



**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Asbestos Abatement Portions of Air Force Plant 3

Tulsa International Airport
City of Tulsa, Tulsa County, Oklahoma

A & M Project Number 2320-001-008

Version 1 / Revision Date – N/A

August 1, 2019

Prepared For:



City of Tulsa
Office of the Mayor
175 East 2nd Street, Suite 15-041
Tulsa, Oklahoma 74103
Michelle Barnett, P.E. (Deputy Chief of Economic Development)
Email: mbarnett@cityoftulsa.org
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**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

August 9, 2019

Ms. Michelle Barnett, P.E.
Deputy Chief of Economic Development
City of Tulsa
Office of the Mayor
175 East 2nd Street, Suite 15-041
Tulsa, Oklahoma 74103

A & M Project Number 2320-001-008

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**REF: Quality Assurance Project Plan (QAPP) for Asbestos Abatement at Portions of Air Force Plant 3,
located at the Tulsa International Airport, City of Tulsa, Tulsa County, Oklahoma.**

Dear Ms. Barnett:

A & M Engineering and Environmental Services, Inc. (A & M) has prepared the enclosed Quality Assurance Project Plan (QAPP) for **Asbestos Abatement** to be performed at the above referenced site.

Thank you for choosing A & M. If you have any questions feel free to contact us at (918) 665-6575 or via email.

Respectfully,
A & M Engineering and Environmental Services, Inc.

Jeff Jenkins, CIH, CSP
Senior Industrial Hygienist
ODOL Project Designer (OKPD 143988)
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Jeff Elbert
Director of Compliance
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Enclosure

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Appendices

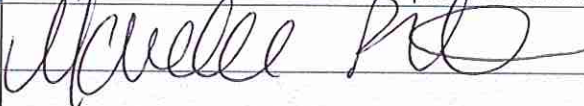


Appendix A	Project Figures
Appendix B	Asbestos Abatement Project Design (PD)
Appendix C	QAPP Amendment Log Form and Completed Forms
Appendix D	Project Organizational Chart
Appendix E	Air Monitoring Data Form

Figures (See Appendix A)

Figure 1	Site Map
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1.0 PROJECT TITLE AND QAPP APPROVAL

This Quality Assurance Project Plan (QAPP) will be reviewed and approved by the City of Tulsa's Quality Assurance Manager, United States Environmental Protection Agency's (USEPA's) Project Officer, Consultant's Project Manager, and Consultant's Project Quality Assurance Manager prior to implementation and commencement of project activities. Project title and approval information is provided below:

Project Title:	Asbestos Abatement at portions of Former Air Force Plant 3 located at the Tulsa International Airport, City of Tulsa, Tulsa County, Oklahoma	
Implementing Organization:	City of Tulsa	
QAPP Effective Date:	August 1, 2019	
Approving Officials:	The City of Tulsa's Quality Assurance Manager will have primary responsibility for project oversight and quality assurance on behalf of the City of Tulsa. The USEPA's Project Officer will ensure that the policies, goals, and objectives of the project are achieved on behalf of the USEPA. The consultant will provide a Project Manager designated with the primary responsibility for project oversight on behalf of the consultant. They will also provide a Project Quality Assurance Manager to ensure Quality Assurance expectations are met on behalf of the consultant. The consultant will also provide a Health and Safety Officer to ensure safe work practices throughout the project.	
Michelle Barnett, P.E.		9/3/19
City of Tulsa's Quality Assurance Manager (print name)	Signature	Date
Paul Johnson		9/3/2019
USEPA's Project Officer (print name)	Signature	Date
Jeff Elbert		8-09-2019
Consultant's Project Manager (print name)	Signature	Date
Jeff Jenkins, CIH, CSP		8-09-2019
Consultant's Project Quality Assurance Manager and Health and Safety Officer (print name)	Signature	Date

2.0 QAPP DISTRIBUTION AND PROJECT ORGANIZATION

Any individual or organization participating in this project may request a copy of this QAPP. All individuals listed in Section 1.0 of this QAPP will receive a final copy of this QAPP and comprise the project organization and distribution list, as listed below:

Name	Title	Company/Agency/Entity	Project Role
Michelle Barnett, P.E.	Deputy Chief of Economic Development	City of Tulsa	City of Tulsa's Quality Assurance Manager
Paul Johnson	EPA Project Officer	US EPA	USEPA's Project Officer
Bernita Hart	ODOL Director Asbestos	ODOL	ODOL Director Asbestos
Jeff Elbert	Director of Compliance	A & M Engineering and Environmental Services, Inc.	Consultant's Project Manager
Jeff Jenkins, CIH, CSP	Senior Industrial Hygienist/ Oklahoma Project Designer	A & M Engineering and Environmental Services, Inc.	Consultant's Project Quality Assurance Manager

It shall be the responsibility of the USEPA's Project Officer to distribute the QAPP to the required Project Managers, Quality Assurance Managers, and any other representatives of their groups involved in the project.

3.0 INTRODUCTION

This QAPP has been prepared to document quality assurance and quality control procedures to be implemented for Asbestos Abatement at the Former Air Force Plant 3, Building 6 located at the Tulsa International Airport, City of Tulsa, Tulsa County, Oklahoma, henceforth referenced as the Site. [Appendix A \(Project Figures\) contains a Site Map \(Figure 1\).](#)

This QAPP has been developed by A & M Engineering and Environmental Services, Inc. (A & M) in accordance with applicable USEPA protocols outlined in the USEPA's Requirements for Quality Assurance Project Plans, USEPA QA/R-5 (EPA, 2001), and USEPA Guidance for Quality Assurance Project Plans (EPA QA/G-5) (EPA, 2002).

The Asbestos Abatement Project Design has been prepared in accordance with the specific governing including but not limited to: 29 Code of Federal Regulations (CFR) 1926.1101 (OSHA Construction Industry Asbestos Standard), 29 CFR 1910.134 (OSHA Respiratory Protection), 40 CFR 61, Subpart M (Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP), and Oklahoma Asbestos Control Act (OAC) 380:50 with approved variances.

4.0 OTHER PROJECT PLANS

This QAPP incorporates the following additional Project Plans including:

- **Project Design (PD)** that outlines the planned work activities and implementation. [Appendix B contains a copy of the PD.](#)

5.0 AMENDMENTS

All amendments to this QAPP and/or associated other plans (PD) will be reviewed/approved prior to implementation by the individuals identified in Section 1.0 of this QAPP. [Appendix C contains a QAPP Amendment Log Form to be completed for all such amendments. Completed Amendment Log Forms will also be kept in Appendix C or the appropriate appendix of the other associated plans, as appropriate.](#)

6.0 PROBLEM DEFINITION AND BACKGROUND

Air Force Plant 3 (AFP3) is located on approximately 332 acres of land immediately east of the Tulsa International Airport and contains a total of ninety-two (92) buildings, of these four (4) are electrical power stations.

The AFP3 facility was constructed in early 1942 for the production and repair of aircraft during World War II and remained in use until 1994 when aircraft production and repair operations ceased. During the late 1990's, McDonnell Douglas – Tulsa (The Boeing Company) occupied some of the buildings, but the majority remained vacant. The facility was eventually deeded to the City of Tulsa. McDonnell Douglas retained A & M Engineering and Environmental Services to conduct asbestos surveys of the facility. The surveys were initiated in late 1998 and a report finalized in March 1999.

Today, the City of Tulsa has tenants in many of the buildings, but much of the asbestos remains. The City of Tulsa is looking to abate the buildings of the asbestos containing materials (ACM) to allow more of the buildings to be modernized and restored to useful production.

7.0 PROJECT MANAGEMENT

Project management includes the elements and personnel in place to ensure that the project has defined goals that are understood by all participants and achieved with implementation of the designed approach. Project Managers ensure that project planning, implementation, Quality Assurance/Quality Control (QA/QC), and reporting are properly documented.

7.1 PROJECT/TASK ORGANIZATION

The individuals and organizations participating in this project along with their specific roles and responsibilities are categorized by Principal Data Users, Quality Assurance Managers, Consultants, Subcontractors, and Key Decision Makers as described below and on the following pages.

Principal Data Users

Those principal persons/representatives, companies, agencies, and/or entities that will represent principal users of the data generated during the course of this project are identified below along with their contact information:

City of Tulsa's Quality Assurance Manager	
Name:	Michelle Barnett, P.E.
Title:	Deputy Chief of Economic Development
Company/Agency/Entity:	City of Tulsa - Office of the Mayor
Mailing Address:	175 East 2nd Street, Suite 15-041, Tulsa, Oklahoma 74103
Email Address:	mbarnett@cityoftulsa.org
Phone:	(918) 596-7457
USEPA's Project Officer	
Name:	Paul Johnson
Title:	EPA Project Officer
Company/Agency/Entity:	US Environmental Protection Agency
Mailing Address:	1445 Ross Avenue, Suite 1200; Dallas, TX 75202
Email Address:	Johnson.Paul@epa.gov
Phone:	(214) 665-2246
DOL Director - Asbestos	
Name:	Bernita Hart
Title:	Director – Asbestos/Alarm Locksmiths and Fire Sprinkler
Company/Agency/Entity:	Oklahoma department of Labor
Mailing Address:	3017 N Stiles, Suite 100; Oklahoma City, OK 73105
Email Address:	Bernita.Hart@labor.ok.gov
Phone:	(405) 521-6467
Consultant's Project Manager	
Name:	Jeff Elbert
Title:	Director of Compliance
Company/Agency/Entity:	A & M Engineering and Environmental Services, Inc.
Mailing Address:	10010 East 16 th Street; Tulsa, OK 74128
Email Address:	jelbert@aandmengineering.com
Phone:	(918) 665-6575
Consultant's Project Quality Assurance Manager and Health and Safety Officer	
Name:	Jeff Jenkins, CIH, CSP
Title:	Senior Industrial Hygienist/ OK Asbestos Project Designer
Company/Agency/Entity:	A & M Engineering and Environmental Services, Inc.
Mailing Address:	10010 East 16 th Street; Tulsa, OK 74128
Email Address:	jjenkins@aandmengineering.com
Phone:	(918) 665-6575

Asbestos Abatement Contractor's Project and Quality Assurance Manager	
Name:	To Be Determined
Title:	To Be Determined
Company/Agency/Entity:	To Be Determined
Mailing Address:	To Be Determined
Email Address:	To Be Determined
Phone:	To Be Determined

Quality Assurance Managers

City of Tulsa's Quality Assurance Manager

The City of Tulsa's Quality Assurance Manager for this project will have primary responsibility for project oversight and quality assurance on behalf of the City of Tulsa.

Their project management responsibilities include the following:

- Overall contracting and management of the grant (as applicable) and project performance.
- Development of the QAPP and other associated project plans.
- Shared responsibility of review/approval of the QAPP and other associated project plans.
- Contractor oversight including review, evaluation and decision-making regarding the contractor's recommendations.
- Impose stop work authority, whenever necessary.

Their quality assurance responsibilities include QA/QC oversight comprised of the following:

- Technical assistance to ensure environmental compliance.
- Shared responsibility for review/approval of the QAPP and other associated project plans including subsequent revisions.
- Maintaining the official/approved QAPP and ensuring that all involved parties have the most recent version of the QAPP and receive all amendments.
- Serve as the official QA/QC contact for all intramural and extramural QA/QC activities for the City of Tulsa.
- Report directly, as a partner, to the City of Tulsa regarding all QA/QC matters.
- Review and concur with the QAPP and submit to the QAPP to the USEPA Project Officer prior to the planned initiation of secondary environmental data review activities.
- Work with the City of Tulsa personnel to take appropriate corrective action when, where, and however needed, during the proposed project activities.
- Assure that all secondary environmental data review activities are accomplished in strict compliance with QAPP requirements.
- Impose stop work authority, whenever necessary.

USEPA's Project Officer

The USEPA's Project Officer will ensure that the policies, goals, and objectives of the project are achieved on behalf of the USEPA and implement the following:

- Assist the City of Tulsa's QA/QC staff.
- Shared responsibility for review/approval of the QAPP and other associated project plans including subsequent revisions.
- Provide overall resources to accomplish the implementation of the associated program.
- Routinely evaluate the relevant programs effectiveness.
- Impose stop work authority, whenever necessary.

When necessary, the City of Tulsa's Quality Assurance Manager and/or USEPA's Project Officer will coordinate with all appropriate State Agencies in a manner that ensures that compliance with all applicable State regulatory requirements are achieved. These agencies may include the Oklahoma Department of Environmental Quality (ODEQ), Oklahoma Department of Labor (ODOL), and/or others, as appropriate.

ODOL Director - Asbestos

The ODOL Director - Asbestos will ensure that the policies, goals, and objectives of the project are achieved on behalf of the ODOL and implement the following:

- Review and Approve the Project Design.
- Shared responsibility for review/approval of the QAPP and other associated project plans including subsequent revisions.
- Provide required regulatory inspections during the course of the project.
- Impose stop work authority, whenever necessary.

Consultants

The Consultant's Project Manager and Project Quality Assurance Manager designated for this project are responsible for project oversight and QA/QC on behalf of the consultant.

Consultant's Project Manager

The Consultant's Project Manager responsibilities include project oversight comprised of the following:

- Oversee project work and scheduling.
- Interact with City of Tulsa and USEPA staff with regard to the project, provides progress reports, and participates in routine work progress meetings.
- Shared responsibility for review/approval of the QAPP and other associated project plans including subsequent revisions.
- Provide oversight of all project activities and assurance that compliance with the QAPP and other associated project plans is met.

- Manage amendments to the QAPP and other associated project plans.
- Review and submit final documents.
- Schedule, coordinate, and attend required/necessary meetings.
- Impose stop work authority, whenever necessary.

Consultant’s Project Quality Assurance Manager and Health and Safety Officer

The Consultant’s Project Quality Assurance Manager will work closely with the Consultant’s Project Manager, City of Tulsa’s Quality Assurance Manager, and Subcontractor’s Project and Quality Assurance Manager to ensure the following:

- Adherence and compliance with the QAPP and other associated project plans.
- Proper review and approval of Subcontractor work plans, safety plans, and QA/QC procedures.
- Proper implementation and documentation of all QA/QC procedures in accordance with the QAPP and other associated project plans.
- Shared responsibility for review/approval of the QAPP and other associated project plans including subsequent revisions.
- Stop work authority is imposed, whenever necessary.

The Consultant’s Health and Safety Officer will monitor project activities to ensure that they are performed in accordance with the Project Design (PD) to ensure the following:

- Proper and complete implementation of the PD.
- Safe and healthful working environment.
- Prevent safety incidents and close call incidents, which harm or could harm, people, the environment, or the assets or reputation of all parties involved.
- Pre-planning, pro-active implementation, and constant risk evaluation.
- Stop work authority is imposed, whenever necessary.

Asbestos Abatement Contractor

Asbestos Abatement Contractor’s Project and Quality Assurance Manager

The Asbestos Abatement Contractor’s Project and Quality Assurance Manager will work closely with the Consultant’s Project Manager and Project Quality Assurance Manager to ensure that all their work plans, safety plans, and QA/QC procedures have been properly reviewed and approved prior to implementation. This close communication will also function to ensure proper implementation of the QAPP and other associated project plans as work is carried out. The Asbestos Abatement Contractor’s Project and Quality Assurance Manager also has stop work authority.

Project organization has been established in order to demonstrate overall key personnel associated with this project and provide functional overview of the team that will be used to complete the scope of work, along with lines of authority. [Appendix D contains a Project Organizational Chart.](#)

Key Decision Makers

The key decision makers for this project include the following individuals representing the identified companies/agencies/entities:

City of Tulsa's Quality Assurance Manager	
Name:	Michelle Barnett, P.E.
Title:	Deputy Chief of Economic Development
Company/Agency/Entity:	City of Tulsa
USEPA's Project Officer	
Name:	Paul Johnson
Title:	EPA Project Officer
Company/Agency/Entity:	US EPA
ODOL Director Asbestos	
Name:	Bernita Hart
Title:	Director – Asbestos/Alarm Locksmiths and Fire Sprinkler
Company/Agency/Entity:	Oklahoma department of Labor

7.2 PROJECT MEETINGS

Regularly scheduled teleconference meetings are planned for this project in order to ensure understanding and proper/safe implementation including a Pre-Work Meeting and Weekly Progress Meetings. Additionally, Called Meetings may be held (as necessary). A Project Close-Out Meeting will be held upon project completion.

Pre-Work Teleconference Meeting

A Pre-Work Meeting will be held via teleconference in order to review and resolve any uncertainties of the QAPP and other associated project plans prior to commencement of the work. All individuals on the project distribution list will be notified and invited to the meeting. This meeting will be organized and directed by the Consultant's Project Manager. A written record of the meeting discussions will also be kept by the Consultant's Project Manager.

Weekly Progress Teleconference Meetings

Weekly Progress Meetings will be held via teleconference or email distribution in order to review progress against the planned work schedule and to identify existing or anticipated problems. These meetings will also be utilized to provide updates on data acquisition and review, address safety issues, ensure maintenance of quality standards, discuss pending changes and substitutions, and discuss any other items that could affect timely completion of the work. All individuals on the project distribution list will be notified and invited to these meetings. These meetings will be organized and directed by the Consultant's Project Manager. A written record of the meeting discussions will also be kept by the Consultant's Project Manager.

Called Meetings

Called Meetings can be requested by any of the individuals listed on the project distribution list to discuss specific concerns, problems, or deficiencies. All individuals on the project distribution list will be notified and invited to these meetings. A written record of the meeting discussions will also be kept by the Consultant's Project Manager.

Project Close-Out Meeting

A Project Close-Out Meeting will be conducted upon completion to facilitate the collection of field data, final reports, records, invoices, and any other required documentation. All individuals on the project distribution list will be notified and invited to the meeting. This meeting will be organized and directed by the Consultant's Project Manager. A written record of the meeting discussions will also be kept by the Consultant's Project Manager.

7.3 PROJECT/TASK DESCRIPTION AND PRE-WORK SITE WALK

The project has been organized into specific tasks in order to ensure accuracy and efficiency.

Task 1 Contractor Bidding

Once the QAPP and other associated project plans have been signed by all individuals identified on the project distribution list, the Consultant will work with the City of Tulsa Quality Assurance Manager to obtain competitive bids from qualified asbestos abatement contractors. This task includes the gathering and evaluation of secondary environmental data. The Consultant will gather and evaluate existing data provided by the City of Tulsa for this project.

Task 2 Site Access Arrangements and Pre-Work Site Walk

The Consultant's Project Manager, in coordination with the City of Tulsa Quality Assurance Manager, will coordinate a mandatory Pre-Bid Walk Through to allow contractors the opportunity to view the project and ask specific questions prior to bidding. All individuals on the project distribution list will be invited.

Task 3 Document Review

The City of Tulsa will determine a top three (3) contractor's bids and may ask the consultant to determine if any quality issues with any of the three (3) contractors.

Task 4 Third Party Monitoring and Project Oversight

The Consultant Project and Quality Assurance Manager will provide Third-Party Air Monitoring during the Asbestos Abatement Phase as required by OAC 380:50-11-7. The Consultant Project and Quality Assurance Manager will provide project oversight on the City of Tulsa's behalf and immediately notify the City of Tulsa Quality Assurance Manager of any deviations from the approved QAPP, Project Design, or safety concerns. The Consultant Project and Quality Assurance Manager will be on-sight whenever the contractor is performing any type of asbestos abatement work activity.

Task 5 Reporting

A Final Report will be compiled by the Consultant of all work activity during the asbestos abatement. The report will include sufficient detail to meet the requirements for recordkeeping to include but not limited to: Worker licenses, worker respirator clearances, daily logs and air monitoring data, waste shipments, ODOL or USEPA inspections, etc. A single draft report will be circulated for comments by all individuals identified on the project distribution list. Comments will then be incorporated into a final report to be re-distributed to the same individuals. The draft report will be provided in electronic Portable Document Format (PDF) only. The final report will be provided in both electronic PDF and hard copy.

The consultant during the project will conduct Davis Bacon wage interviews and supply the documentation with the final report as a separate document.

Task 6 Project Close-Out

A Project Close-Out Meeting will be conducted upon completion in order to confirm no outstanding items remain; to gain acknowledgment from all members of the project distribution list that the project is complete; and to facilitate invoicing. All individuals on the project distribution list will be notified and invited to the meeting.

8.0 PROJECT QUALITY OBJECTIVES, CRITERIA, AND PERFORMANCE MEASURES

In order to ensure project goals are met it is imperative that quality objectives and criteria are established and measured.

Project Quality Objectives

The data quality objectives take into account both the best practices for similar projects and the resources available for this project. If necessary, the Consultant's Project Manager will rely upon USEPA's *Generic Guide to Statistical Aspects of Developing and Environmental Results Program* (2003) for advice in making decisions related to optimizing the following aspects of data quality for this project, including:

Precision

Precision is the measurement of agreement or reproducibility among replicate samples of the same media under prescribed similar conditions. It is normally expressed as the Relative Percent Difference (RPD) between two (2) values.

Accuracy

Accuracy is a measure of the closeness of an individual measurement or the average of a number of measurements, to the true value. Bias is the systematic or persistent distortion of a measurement process that causes error in one direction. Accuracy is normally expressed as a percent recovery.

Representativeness

Representativeness is an expression of the degree to which a sample accurately and precisely represents a characteristic of a population, parameter variations at a sampling point or an environmental condition. Representativeness is a qualitative parameter, which relies upon the proper design of a sampling program and proper laboratory protocol.

Comparability

Comparability is defined as an expression of the confidence with which one data set can be compared to another. In most instances, the proficiency of field sampling efforts will be the determining factor that affects the overall comparability of environmental measurement data. To optimize the comparability of environmental measurement data, sample collection activities should always be performed using standardized procedures whenever possible. When performing a site investigation, adhering to the quality control criteria will facilitate these efforts.

Completeness

Completeness is defined as the measurement of the amount of data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. Data completeness is often expressed as the percentage of valid data obtained from a given measurement system. To consider data valid, it is customary to assess if a set of data satisfies all of the specified acceptance and performance criteria (accuracy measures, precision measures, etc.) to render a determination.

Performance Measures

To the extent that performance measures rely on the generation of data, this QAPP and other associated plans seek to verify that the project quality objectives are appropriate for the regulatory and non-regulatory decisions to be made based upon that data. Performance measures to ensure the project quality objectives are achieved include the following:

- Protection of site workers and public through adherence to the PSAHP.
- Protection of the environment.
- Successful completion of abatement with no visible emissions or asbestos debris left behind
- Successful control of the asbestos abatement documented by air samples outside of containment less than 0.01 fibers per cubic centimeter (f/cc).
- Successful clearance of all abated spaces for re-occupancy documented by air samples outside of containment less than 0.01 f/cc.

9.0 SPECIAL TRAINING/CERTIFICATIONS

All Consultant's employees assigned to this project and will be onsite will be properly trained and licensed by the ODOL. Air monitoring analyst's performing on-site analysis of the collected air samples will have attended a National Institute of safety and Health (NIOSH) 582 course or an approved 582 equivalent (582e) course and will have demonstrated proficiency by successful completion in American Industrial Hygiene s (AIHA) Proficiency Analytical Program (PAT).

All Asbestos Abatement Contractor's employees will hold a current ODOL asbestos worker license and be medically cleared for respirator use. All work crews will be supervised by an ODOL licensed Asbestos Abatement Supervisor. The contractor will always have a licensed supervisor onsite when asbestos work activities are being conducted.

The Consultant's Air Monitor and Oversight Representative and/or Contractor's Supervisor will not allow anyone inside containment without proper training and licensure.

10.0 DOCUMENTATION AND RECORDS

Documents and records generated as a result of the asbestos abatement are considered quality assurance records and will be processed in accordance with the requirements of this QAPP and other project plans. Quality assurance records provide a record of events that have occurred for all aspects of the project. Their adequate generation, review, protection, and submittal are essential to the success of the process. Copies of all field generated data including daily field logs/notes and all other relevant forms and documentations will be maintained by the Consultant's Project Manager.

Records pertaining to this project and its related work tasks, including all field generated data, will be maintained by the Consultant for a minimum of five (5) years following the conclusion of work performed.

11.0 PROJECT SCHEDULE

It is anticipated that the project will begin immediately upon approval of the QAPP, Project Design approval, funding, and all notifications have been made. The total estimated project duration is ninety (90) calendar days. If necessary, time extension notices will be submitted.

12.0 DATA SELECTION AND MANAGEMENT

Readily available data will be selected and managed in association with this project to ensure proper project knowledge and familiarity with background information.

12.1 EXISTING DATA SOURCES

The primary existing data source for this project includes the asbestos survey report prepared by A & M (dated March 1999).

12.2 EXISTING DATA SOURCES INTENDED USES AND LIMITATIONS

Data from the A & M Asbestos Report will be utilized to identify the materials to be abated and their locations. A new asbestos survey report will not be conducted.

12.3 FIELD GENERATED DATA

The project will involve the field generation of data by both the Consultant and Contractor including primarily daily field logs, air monitoring data, and/or notes.

12.4 SAMPLING AND ANALYTICAL METHODS

Daily air monitoring will be conducted outside of containment at locations as identified in the Project design. Sample pump flow rates will be checked using a calibrated rotameter at the beginning and completion of the sampling period. The rotameter will be calibrated to a primary calibrator monthly as required by OAC 380:50-11-1(4). All daily air monitoring and analytical data will be entered onto an Air Monitoring Data Form. [A copy of the Air Monitoring Data Form is provided in Appendix E.](#)

Suspect materials identified during the abatement, that may not have been previously sampled or for confirmation, will be sampled for Bulk Asbestos Analysis by Polarized Light Microscopy (PLM) using method EPA/600/R-93/116. Bulk samples will be shipped to a Third-Party Laboratory that is accredited by National Voluntary Laboratory Accreditation program (NVLAP).

12.5 EQUIPMENT/INSTRUMENT OPERATION AND CALIBRATION

Equipment (rotameters) used for calibrating air sample flow rates will be calibrated to a primary standard on a monthly basis.

The Phase Contrast Microscopy (PCM) used for analysis of collected air samples will be checked each time it is moved using the HSE test slide and centering telescope for proper optical alignment.

All electrical equipment will be protected using Ground-Fault Circuit Interrupters (GFCI).

13.0 ASSESSMENT AND OVERSIGHT

Assessment and oversight procedures are in place to assess the effectiveness of project implementation and the associated QA/QC activities. The purpose of assessment is to ensure proper implementation of the QAPP and other associated project plans.

Self-assessment and performance evaluations will be conducted weekly to evaluate the effectiveness of project implementation and determine whether QAPP and other project plan procedures are being properly implemented. The self-assessments and performance evaluations will be conducted by the Consultant's Project Manager and/or Project Quality Assurance Manager, whom will have the authority to stop work in the event that non-conforming conditions are identified that cannot be remedied or resolved with immediate actions in a manner that protects the validity of the information being gathered.

The Consultant's Project Manager and/or Project Quality Assurance Manager will review the documentation required to be maintained. A record of any significant deviations from normal procedures will be documented to ensure that corrective actions are taken to correct any noted deficiencies. Minor deviation items will be corrected on the spot. Significant deviations or recurring deviations will be recorded and addressed at the Weekly Progress Meeting.

14.0 DATA REVIEW, VERIFICATION, VALIDATION, AND EVALUATION

This QAPP and other associated project plans will govern the operation of the project at all times. Each responsible party listed in the project distribution list shall adhere to the procedural requirements of the QAPP and other associated project plans and ensure that subordinate personnel do likewise.

This QAPP and other associate project plans will be reviewed at least quarterly to ensure that the project will achieve all intended purposes. All the persons listed in the distribution list shall participate in the review of the QAPP and other associated project plans. The Consultant's Project Manager and/or Project Quality Assurance Manager is responsible for determining that data are of adequate quality to support this project. The project will be modified as directed by the Consultant's Project Manager and/or Project Quality Assurance Manager. The Consultant's Project Manager and/or Project Quality Assurance Manager will be responsible for the implementation of changes to the project and shall document the effective date of all changes made.

Initial data review, verification, and validation of all data and information acquired will be accomplished by experienced/qualified team members performing within their disciplines and practicing professional judgment. The final layer of data review, verification, and validation will be performed by the Consultant's Project Manager and Project Quality Assurance Manager during their reviews. During either phase of these reviews the data can be accepted, rejected, or qualified by any of these individuals.

15.0 USER REQUIREMENTS RECONCILIATION

The results obtained from the project will be reconciled with the requirements defined by the data user and/or decision makers. The data will be analyzed to determine possible anomalies and/or departures from any assumptions made during the planning phase. The data will be analyzed by experienced/qualified team members performing within their disciplines and practicing professional judgment initially followed by reviews performed by the Consultant's Project Manager and Project Quality Assurance Manager. The decision makers will be made aware of any limitations associated with the data and/or information collected.

The work to be done on this project is fairly straightforward in that standard work procedures are to be used. No deviations from the QAPP or other associated project plans are anticipated at this time. Should unforeseen conditions arise that warrant a deviation from the QAPP or other associated project plans, the Consultant's Project Manager will notify the City of Tulsa's Quality Assurance Manager and a determination will be made regarding notification of the appropriate regulatory agencies and decision makers.

Corrective action will be taken whenever data are determined unacceptable by comparison to pre-established quality control limits. Corrective actions will be the responsibility of the Consultant's Project Manager or, in the case of Contractor's, the Contractor's Project and Quality Assurance Manager.

Corrective action will, in general, consist of the following:

- Review of raw data and calculations
- Review of procedures to determine that appropriate abatement procedures, sample collection, and analytical methods were followed.
- Review of instrumentation operation, calibration, and maintenance.
- Other actions as deemed necessary by the USEPA.

As a result of the above, corrective action may be identified and will be pursued as necessary. This action may include:

- Stop-Work until conditions have been corrected.
- Recleaning of an area using specialized cleaning and/or abatement procedures.
- Recalibration of instrumentation/equipment.
- Instrumentation/equipment repairs.
- Additional training.
- Other action as deemed necessary by the USEPA.

A Deviation Record will be completed and approved by the individuals identified on the project distribution list. The final report will include a description of any deviations, assumptions, or limitations along with a summary of any associated reconciliation that occurred during the course of the project.

16.0 PROJECT COMPLETION AND REPORT

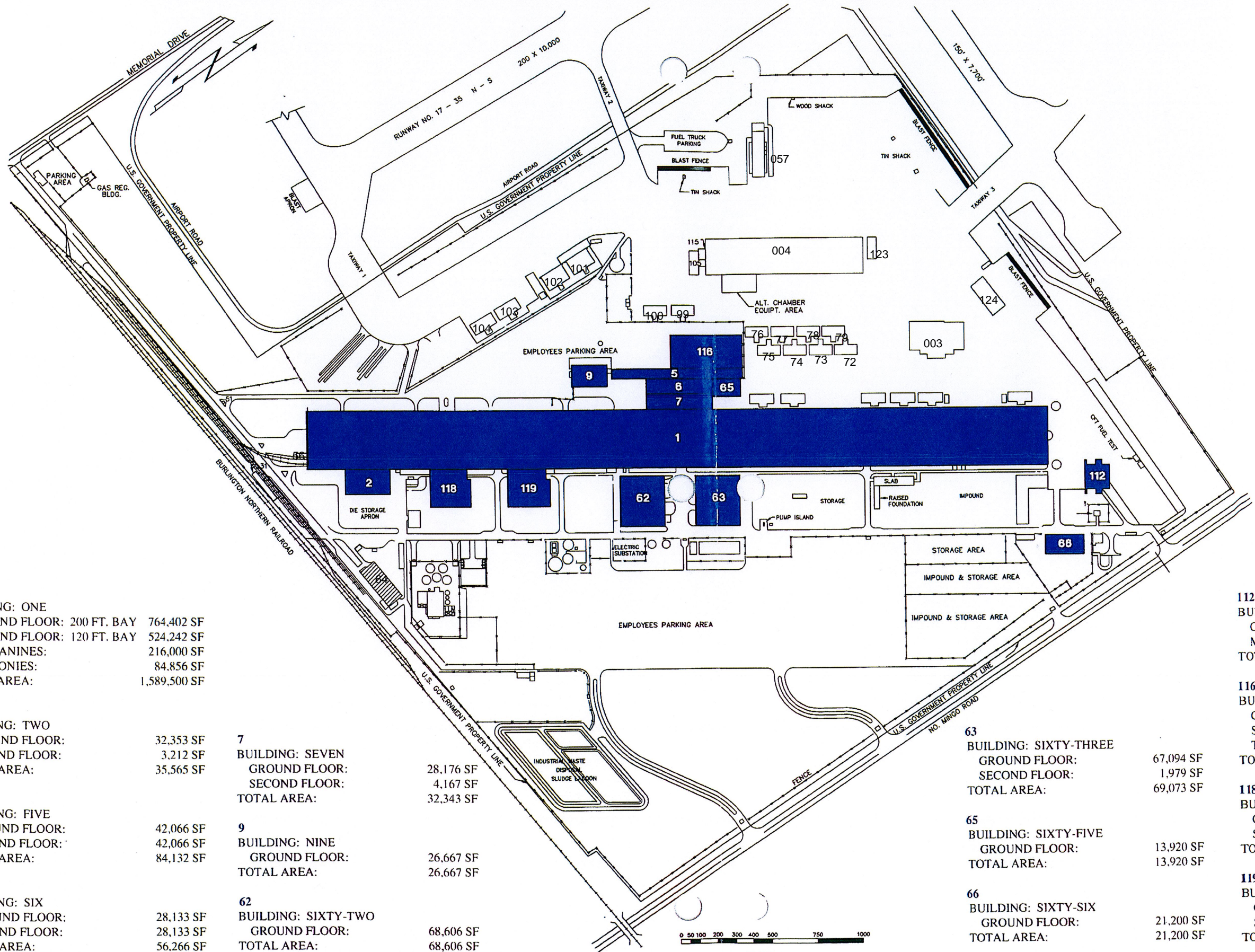
After completion of all work as outlined in this QAPP, the Consultant's Project Manager will deliver to the City of Tulsa's Quality Assurance Manager one (1) electronic PDF and hardcopies of the final report containing:

- List of any deviations, assumption, or limitations along with a summary of any associated reconciliation.
- Certification that all work specified in the QAPP has been completed.
- Summary of field activities and methodologies used.
- Overview of QA/QC procedures.
- Asbestos daily records to include notes and air monitoring data.
- ODOL inspection forms.
- Waste disposal receipts.
- Findings and recommendations.
- Bacon Davis Wage Interview forms

A Certificate of Work Completion and authorization for final payment will not be issued by the consultant representative until the documents and data are reviewed and approved by the client representatives, and the documents are submitted in satisfactory form.

Appendix A

Project Figures



1
 BUILDING: ONE
 GROUND FLOOR: 200 FT. BAY 764,402 SF
 GROUND FLOOR: 120 FT. BAY 524,242 SF
 MEZZANINES: 216,000 SF
 BALCONIES: 84,856 SF
 TOTAL AREA: 1,589,500 SF

2
 BUILDING: TWO
 GROUND FLOOR: 32,353 SF
 SECOND FLOOR: 3,212 SF
 TOTAL AREA: 35,565 SF

5
 BUILDING: FIVE
 GROUND FLOOR: 42,066 SF
 SECOND FLOOR: 42,066 SF
 TOTAL AREA: 84,132 SF

6
 BUILDING: SIX
 GROUND FLOOR: 28,133 SF
 SECOND FLOOR: 28,133 SF
 TOTAL AREA: 56,266 SF

7
 BUILDING: SEVEN
 GROUND FLOOR: 28,176 SF
 SECOND FLOOR: 4,167 SF
 TOTAL AREA: 32,343 SF

9
 BUILDING: NINE
 GROUND FLOOR: 26,667 SF
 TOTAL AREA: 26,667 SF

62
 BUILDING: SIXTY-TWO
 GROUND FLOOR: 68,606 SF
 TOTAL AREA: 68,606 SF

63
 BUILDING: SIXTY-THREE
 GROUND FLOOR: 67,094 SF
 SECOND FLOOR: 1,979 SF
 TOTAL AREA: 69,073 SF

65
 BUILDING: SIXTY-FIVE
 GROUND FLOOR: 13,920 SF
 TOTAL AREA: 13,920 SF

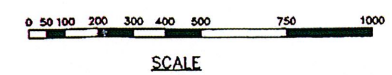
66
 BUILDING: SIXTY-SIX
 GROUND FLOOR: 21,200 SF
 TOTAL AREA: 21,200 SF

112
 BUILDING: ONE HUNDRED & TWELVE
 GROUND FLOOR: 18,937 SF
 MEZZANINE: 1,580 SF
 TOTAL AREA: 20,517 SF

116
 BUILDING: ONE HUNDRED & SIXTEEN
 GROUND FLOOR: 21,789 SF
 SECOND FLOOR: 70,638 SF
 THIRD FLOOR: 75,723 SF
 TOTAL AREA: 168,150 SF

118
 BUILDING: ONE HUNDRED & EIGHTEEN
 GROUND FLOOR: 43,070 SF
 SECOND FLOOR: 1,455 SF
 TOTAL AREA: 44,525 SF

119
 BUILDING: ONE HUNDRED & NINETEEN
 GROUND FLOOR: 41,836 SF
 SECOND FLOOR: 1,474 SF
 TOTAL AREA: 43,310 SF



Appendix B

Asbestos Abatement Project Design (PD)



**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

Asbestos Abatement Project Design Former Air Force Plant 3, Building 6

**Tulsa International Airport
City of Tulsa, Tulsa County, Oklahoma**

A & M Project Number 2320-001-008

Version 1 / Revision Date – N/A

August 6, 2019

Prepared For:



City of Tulsa
Office of the Mayor
175 East 2nd Street, Suite 15-041
Tulsa, Oklahoma 74103
Michelle Barnett, P.E. (Deputy Chief of Economic Development)
Email: mbarnett@cityoftulsa.org
Phone: (918) 596-7457



**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

August 6, 2019

Ms. Michelle Barnett, P.E.
Deputy Chief of Economic Development
City of Tulsa
Office of the Mayor
175 East 2nd Street, Suite 15-041
Tulsa, Oklahoma 74103

A & M Project Number 2320-001-008

Email: mbarnett@cityoftulsa.org
Phone: (918) 596-7457

REF: Asbestos Abatement Project Design (PD) for Asbestos Abatement at the Former Air Force Plant 3, Building 6 located at the Tulsa International Airport, City of Tulsa, Tulsa County, Oklahoma.

Dear Ms. Barnett:

A & M Engineering and Environmental Services, Inc. (A & M) has prepared the enclosed Asbestos Abatement Project Design (PD) for **Asbestos Abatement** to be performed at the above referenced site.

Thank you for choosing A & M. If you have any questions, feel free to contact us at (918) 665-6575 or via email.

Respectfully,

A & M Engineering and Environmental Services, Inc.

Jeff Jenkins, CIH, CSP
Senior Industrial Hygienist
ODOL Project Designer
jjenkins@aandmengineering.com
Enclosure (1)

Jeff Elbert
Director of Compliance
jelbert@aandmengineering.com

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TABLES

Table 1 Asbestos Materials to be Abated

APPENDICES

Appendix A Asbestos Sample Results

Appendix B Proposed Abatement Layout

1.0 INTRODUCTION

This Asbestos Project Design was prepared by A & M Engineering and Environmental Services Inc. (A & M), to provide a prudent course of action for abating Asbestos-Containing Materials (ACM) associated with the Building 6 at the former Air Force Plant 3 (AFP3). Protocols to be used for compliance with governing regulations to protect workers and the environment from incidental exposure to airborne asbestos fibers during the work being performed are included or referenced.

PROJECT INFORMATION:

Project Name:	Air Force Plant 3, Building 6
Description of Work/Occupancy:	Removal of friable ACM (thermal insulation)
Project Type:	Pre-renovation
Contractor:	To be determined
Owner's Environmental Representative:	A & M Engineering and Environmental Services, Inc. (A & M)
IH/Air Monitoring Firm:	A&M: All air samples will be collected by an experienced Industrial Hygiene Technician and holds a current asbestos license in Oklahoma.
Laboratory:	A & M: A & M is a new participant in the American Industrial Hygiene Association (AIHA) Proficiency Analytical (AIHA) proficiency Analytical testing (PAT) program. All air monitoring techs performing analysis using NIOSH method 7400 A will have completed a NIOSH 582e course and shown to be proficient. The laboratory to be used for quality assurance testing and back-up analysis will be Quantem Laboratories, AIHA PAT Laboratory 101352. The Contractor is responsible for their personnel samples.

2.0 REGULATORY COMPLIANCE

The specific governing regulations affecting this work include but are not limited to: 29 Code of Federal Regulations (CFR) 1926.1101 (OSHA Construction Industry Asbestos Standard), 29 CFR 1910.134 (OSHA Respiratory Protection), 40 CFR 61, Subpart M (Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP), and Oklahoma Asbestos Control Act (OAC) 380:50 with approved variances. Waste transport and disposal is to be performed by an Oklahoma-licensed asbestos waste transporter with a waste disposal manifest/chain of custody signed by the receiving landfill. DOT Class 9 placards are to be displayed during transportation of asbestos waste.

The contractor shall maintain a daily log showing the number and names of workmen and supervisory personnel by craft physically on the job site each working day and a report of daily progress. The daily entries shall include a brief statement of the work in progress and a record of any accidents, injuries and/or safety meetings held on that day. All workmen must sign in and out during abatement operations and provide a brief description of

operations performed. These logs shall always be available for inspection at the job site while work is in progress. A reproducible copy of these logs shall be provided to the Owner's Representative at the weekly progress meeting. All personnel entering containment must have their current asbestos licenses onsite with them.

The technicians performing on-site air monitoring must maintain an onsite daily activity log. The log shall include, but not be limited to:

- Time of on-site arrival and departure.
- Times of entrance into the regulated area to ensure sample integrity.
- Signature of on-site asbestos supervisor.
- All cassettes must be properly labeled as they are placed for sample collection.
- At least one (1) technician performing on-site air monitoring will be present at the job site while asbestos abatement work is being performed.

3.0 WORK SEQUENCING/SCHEDULING

The asbestos abatement of the AFP3, Building 6 is being conducted in a single Phase, but may involve subsections or multiple areas. The tentative start date is estimated to be shortly after October 1, 2019. The work is to be scheduled by the Abatement Contractor in coordination with City of Tulsa and A & M. Work is expected to be conducted during normal work hours, Monday through Friday and hours of 7:00 AM to 5:00 PM.

4.0 EGRESS AND FIRE PROTECTION

Workers must be briefed on emergency exit procedures and the assembly point at the beginning of the work shift. In the event emergency evacuation is necessary, workers will exit immediately through the decon and to the nearest exit.

Emergency illumination shall be provided for not less than 1-1/2 hours in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of one (1) foot-candle (ft.-candle) and, at any point, not less than 0.1 ft.-candle, measured along the path of egress at walk surface. The emergency lighting system shall be arranged to provide the required illumination automatically in the event of any interruption of normal lighting. Where maintenance of illumination depends on changing from one (1) energy source to another, a delay of not more than ten (10) seconds shall be permitted. The Abatement Contractor will provide a minimum of one (1) ABC dry-charged fire extinguisher ten (10) pound (lb.) for every three thousand (3,000) square feet (SF) of work area and outside the decon during abatement. The fire extinguishers must have a valid inspection tag and be decontaminated upon removal from the work area.

All poly used must be rated Fire Retardant Polyethylene and meet National Fire protection Association (NFPA) 701-04, American Standards for Testing and Materials (ASTM) E84, and Canvas Products Association International (CPAI) 84 or equivalent.

The Abatement Contractor must provide appropriate and sufficient signs at the abatement-controlled access entrances to direct pedestrian traffic away from blocked entrances. Signs shall be clearly visible and readable at fifty (50) feet from the abatement work area. The contractor shall install signs at the onset of work.

5.0 MATERIALS TO BE ABATED

Table 1 lists the identified ACM that is included as part of this Asbestos Project Design

**Table 1
ACM to be Abated**

Materials	Friable	Location(s) of the Homogeneous Material	% Asbestos Content	Estimated Quantity	Condition
Pipe Insulation	Friable	Throughout the Building	Chrysotile	2,800 LF	Intact
Pipe Fittings	Friable		Chrysotile	550 fittings	
Fan and HVAC Insulation	Friable		Chrysotile	11,000	
Fire Door	Non-friable	HVAC room – southeast corner	Unknown	2 doors	intact

ND = None Detected; NQ = Not Quantified; SF Square Foot; LF Linear Feet

A copy of the laboratory analyses (A&M March 1999 report) is provided in Appendix A. A site drawing of abatement is provided in Appendix B.

6.0 METHOD OF ABATEMENT

Building #6 will be cleared of any movable materials prior to any preparation work being conducted. The contractor must follow OAC 380:50-17 for abatement procedures.

Pipe insulation and fittings on piping that is not domestic water or sprinkler system pipes will be removed by using wrap and cut techniques. The pipes will be abated at manageable lengths using glove bag procedures allowing them to be cut. Most of the pipes are overhead and will be accessed by mechanical man-lifts or stepladders (in some situations). Piping exists on both first and second floors.

Domestic, sprinkler piping, pipe fittings will be abated using glove bag procedures with the pipes remaining in place. Domestic and sprinkler system piping may be overhead or in pipe chases feeding the four (4) restrooms. The restroom pipe chases may require selective demolition to provide access. Many of the pipes are overhead and will be accessed by mechanical man-lifts or stepladders (in some situations). Piping exists on both first and second floors.

The Heating, Ventilation, and Air conditioning (HVAC) rooms will be abated under full containment with a three (3) chamber decontamination room. All HVAC equipment in the HVAC rooms are to be demolished and removed in its entirety following the abatement by the contractor. The southeast HVAC room will be retrofitted into a compressor room; thus, the removal of the fire doors will be included in the abatement.

Removed material will be promptly bagged in accordance with OAC 380:50-17-6.

7.0 AIR MONITORING and RESPIRATORY PROTECTION

Daily air monitoring will be conducted in accordance with OAC 380:50-11-1 through 380:50-11-7. A minimum of one (1) area air monitor will be located:

- In each active abatement work area;
- Along the load-out path during loadout;
- Each independent exit area directly outside and adjacent to the work area;
- Immediately outside the clean room;
- At the exhaust point of each Air Filtration Device (AFD) or from a bank of AFD's (may not exceed 0.01 fibers/cubic centimeter (f/cc));
- Outside of a critical barrier adjacent to the work area;

The Contractor is responsible for (may arrange with A&M to provide):

- Personal air monitor samples will be collected on one (1) out of every four (4) workers (25%); or a minimum of two (2) personal air samples per abatement crew.

All non-primary calibration devices must be calibrated to a primary calibrator within one month of use and will not include any adjustable flow restricting devices as part of its construction. Calibration records or chart must be maintained onsite.

Removal of ACM materials must be conducted in full-face APR respirators fitted with High Efficiency Particulate Air (HEPA) cartridges.

8.0 CLEARANCE SAMPLING

The work area in the building is scheduled for re-occupancy; therefore, clearance by AHERA Phase Contrast Microscopy (PCM) protocol must be conducted. A minimum of five (5) samples per /work area shall be collected. Clearance samples shall be collected following the post-abatement ODOL inspection. Clearance samples inside of full containment areas will be conducted using aggressive sampling techniques.

9.0 AIR FILTRATION

Negative Air Machines (NAM) will be utilized to provide a negative air pressure of 0.02" negative pressure (water pressure drop) through the Decon of full containments. The NAMs must be fitted with HEPA filters. Ventilation must be adequate to provide four (4) Air Changes per Hour (ACH).

Each HVAC room will have approximately seven hundred (700) SF will be inside of containment and an estimated twenty (20) feet ceiling height. A minimum of one (1) two thousand (2,000) Cubic Feet per Minute (CFM) NAMs must be used inside of containment. One (1) NAM must be available for an operational back-up, if needed.

10.0 CONTAINMENT METHODS

Preparation of asbestos abatement work area will be per OAC 380:50-17-4. Critical barriers shall be utilized over openings (e.g. windows, doors, exhaust vents) where feasible and where construction of the critical barrier would not be of significant hazard. Non-moveable fixtures and equipment will be covered with a minimum single layer of 4 mil poly following pre-cleaning of surface debris prior to asbestos removal. All surfaces and equipment are to be thoroughly sprayed with a lock-down encapsulant after abatement.

11.0 DECONTAMINATION SYSTEM

A remote decontamination facility (decon) under negative pressure is planned for the abatement. The Remote Decon is to be used with the Glove-bag operations. The decon unit will be established per OAC 380:50-15-7 (Clean room requirements) and OAC 380:50-15-12 (decontamination facility preparation) consisting of three (3) chambers: a clean room, a shower and a dirty room. The airlocks for the decon unit shall consist of triple six (6) mil polyethylene overlapping flaps. The decon shower shall be equipped with a five (5) micron wastewater filter, liquid cleaning agent, non-porous shower grates and a functioning in-line water heater with capacity for five (5) gallons per worker. Disposal of wastewater will be into the sanitary sewer. The temperature of the clean room and decon must be maintained above fifty (50) degrees °F during abatement activities. Decon procedures will be per OAC 380:50-15-8 (Decontamination procedures).

Full containments (HVAC rooms) will have an attached decontamination facility (decon) with the “dirty room” opening to the work area. The containment will be under negative pressure with make-up air flowing through the three (3) chamber decon facility. The decon unit will be established per OAC 380:50-15-7 (Clean room requirements) and OAC 380:50-15-12 (decontamination facility preparation) consisting of three (3) chambers: a clean room, a shower and a dirty room. The airlocks for the decon unit shall consist of triple six (6) mil polyethylene overlapping flaps. The decon shower shall be equipped with a five (5) micron wastewater filter, liquid cleaning agent, non-porous shower grates and a functioning in-line water heater with capacity for five (5) gallons per worker. Disposal of wastewater will be into the sanitary sewer. The temperature of the clean room and decon must be maintained above fifty (50) degrees °F during abatement activities. Decon procedures will be per OAC 380:50-15-8 (Decontamination procedures).

12.0 SOIL CONTAMINATION CLEANUP

Not Applicable.

13.0 SPECIAL MATERIALS or METHODS

Scaffolding and Fall Protection

Work during this abatement may be conducted using ladders, man-lifts, or baker scaffolding. Fall protection must be used where appropriate. The asbestos abatement contractor will comply with 29 CFR 1926 Subpart L-Scaffolds and Subpart M-Fall Protection.

Electrical

Electric service is anticipated to be provided; however, tie-ins to the electrical service by a licensed electrician is the responsibility of the contractor. Lockout/tagout procedures must be used on all electrical circuits which penetrate the work area.

Water

Water service is anticipated to be provided; however, tie-ins may be in occupied buildings adjacent to Building #6.

Heat Stress

The contractor shall monitor heat stress in general accordance with OSHA Technical Manual Section III, Chapter 4.

Sanitation Facilities

Currently the building is vacant, with electric operating. Sanitation facilities in the building is not available for use. The asbestos contractor will be responsible for arranging for sanitation facilities.

14.0 VARIANCES REQUESTED

No Variances are being requested.

15.0 CERTIFICATION

This project design was prepared by the undersigned for compliance with applicable federal and State regulations.



Jeff Jenkins, CIH, CSP
Asbestos Project Designer, OKPD 143988

August 6, 2019

Date

Appendix A

Asbestos Sample Results

BUILDING NO. 006:

Date of Construction: 1942

Original Use: Maintenance Building

Floor Area: 56,266 square feet

Figure 006

Asbestos Containing Materials (ACM):

Homogeneous Areas:

HA-2: 9" x 9" floor tile – black with white streaks (+)

Consists of 700 square feet of 9" x 9" floor tile described as black with white streaks. The floor tile was installed in a checkered pattern with HA-3 (orange tan) and is damaged and in overall poor condition. The floor tile, found within the first floor entry and office areas (FS-1) is loose, warped and beginning to crumble.

HA-3: 9" x 9" floor tile – orange tan (+)

Consists of 700 square feet of 9" x 9" floor tile described as orange tan in color. The floor tile was installed in a checkered pattern with HA-2 (black) and is damaged and in overall poor condition. The floor tile, found within the first floor entry and office areas (FS-1) is loose, warped and beginning to crumble.

HA-6: 9" x 9" floor tile – red with white streaks (+)

Consists of 22,500 square feet of 9" x 9" floor tile described as red with white streaks. The floor tile is found in checkered patterns with various other tiles in both the first and second floor entries and the office areas (FS-1). This tile is in overall fair condition with some minor physical damage.

HA-8: White cementitious joints (+)

Consists of 250 joints described as white cementitious found in entries and office areas (FS-1), pipe chases (FS-3), and mechanical rooms (FS-4). The majority of joints are in good condition. However, some of the joints have been damaged from impacts and general deterioration and are in need of repair.

HA-9: White fibrous pipe and joint insulation (+)

Consists of 1,700 linear feet of pipe insulation and 300 joints described as white fibrous. The majority of pipe insulation and joints are in good condition. However, a few joints appear to be damaged and are in need of repair. This type of insulation is found throughout the first and second floor entry/office areas (FS-1), pipe chases (FS-3), and mechanical rooms (FS-4).

HA-10: Air handler insulation jacket – brown wool like under white fibrous (+)

Consists of 11,000 square feet of air handler insulation jacket, described as brown wool like under white fibrous. The insulation material is found in the mechanical rooms (FS-4) and is in good condition.

HA-11: 9" x 9" floor tile – aqua blue with white streaks (+)

Consists of 10,000 square feet of 9" x 9" floor tile described as aqua blue with white streaks. This floor tile is found within the second floor office space (FS-1) in a checkered pattern with HA-12 (gray) and is in overall good condition.

HA-12: 9" x 9" floor tile – gray with white and black streaks (+)

Consists of 10,000 square feet of 9" x 9" floor tile described as gray with white and black streaks. This floor tile is found within the second floor office space (FS-1) in a checkered pattern with HA-11 (aqua blue) and is in overall good condition.

HA-13: Gray fibrous pipe insulation (+)

Consists of 700 linear feet of pipe insulation described as gray fibrous. This insulation material found within the first floor office space (FS-1) and pipe chases (FS-3) is in overall good condition.

HA-14: Roof felt/tar/gravel (Assume +)

Consists of 30,000 square feet of roofing materials (felt/tar/gravel) located on the roof top (FS-5). This material is in a good non-friable condition.

Non-Asbestos Containing Materials Which Were Suspect:

Homogeneous Areas:

HA-1: 12" x 12" floor tile – white with gray specks found on first floor (south end of building (-)

HA-4: 9" x 9" floor tile – dark orange with white specks found on first floor (south/central end of building) (-). Checkered pattern with HA-5 (pink).

HA-5: 9" x 9" floor tile – pink with white specks found on first floor (south/central end of building) (-). Checkered pattern with HA-4 (dark orange).

HA-7: Brown fibrous (cardboard like) pipe insulation (-)

TABLE 6-1 (Continued)

Air Force Plant No. 3

Asbestos Survey Building Summary (Regulated & Non-Regulated)

Building Number	Description
	<ol style="list-style-type: none">2) Approximately 400 visible insulated joints. Unknown quantities of joints also exist above the ceilings and inside pipe chases. Probably figure total of ~1,500 joints.3) Approximately 27,000 square feet of air handler jacket insulation.4) An unknown quantity of duct insulation exists above the drop ceilings. Probably figure total of ~15,000 linear feet of 2' x 3' duct insulation.5) Approximately 84,000 square feet of floor tile and associated mastic.6) Approximately 100 square feet of transite board.7) Approximately 84,500 square feet of roof materials.
Building #006	<p>The maintenance building contains the following ACM:</p> <ol style="list-style-type: none">1) Approximately 2,400 linear feet of pipe insulation.2) Approximately 550 insulated joints.3) Approximately 11,000 square feet of air handler insulation jacket.4) Approximately 43,900 square feet of floor tile and associated mastic.5) Approximately 57,000 square feet of roof materials.
Building #007	<p>The boiler house contains the following ACM:</p> <ol style="list-style-type: none">1) Approximately 20,300 linear feet of pipe insulation.2) Approximately 3,500 insulated joints.3) Approximately 66,350 square feet of boiler & tank jacket insulation.4) Approximately 33,000 square feet of roof materials.
Building #008	<p>The police building contains the following ACM:</p> <ol style="list-style-type: none">1) Approximately 130 linear feet of pipe insulation.2) Approximately 25 insulated joints.3) Approximately 50 linear feet of duct insulation (2' x 3' size)4) Approximately 100 square feet of furnace insulation.5) Approximately 1,400 square feet of transite wall board.6) Approximately 3,300 square feet of floor tile & mastic.7) Approximately 84,500 square feet of roof materials.



Polarized Light Microscopy
Asbestos Analysis Report

2033 Heritage Park Drive
Oklahoma City, OK 73120
Ph. (405) 755-7272
Fax (405) 755-2058

Quantem Set ID: 9902P501001
Date Received: February 1, 1999

Client: A&M Engineering & Environmental Serv.
Account Number: A501

Analyzed By: Ellen McKittrick / Joe Melton
Methodology: AHERA (40 CFR Part 763 App. A. Sub. F)

Project: McDonnell Douglas
Project Location: Tulsa, OK
Project No.: 1640-001

Table with 7 columns: QuanTEM Sample ID, Client Sample ID, Composition, Color / Description, Asbestos, Non-Asbestos Fiber, Other. Contains 13 rows of sample analysis data.

Handwritten signature of Ellen McKittrick

Reviewed and Approved

February 2, 1999

Date

Note: Structures denoted as being "<5µ" refer to the structures whose length is from 0.5µm to 4.9µm.
Quantem is a NVLAP-accredited TEM and PLM laboratory (Lab Code 101959). This report relates only to the specific items tested.
NVLAP accreditation applies only to AHERA analysis [40 CFR Ch. I (1-1-87 ed.) Part 763, Appendix A to Subparts E and F].
This report may not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.
This report shall not be reproduced except in full, without the written approval of the laboratory.



Polarized Light Microscopy Asbestos Analysis Report

2033 Heritage Park Drive
Oklahoma City, OK 73120
Ph. (405) 755-7272
Fax (405) 755-2058

QuanTEM Set ID: 9902P501001
Date Received: February 1, 1999

Client: A&M Engineering & Environmental Serv.
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Analyzed By: Ellen McKittrick / Joe Melton
Methodology: AHERA (40 CFR Part 763 App. A. Sub. F)

Project: McDonnell Douglas
Project Location: Tulsa, OK
Project No.: 1640-001

QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos	Non-Asbestos Fiber	Other
14	7-FS1-HA5-002	homogeneous	tan bulk material	chrysotile 3%	cellulose 92%	
15	6-FS1-HA4-001	homogeneous	tan bulk material	NAD	n/a	
16	6-FS1-HA8-001	homogeneous	white bulk material	chrysotile 20%	mineral wool 30%	
17	6-FS1-HA2-001	homogeneous	black bulk material	chrysotile 3%	n/a	
18	6-FS1-HA11-001	homogeneous	blue bulk material	chrysotile 10%	n/a	
19	6-FS1-HA3-001	homogeneous	tan bulk material	chrysotile 3%	n/a	
20	6-FS1-HA6-001	homogeneous	red bulk material	chrysotile 3%	n/a	
21	6-FS1-HA1-001	homogeneous	gray bulk material	NAD	cellulose 5%	
22	6-FS1-HA5-001	homogeneous	tan bulk material	NAD	n/a	
23	6-FS1-HA9-001	homogeneous	white bulk material	chrysotile 15%	cellulose 15% glass fiber 20%	
24	6-FS1-HA7-001	homogeneous	tan / black bulk material	NAD	cellulose 80% synthetic 5% animal hair 3%	
25	6-FS1-HA12-001	homogeneous	gray bulk material	chrysotile 10%	cellulose <1%	

Reviewed and Approved

February 2, 1999

Date

A & M ENGINEERING AND ENVIRONMENTAL SERVICES, INC.



ENGINEERING - ENVIRONMENTAL - CONSTRUCTION
TULSA, OKLAHOMA

10010 E. 16th Street - TULSA, OKLAHOMA 74128-4813
TEL: (918)665-6575 FAX: (918)665-6576 E-Mail: aandm@galstar.com

SAMPLING FIRM

Adm

CLIENT CONTACT

JEFF ELBERT

PHONE #

918-665-6575

PROJECT NUMBER

1640-001

PROJECT NAME

MCDONNELL DOUGLAS - TULSA, OK

ANALYTICAL TESTS REQUIRED

SAMPLERS: (Signature)

J. Schwan

STA. NO	DATE	TIME	COMP. GRAB	STATION LOCATION	MATRIX	NO. OF CONTAINERS		RUSH ?		REMARKS
						YES	NO	YES	NO	
1	<i>1-28-99</i>		X	<i>57-F51-HA1-001</i>	<i>SOLID</i>	1				
2			X	<i>57-F51-HA5-001</i>	}					
3			X	<i>57-F52-HA3-003</i>						
4			X	<i>57-F52-HA3-002</i>						
5			X	<i>57-F52-HA3-001</i>						
6			X	<i>57-F52-HA2-001</i>						
7			X	<i>57-F51-HA4-001</i>						
8			X	<i>57-F53-HA6-001</i>						
9			X	<i>7-F51-HA2-001</i>						
10			X	<i>7-F51-HA2-002</i>						
11			X	<i>7-F51-HA5-001</i>						
12			X	<i>7-F51-HA3-001</i>						
13			X	<i>7-F51-HA4-001</i>						

TESTS - PM

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
<i>J. Schwan</i>	<i>1-28-99</i>	<i>16:30</i>	<i>Timothy</i>	<i>2-1-99</i>	<i>12:30</i>
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME

REMARKS:

CHAIN

A & M ENGINEERING AND ENVIRONMENTAL SERVICES, INC.



TULSA, OKLAHOMA

ENGINEERING - ENVIRONMENTAL - CONSTRUCTION

10010 E. 16th Street - TULSA, OKLAHOMA 74128-4813
 TEL: (918)665-6575 FAX: (918)665-6576 E-Mail: aandm@galstar.com

SAMPLERS: (Signature)

J. E. ...

SAMPLING FIRM

A & M

CLIENT CONTACT

JEFF ELBERT

PHONE N

918-665-6575

PROJECT NUMBER

1640-001

PROJECT NAME

MC DONNELL DUGLAS - TULSA, OK

ANALYTICAL TESTS REQUIRED

ASBESTOS - PLM

STA. NO	DATE	TIME	COMP. GRAB	STATION LOCATION	MATRIX	NO. OF CONTAINERS	RUSH ?		REMARKS
							YES	NO	
14	1-28-99		X	7-F51-HA5-002	SOLID	1			
15	1-27-99		X	6-F51-HA4-001					
16	1-27-99		X	6-F51-HA8-001					
17	1-27-99		X	6-F51-HA2-001					
18	1-27-99		X	6-F51-HA11-001					
19	1-27-99		X	6-F51-HA3-001					
20	1-27-99		X	6-F51-HA6-001					
21	1-27-99		X	6-F51-HA1-001					
22	1-27-99		X	6-F51-HA5-001					
23	1-27-99		X	6-F51-HA9-001					
24	1-27-99		X	6-F51-HA7-001					
25	1-27-99		X	6-F51-HA12-001					

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
<i>J. E. ...</i>			<i>Phillip ...</i>	3-1-99	12:30
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME

Appendix B

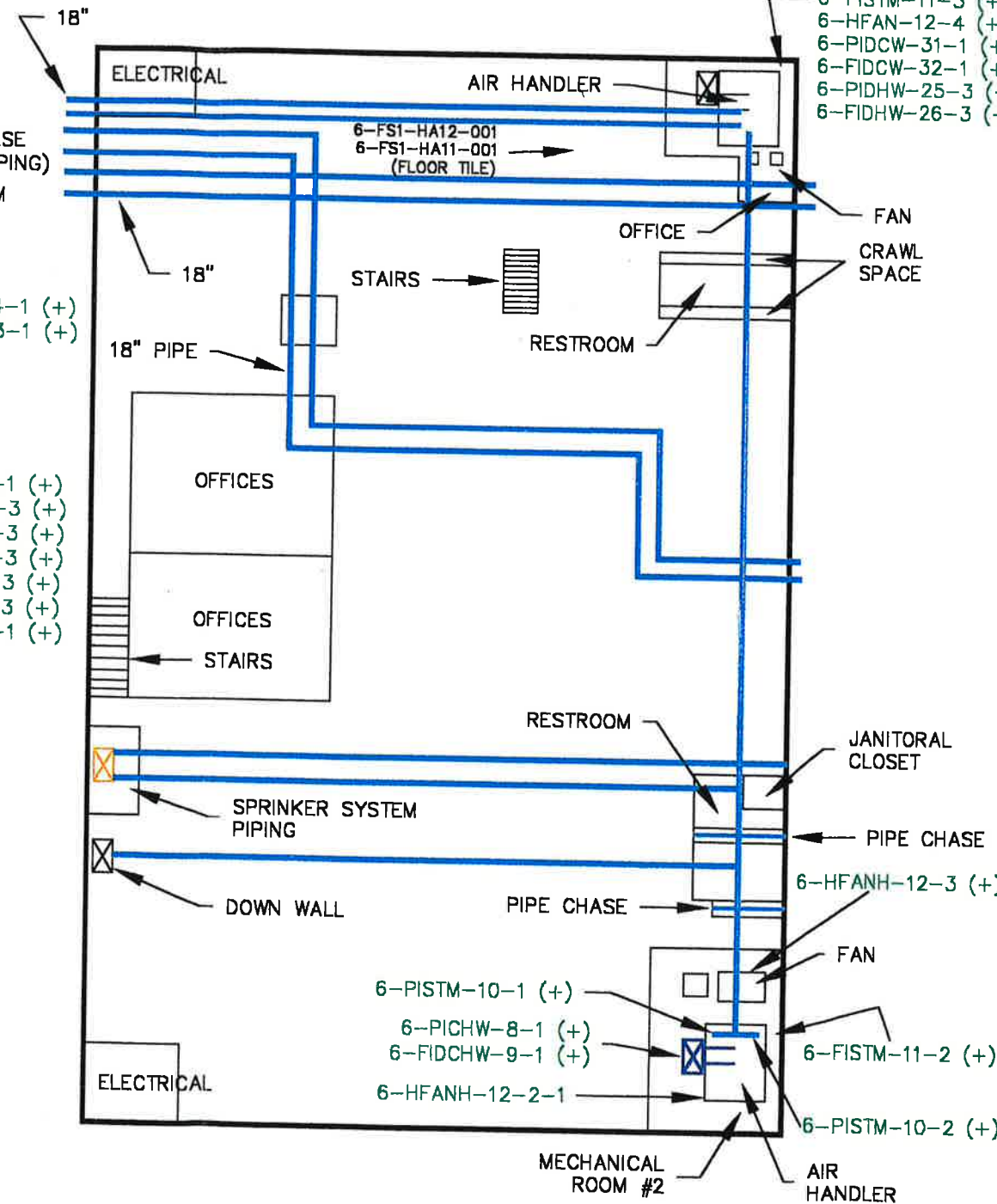
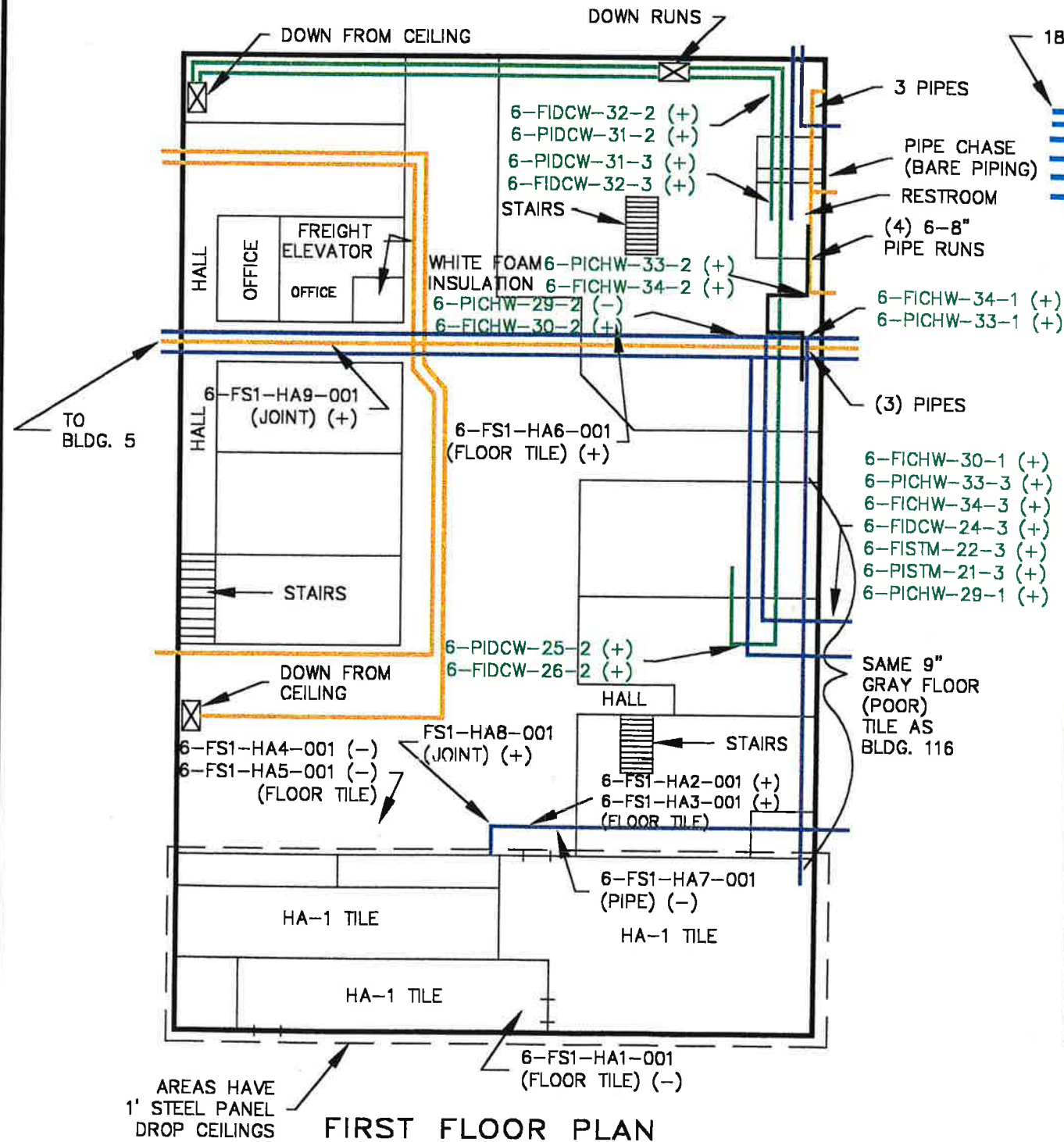
Proposed Abatement Layout

BUILDING 006

- SAME ORANGE FIBROUS WALL & CEILING INSULATION WITH STEEL GRATE AS SAMPLED IN OTHER BUILDINGS (ASSUME -)
- ROOF - TAR/FELT/GRAVEL (ASSUME +)

- BROWN FIBROUS (CARDBOARD LIKE) PIPE INSULATION (WHITE WRAP) (-) (WHITE CEMENTITIOUS JOINTS (+) & WHITE FIBROUS JOINTS (+))
- NEWER YELLOW FIBROUS (WHITE WRAP) PIPE INSULATION (ASSUME -) & JOINTS
- GRAY FIBROUS PIPE & JOINTS (WHITE WRAP) (+) (WHITE FIBROUS JOINTS) (+)
- WHITE FIBROUS PIPE, JOINT, HVAC INSULATION (+) (WHITE FIBROUS JOINTS (+))

- MECHANICAL ROOM #1
SAME AS ROOM #2
- 6-FICHW-9-3 (+)
 - 6-PISTM-10-3 (+)
 - 6-FISTM-11-3 (+)
 - 6-HFAN-12-4 (+)
 - 6-PIDCW-31-1 (+)
 - 6-FIDCW-32-1 (+)
 - 6-PIDHW-25-3 (+)
 - 6-FIDHW-26-3 (+)



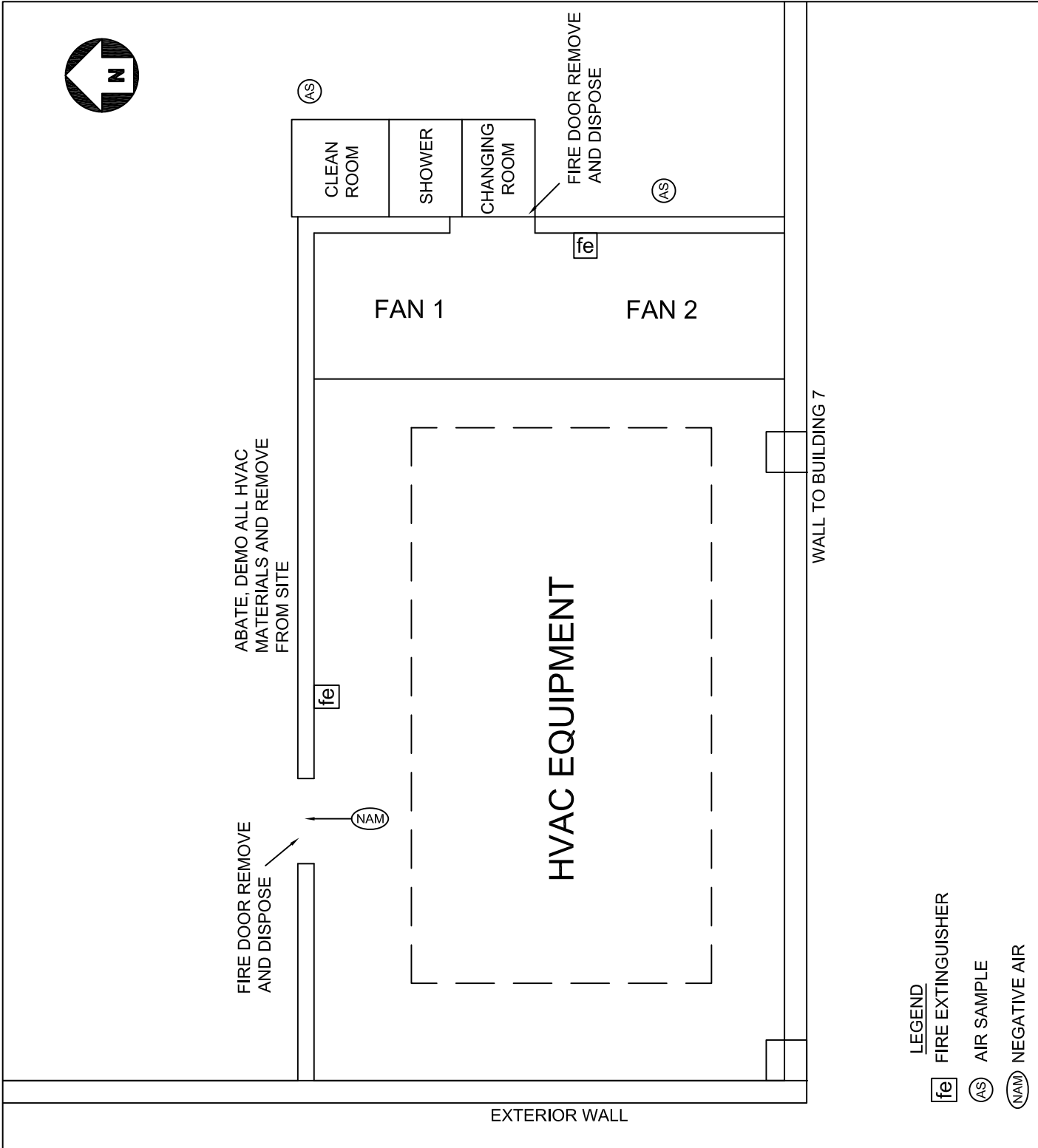
SAMPLE LEGEND	
FUNCTIONAL SPACES (DENOTED BY PREFIX FS)	
FS-1	ENTRY AREAS & OFFICES
FS-2	RESTROOMS
FS-3	PIPE CHASES
FS-4	MECHANICAL ROOMS
FS-5	ROOF TOP
HOMOGENEOUS AREAS (DENOTED BY PREFIX HA)	
HA-1	12"X12" WHITE FLOOR TILE WITH GRAY SPECK
HA-2	9" BLACK FLOOR TILE WITH WHITE STREAKS (CHECKERED PATTERN)
HA-3	9" ORANGISH TAN TILE (CHECKERED PATTERN)
HA-4	9" DARK ORANGE FLOOR TILE WITH WHITE SPECK (CHECKERED PATTERN)
HA-5	9" PINK FLOOR TILE WITH WHITE SPECKS (CHECKERED PATTERN)
HA-6	9" RED FLOOR TILE WITH WHITE STREAKS (CHECKERED PATTERN)
HA-7	BROWN FIBROUS (CARDBOARD LIKE) PIPE INSULATION (WHITE WRAP)
HA-8	WHITE CEMENTITIOUS JOINTS
HA-9	WHITE FIBROUS JOINTS & PIPE INSULATION
HA-10	AIR HANDLER INSULATION (GRAY WRAP) BROWN WOOL LIKE UNDER WHITE FIBROUS
HA-11	9" AQUA BLUE FLOOR TILE WITH WHITE STREAKS (CHECKERED PATTERN)
HA-12	9" GRAY FLOOR TILE WITH WHITE & BLACK STREAKS (CHECKERED PATTERN)
HA-13	GRAY FIBROUS PIPE INSULATION
HA-14	ROOF FELT/TAR/GRAVEL (ASSUME +)

NOTE: GREEN TEXT DENOTES PREVIOUS SURVEY BY GALSON TECHNICAL SERVICES, INC. IN 1991.

A & M ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
ENGINEERING - ENVIRONMENTAL - CONSTRUCTION

SCALE:	DATE:	FIGURE NO.
NTS	3/1/99	006
APPROVED BY:	DRAWN BY:	PROJECT NO.
JRE	ALB	1640-001

ASBESTOS SURVEY
BUILDING 006
AIR FORCE PLANT NO. 3
TULSA, OKLAHOMA



- LEGEND**
- fe FIRE EXTINGUISHER
 - AS AIR SAMPLE
 - NAM NEGATIVE AIR

Scale: 1"=70'



A & M Engineering and Environmental Services, Inc.
 Consulting - Design - Construction - Remediation

XX		
AIR FORCE PLANT 3 TULSA, OKLAHOMA		
SCALE: 1" = 70'	DATE: 8/2/2019	FIGURE NO. XX
APPROVED BY: JJ	DRAWN BY: TF	PROJECT NO. 2320-001-008

Appendix C

QAPP Amendment Log Form and Completed Forms



QAPP Amendment Log Form

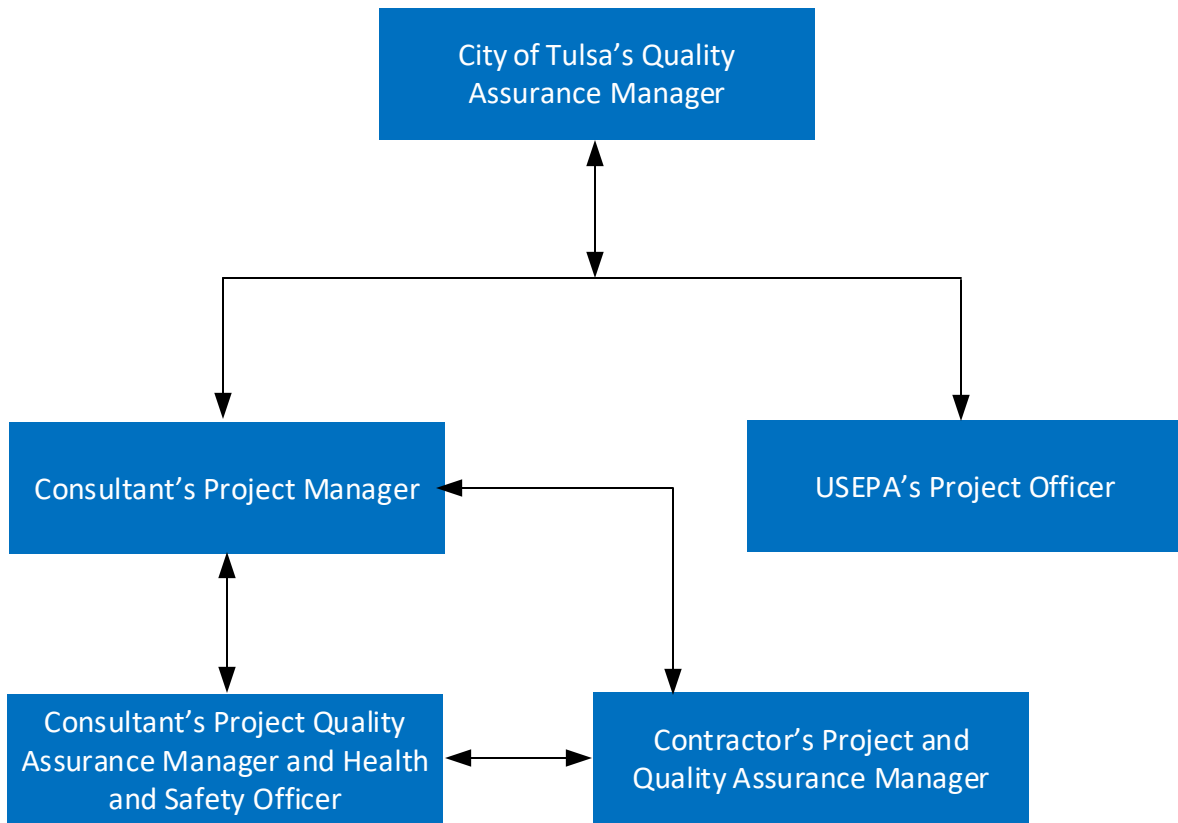
**Asbestos Abatement
Air Force Plant 3, Building 6
Tulsa International Airport
City of Tulsa, Tulsa County, Oklahoma 74104**

Number	Dates Completed	Descriptions	Amended By (Names)	Sections Affected	Approved by all Project Distribution Listed Individuals
1					<input type="checkbox"/> Yes
2					<input type="checkbox"/> Yes
3					<input type="checkbox"/> Yes
4					<input type="checkbox"/> Yes
5					<input type="checkbox"/> Yes
6					<input type="checkbox"/> Yes
7					<input type="checkbox"/> Yes

Please attach amendment support documentation, as necessary.

Appendix D

Project Organizational Chart



A & M Engineering and Environmental Services, Inc.
 Consulting - Design - Construction - Remediation

Project Organizational Chart

Air force Plant 3, Building 6

Tulsa International Airport
 City of Tulsa, Tulsa County, Oklahoma

Not To Scale

July 30, 2019

Appendix E

Appendix E

Air Monitoring Data Form

