the staging area for decontamination.
- 4.4.3 Clean external surfaces of containers thoroughly by wet sponging in the designated areas that is part of the equipment decontamination enclosure system. Move containers to the washroom, wet-clean each container thoroughly, and move them to the holding areas pending removal to uncontaminated areas. Place decontaminated, sealed plastic bags containing asbestos material into a second clean bag; twist the bag opening tightly, bend the twisted end downward, and seal with tape. Move all disposal containers to the holding area to await disposal at an approved landfill. If glove bag techniques are used, place the glove bag into a clean bag; twist the bag opening tightly, bend the twisted end downward, seal with tape, and then move it to the holding area. Place danger labels on containers in accordance with 29 CFR 1926.1101. Identification labels shall also be placed on the outside of the first bag in accordance with 40 CFR Part 61, Subpart M. Ensure that containers are removed from the holding area by workers, dressed in clean coveralls, who have entered from uncontaminated areas. Ensure that workers do not enter from uncontaminated areas into the washroom of the work area; ensure that contaminated workers do not exit the work area through the equipment decontamination enclosure system.
- 4.4.4 To prevent exceeding available storage capacity on-site as the work progresses (if applicable), remove sealed and labeled containers of asbestos waste and dispose of such containers at an authorized disposal site in accordance with disposal regulatory requirements.
- 4.4.5 After the waste containers are decontaminated, the Contractor may make arrangements for a hauler or truck driver from the waste disposal site to transport the asbestos waste and contaminated material to the disposal site. Transportation of all materials from each work area shall be in accordance with all applicable DOT and EPA regulations.
- 4.4.6 Transportation shall be by enclosed truck, trailer, or waste shipping container with the cargo area free of debris and lined with 6-mil polyethylene sheeting on floors and walls. Drums and/or bags shall be placed in the cargo area so as to prevent shifting and damage during transport. Asbestos warning signs shall be prominently posted during loading and unloading.
- 4.4.7 All asbestos-containing waste inside the work area shall be removed and items decontaminated before any cleanup work is started and before the isolation structures are dismantled.
- 4.4.8 The Contractor shall be responsible for determining current waste handling and disposal regulatory requirements and must comply with these regulations.
- 4.4.9 The Contractor shall ensure that all employees handling and discarding asbestos waste wear approved respiratory equipment and protective clothing.
- 4.4.10 In certain instances, plastic bags or fiber and metal drums may not be adequate or suitable to handle certain asbestos-containing materials. As an alternative, the Contractor may remove asbestos-containing material that is bulky or cumbersome in two layers of 6-mil plastic sheeting sealed tightly at all joints with tape and/or spray adhesive. The waste shall be properly labeled in accordance with current OSHA, DOT and NESHAP requirements before transportation to the approved disposal site. All metal waste shall be deposited and disposed of in air and water tight drums. The drums shall be properly labeled before transportation to the appointed disposal site.



#### 4.5 CLEANUP AND DECONTAMINATION OF THE WORK AREA

- 4.5.1 Asbestos Cleanup - Remove visible accumulations of asbestos material and debris. Wet-clean all surfaces within the work area.
- 4.5.2 Clean all surfaces in the work area and any other contaminated areas with water and/or with HEPA-filtered vacuum equipment. After cleaning the work area, wait twenty-four hours to allow dust to settle, and wet-clean and/or HEPA vacuum all surfaces in the work area a second time. After completion of the second cleaning operation, visually inspect the entire work area to ensure that it is free of visible asbestos debris.
- 4.5.3 Sealed containers and all equipment used in the work area shall be included in the cleanup and shall be removed from work areas, via the decontamination enclosure system, at an appropriate time in the cleaning sequence.
- 4.5.4 If the Owner finds visible accumulations of asbestos debris in the work area after cleaning, the Contractor shall repeat the wet-cleaning until the work area passes inspection.
- 4.5.5 When the final inspection and subsequent final clearance air monitoring survey (if performed) determines the area is free of accumulated visible asbestos debris and airborne fibers, the decontamination enclosure system shall be removed and materials from the equipment room and shower shall be disposed of as contaminated waste.
- 4.5.6 To prevent exceeding available storage capacity on-site as the work progresses, sealed and labeled containers of contaminated waste shall be removed and disposed of as contaminated waste.

#### 4.6 DETERMINING ABATEMENT COMPLETION

##### 4.6.1 Visual Inspection

- 4.6.1.1 The Contractor shall be required to conduct a thorough visual inspection of each work area after all asbestos-containing material has been completely removed.
- 4.6.1.2 Items to be checked during the visual inspection include, but are not limited to, the following:
- The adequacy of removal of asbestos-containing materials from their substrate.
  - The presence of adhering material or accumulated material on exposed surfaces.

Only after the work area has passed the visual inspection will the Contractor be permitted to apply sealant materials.

#### 4.7 SEALANT APPLICATION FOR LOCKDOWN

- 4.7.1 In all areas from where asbestos-containing materials are removed (including glove bag), an approved sealant shall be used to lock down residual fibers to their substrate.
- 4.7.2 The sealant shall be applied to all surfaces within the containment.
- 4.7.3 The sealant shall be applied with low-pressure airless spray equipment.
- 4.7.4 The sealant shall be used and applied in strict accordance to manufacturer's specifications.

- 4.7.5 The Contractor shall apply a thin, visible, contiguous film of sealant to all areas specified. Additional applications shall be required if the first application does not adequately cover the substrates.
- 4.8 FINAL AIR MONITORING
- 4.8.1 Final air sampling will be performed to determine and document air quality upon completion of abatement activities within full negative pressure containments. The consultant shall perform the final air sampling after the worksite has passed the final visual inspection and the polyethylene walls have been removed. Samples will be collected by use of high-volume electric sampling pumps calibrated to a maximum flow rate of 10 liters/minute. Final clearance air samples shall be collected and analyzed using Phase-Contrast Microscopy (PCM) and/or Transmission Electron Microscopy (TEM).
- 4.8.1.1 Acceptable Final Air Clearance Concentrations by PCM - Clearance air samples will be collected from several locations in the work area and in the adjacent worker decontamination area. Samples will be analyzed by PCM using NIOSH Method No. 7400. Total airborne fiber levels in all locations in the work area (as determined by phase-contrast microscopy) must be less than 0.01 fiber/cubic centimeters of air. If anyone air sample collected within the work area is equal to or greater than 0.01 fiber/cubic centimeters, the Contractor shall re-clean the work area with HEPA-filtered vacuum equipment and damp cloths/mops. A second set of final air samples will be collected and analyzed by the Consultant at the Contractor's expense.
- 4.8.1.2 Acceptable Final Air Concentrations by TEM - A total of thirteen (13) TEM samples may be required: five (5) samples collected inside all applicable abatement work areas, five (5) samples collected outside all applicable abatement work areas, two (2) field blanks, and one (1) sealed blank per the requirements of EPA 40 CFR Part 763, Appendix A. If the average of the 5 inside sample concentrations is less than or equal to 70 structures per millimeter squared (70 s/mm<sup>2</sup>), the work area shall be considered clean. In the event the TEM samples fail to pass the clearance criteria as listed, the Contractor shall be required to re-clean the contained work area and re-encapsulate all specified surfaces. All cost associated with the analysis of a second and/or subsequent set(s) of TEM samples shall be borne by the Contractor.

## **Appendix A**

### **Final Documentation Audit**

## **FINAL DOCUMENTATION AUDIT**

Throughout the progress of the Work, the Contractor's Supervisor or Foreman of each crew shall generate the following documentation to be submitted to the Consultant at Substantial Completion. The Contractor shall be required to submit all items listed below before final payment can be issued.

1. Air monitoring data.
2. Copies of all transport and disposal manifest.
3. Daily project log.
4. Accreditation and worker medical documentation for all Contractor employees.
5. Copy of Contractor's Ohio Abatement License.
6. Copy of Contractor's Workers Compensation/Insurance Certificates.
7. Safety Data Sheets on all chemicals used on project.
8. Landfill forms/dump receipts.
9. EPA notification(s).

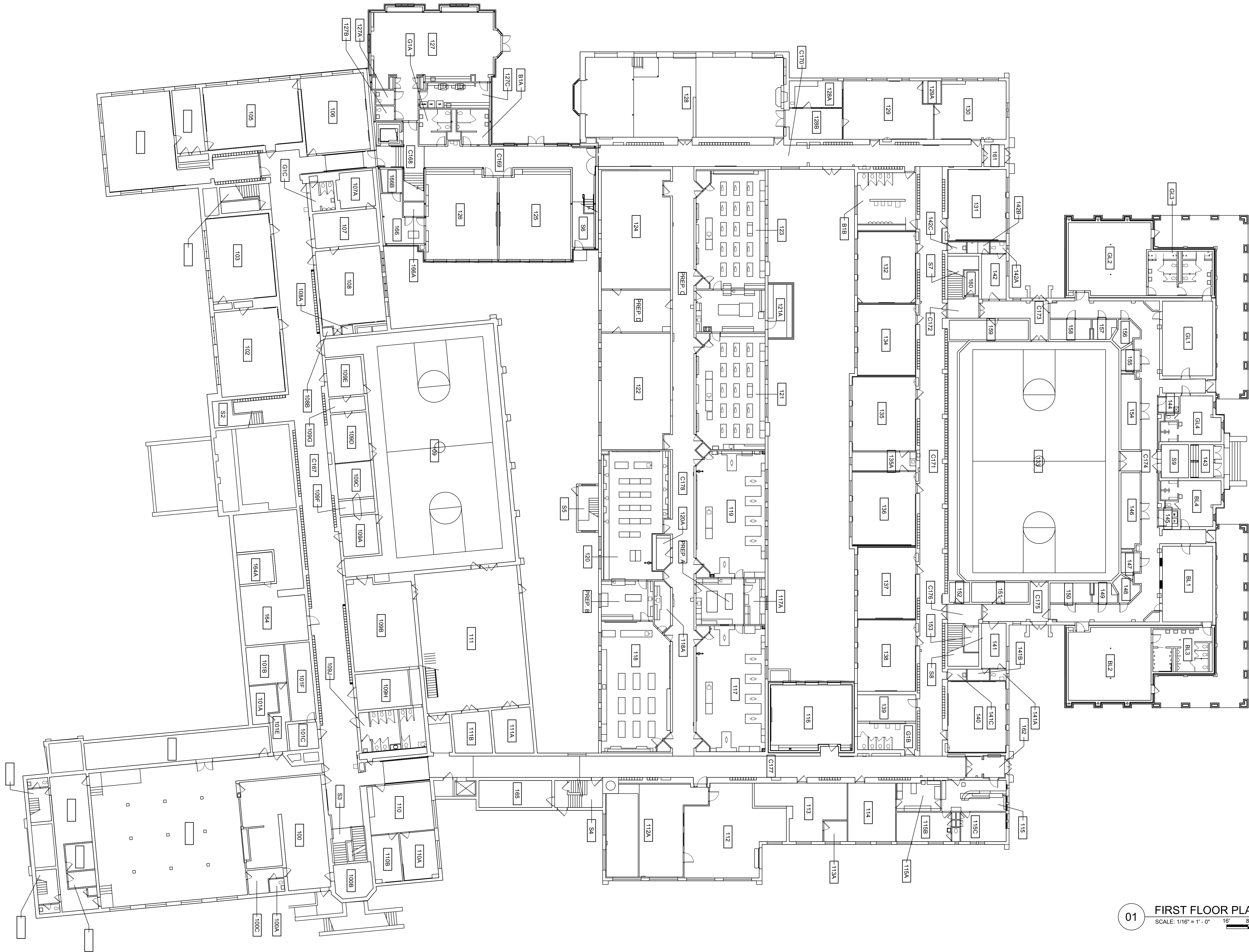
Close out documentation shall be forwarded to the Owner and/or Owners representative within 30 calendar days upon completion of the project

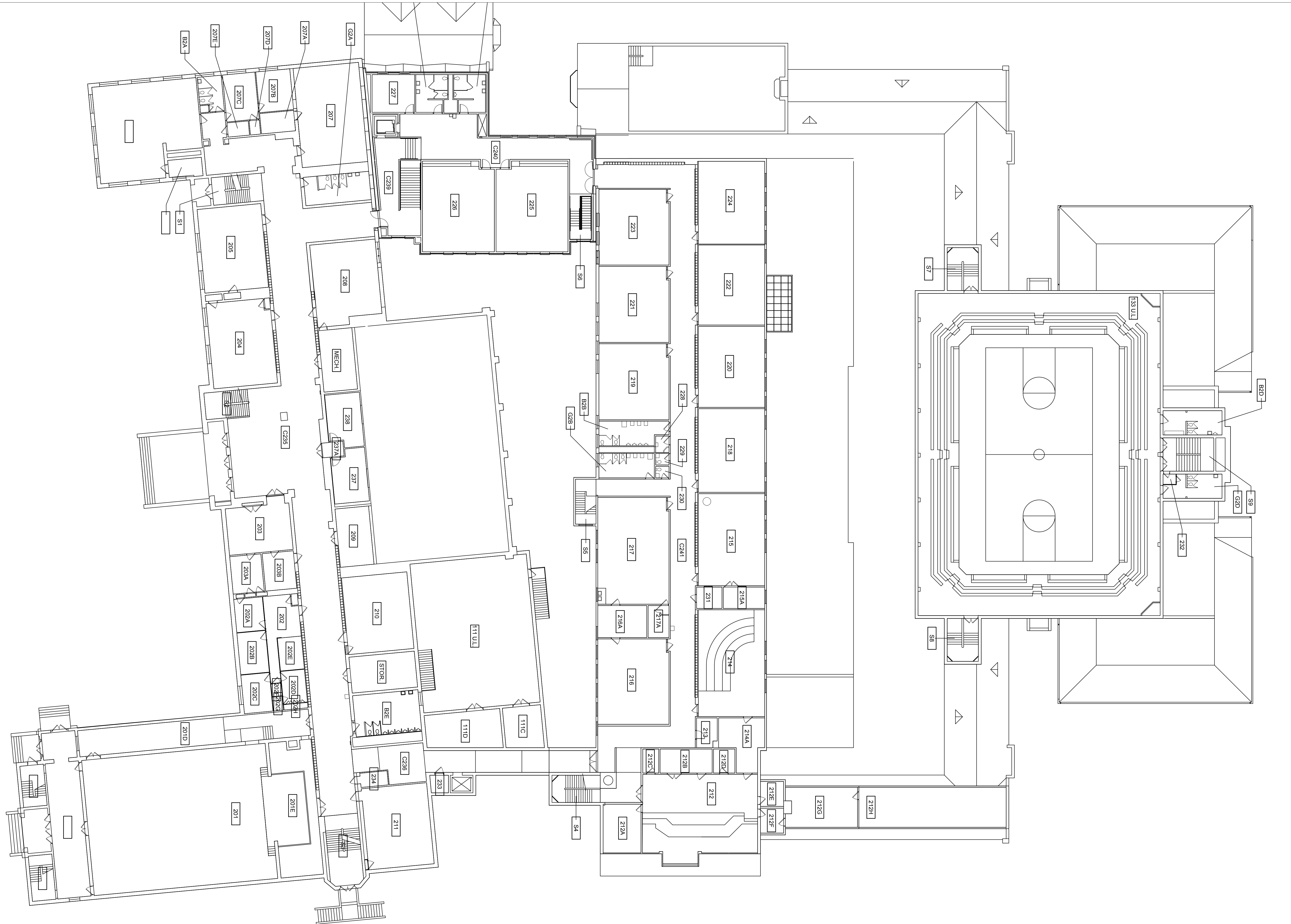
## **Appendix B**

### **Asbestos-Containing Materials Inspection Report (2019)**

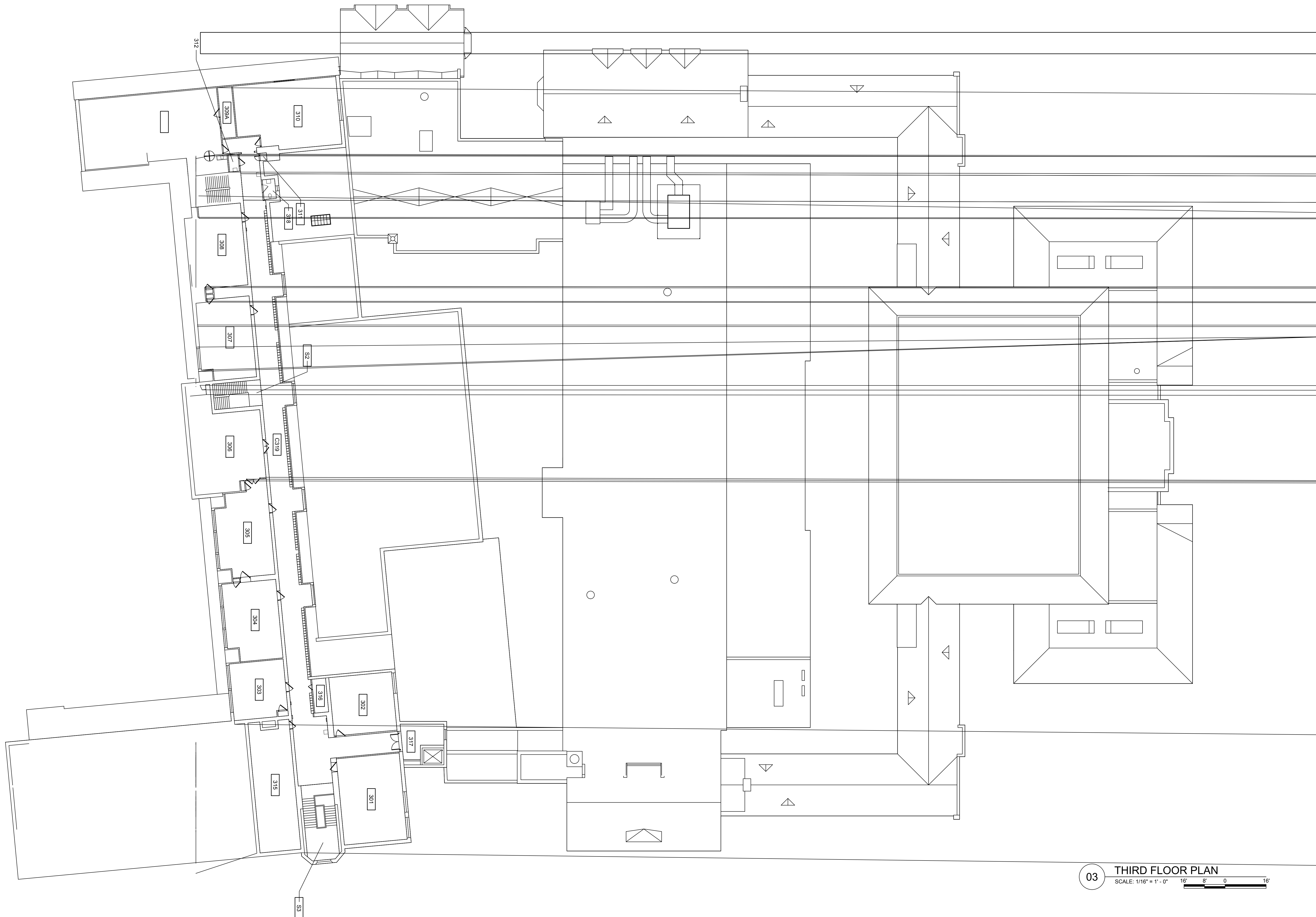
## **Appendix C**


### **Drawings Outlining Identified Phasing Work Areas**











Final Phasing will be reviewed/updated with contractors prior to starting work. This plan is subject to change pending review with subcontractors and Oakwood Schools.





