ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

U.S. Environmental Protection Agency

Subgrantee: The City of Tulsa, Oklahoma

Tulsa Evans Fintube Property

Grant No. BF00F71001-0

Parcels # 1, #2, and #3

150/186 North Lansing Avenue, Tulsa, OK

Prepared By

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Prepared For

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October 2015

TITLE AND APPROVAL SHEET

Project Title: **City of Tulsa – Evans/Fintube Project ABCA**

City of Tulsa
175 East 2nd Street, Suite 260
Tulsa, Oklahoma 74103

Implementing Organization: City of Tulsa

ABCA Effective Date: _____

Approving Officials:

For this project the City of Tulsa's Economic Development Director will function as the Project Manager and have primary responsibility for implementation of the Clean-up Grant. The City of Tulsa's Brownfields Program Manager will function as the Assistant Project Manager and have secondary responsibility for the implementation of the program and QA. The City of Tulsa's Project Officer for Evans/Fintube on the staff of the Engineering Department will function as the QA Manager and perform primary QA activities.

The USEPA Project Officer will ensure that the policies, goals, and objectives of the Clean-up Grant are achieved. This ABCA must be reviewed and approved by the Project Manager, Assistant Project Manager, QA Manager, USEPA Project Officer, and the USEPA Brownfields Project Officer prior to implementation and commencement of project activities.

Project Manager, Clay Bird:

_____ _____
Signature ***Date***

Assistant Project Manager, Adrienne Russ:

_____ _____
Signature ***Date***

QA Manager, Doug Wilson:

_____ _____
Signature ***Date***

USEPA Region 6 Project Officer, Paul Johnson:

_____ _____
Signature ***Date***

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1.0 EXECUTIVE SUMMARY

The Tulsa Evans Fintube Property is located at 150/186 North Lansing in Tulsa, Oklahoma. The site currently consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three north-south oriented buildings to the north and two east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four buildings oriented north-south and one smaller building to the southeast that is oriented east-west.

The Evans Building Complex was formerly a steel manufacturing facility that contained a foundry on the northern end. The Fintube Building Complex was formerly used as a metal manufacturing facility and a producer of heat exchangers that consisted of a concrete reservoir, a forge, and welding and fabrication shops. The site has also been a scrap metal recycling facility and a storage yard for a wrecker service and highway construction equipment and materials.

A Phase II Environmental Site Assessment (ESA) was conducted at the site in June 2010 by ALL Consulting identified the potential presence of asbestos-containing building materials (ACBM) and lead-based paint (LBP), as well as arsenic, lead, petroleum hydrocarbons, polychlorinated biphenols (PCBs) and polycyclic aromatic hydrocarbons. The City of Tulsa is seeking to remediate environmental hazards in an effort to increase the safety of the site and prepare for redevelopment efforts. **This Analysis of Brownfields Alternative (ABCA) is limited to the cleanup of ACBM and LBP.**

Currently, the Evans Fintube Property remains vacant, and is suffering from natural decay leading to hazardous conditions in the interior of the building and the soil and groundwater. These problems are prohibiting renovation efforts and ultimate reuse of the building. ACBM are becoming deteriorated leading to the possible disbursement of asbestos fibers into the air, lead paint is chipping and peeling off causing the possible dispersion of lead in the form of dust and paint chips.

The City of Tulsa applied for and received a CERCLA Section 104(k) for clean-up of these hazards. Funds from this grant will be utilized to develop an abatement project design for ACBM and LBP, contractor specifications, public outreach efforts, and ultimately abatement activities to remove ACBM and LBP hazards in preparation of site renovations.

The Analysis of Brownfield Cleanup Alternatives (ABCA) contained herein has been developed by Enercon Services, Inc. (ENERCON) in compliance with the requirements of the funding agency.

2.0 SITE CHARACTERIZATION

2.1 OBJECTIVES

ENERCON prepared this ABCA consistent with our existing Environmental Consulting Agreement with the City of Tulsa. The report content and format is consistent with guidance provided EPA Region 6 for Brownfield Grant projects.

Cleanup alternatives were evaluated in accordance with EPA Region 6 protocols and general guidance required prior to the implementation of a cleanup design using EPA Brownfields Grant funding. Specifically, this ABCA has been developed to present viable cleanup alternatives based on site-specific conditions, technical feasibility, and preliminary cost/benefit analyses. Specific cleanup alternatives and associated recommendations are presented in applicable sections of this report. Site cleanup activities may include one or more buildings.

2.2 SITE DESCRIPTION

LOCATION DESCRIPTION

The subject property, henceforth referred to as the "Site," is bounded as follows:

- West: railroad lines and easement;
- East: N. Lansing Ave. and Highway 75;
- North: Lee Supply Co.; and
- South: E. Archer St. and Highway 244.

It is located in the City of Tulsa, Oklahoma. The Site is located northeast of downtown Tulsa, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The Site currently consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three north-south oriented buildings to the north and two east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four buildings oriented north-south and one smaller building to the southeast that is oriented east-west (All Consulting, LLC, 2010)

SITE IMPROVEMENTS AND CURRENT STATUS

The Site contains approximately 10 buildings and associated parking facilities. All structures are currently vacant and in various degrees of disrepair due to natural deterioration, water intrusion and vandalism. The perimeter of the site is currently protected by a six foot tall chain link security fence.

PREVIOUS REPORTS

On behalf of the U.S. Army Corps of Engineers a Phase I and Phase II Environmental Site Assessment of the site were conducted in 2009 (updated July 2011) and 2010, respectfully, by All Consulting, LLC and Phase III Cleanup Plan/Cost Estimate was complete 2011 by Science Applications International Corporation (now Leidos). These are references as follows:

- *Targeted Brownfields Assessment, Phase II Environmental Site Assessment (ESA), 150/186 N. Lansing, City of Tulsa, Tulsa County, Oklahoma*. All Consulting, LLC. June, 2010.

- *Final Report, Targeted Brownfields Assessment, Phase II Environmental Site Assessment, 150/186 N. Lansing, Tulsa, Oklahoma.* All Consulting LLC. September 2009, updated July 2011.

- *Final Report, Targeted Brownfields Assessment, Phase III* Cleanup Plan/Cost Estimate, Fintube Site, 150/186 North Lansing, Tulsa, OK. Science Applications International Corporation. September, 2011.

2.3 SOURCE, NATURE AND EXTENT OF CONTAMINATION

The Phase I and II ESAs identified regulated ACBMs of thermal systems insulation (TSI) and debris located in the locker room area of the main Fintube building and TSI in the main warehouse of the Evans facility. The Phase I and Phase II ESAs also identified LBP on the exterior of the Fintube buildings and on the interior structures of both the Evans and Fintube buildings.

2.4 EXPOSURE PATHWAYS OF CONCERN

The primary exposure pathway of concern for asbestos and lead at the Evans Fintube Property is inhalation. As the ACBM within the building continues to deteriorate and/or is disturbed through water intrusion, vandalism, renovation, or demolition, asbestos fibers can be released from the ACBM and made airborne. Inhalation of asbestos fibers is a known hazard and carcinogen and is regulated by OSHA and the USEPA. As LBP deteriorates and/or is disturbed through water intrusion, vandalisms, renovation, or demolition, airborne lead particles can be inhaled and can cause cancer and is regulated by OSHA and the USEPA. The hazard is currently limited to the areas within the site structures and to both maintenance workers and trespassers. Renovation or demolition activities prior to abatement of ACBM or LBP would expand the hazard to the neighboring properties, construction crews, and the disposal facility.

2.5 SUMMARY OF AVAILABLE SAMPLE ANALYTICAL RESULTS

ASBESTOS

Regulated Asbestos Containing Materials (RACM)

- Approximately 10 linear feet and 10 square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of Fintube main building.

- Approximately 34 linear feet of asbestos containing TSI located in main warehouse of Evans facility.

The removal, repair, or encapsulation of RACM require that the employer follow the removal and training requirements of OSHA 29CFR 1926.1101 for Class I work activities, the Oklahoma Department of Labor (ODOL) Friable Asbestos Rules, and ODEQ Asbestos Rules.

LEAD BASED PAINT

LBP was identified on exterior walls and sliding doors of the main building and on iron I-beams and stairs in interior buildings at the Fintube complex. LBP was identified on an interior brick wall, interior I-beams, a concrete stem wall and on stairs at the Evans complex (Phase II ESA, Appendix G, June 2010).

The removal of lead based paint requires that the employer follow OSHA 29CFR1926 for possible exposure to lead, along with possible hexavalent chromium and cadmium. RCRA rules for toxicity characteristic leaching procedure (TCLP) for characterizing and disposing of wastes would also need to be implemented.

2.6 SCHEDULE OF BROWNFIELD CUP SUBMITTALS

Clean-up Grant submittals will include the grant compliance document as well as design, plan and specifications. Grant compliance document dates are well defined. However, because contracting for the selected remedial alternative will be performed separately, those dates are subject to change based upon responsiveness.

Task	Sept. 2015		Oct. 2015		Nov. 2015		Dec. 2015		Jan. 2016		Feb. 2016	
	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-28
1 - Grant Document & Grant Oversight												
2 - Document Review And Abatement / Remediation Design												
3 - Advertisement For Bid												
4 - Pre-Bid Meeting												
5 - Bid Selection												
6 - Abatement /Remediation Activities												
7- Final Inspections												
Grant Closeout												

2.7 IDENTIFICATION AND ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

SCOPE AND METHODOLOGY

The scope of this ABCA includes evaluation of reliable ACBM cleanup strategies based upon technical relevance, property redevelopment objectives, and estimated cost. Applicable abatement technologies were outlined and evaluated in response to existing Phase I/Phase II information and supporting data, project documents, and ENERCON's experience with similar site conditions.

Cleanup alternatives are presented and assessed with specific consideration of ODOL, ODEQ, USEPA, and OSHA requirements for asbestos abatement and lead paint projects. Specifically, the following criteria were evaluated:

- Site conditions and potential risks
- Anticipated ACBM conditions, locations, and other ancillary components (e.g. hidden materials)
- General advantages and disadvantages of the abatement approach
- Overall protection of human health and the environment
- Ability to properly abate materials and achieve regulatory standards
- Compliance with federal, state, and local laws and regulations
- Long-term and short-term effectiveness
- Technical and administrative feasibility
- Capital cost and subsequent expenses
- Community and regulatory acceptance

Based upon the criteria above, a preferred alternative was selected and is presented in Section 3 of this report.

COST ESTIMATE ASSUMPTIONS AND LIMITATIONS

The cost summaries provided in this report are presented as general order of magnitude estimates due to various unknown conditions regarding hidden ACM and LBP. Preliminary costs presented in this ABCA may therefore vary significantly from actual abatement, cleanup, or other associated environmental cleanup expenses. These estimates do not reflect ENERCON cost proposals, fee schedules, or other cost warranties related to pending work performed consistent with ABCA recommendations and related technical evaluations.

Several assumptions were made specific to each alternative, generally based on information provided in previous assessment reports prepared without ENERCON oversight. It should be noted that these assumptions may or may not accurately reflect final cleanup plans or pending specifications. Accordingly, budget-level cost determinations would require more detailed site investigations, and related planning

beyond the current phase of the project. Preliminary ABCA cost estimates are intended solely for planning purposes and should be considered accurate for relative comparison only.

ASBESTOS-CONTAINING BUILDING MATERIALS

ENERCON evaluated several cleanup/abatement alternatives in response to the Phase I/II findings noted in previous sections of this report. These alternatives include the following:

Alternative 1 No Action
Alternative 2 Partial Asbestos Abatement and Encapsulation/Enclosure of Both Site Facilities
Alternative 3 Full Asbestos Abatement of Both the Evans and Fintube Facilities
Alternative 4 Full Asbestos Abatement of Evans Facilities and No Action at Fintube Buildings

Alternative 1: No Action Alternative

Approach Summary: Alternative 1 would leave the identified ACBM (RACM) in place and no abatement activities would occur.

Effectiveness: Alternative 1 would have little effectiveness in reducing the human health and environmental hazards associated with the ACBM. The current hazards would remain and would expand as site conditions deteriorate. Furthermore, this approach would significantly impact the ability to perform redevelopment efforts at the site.

Implementability: Alternative 1 is easily implemented and requires no additional effort beyond the status quo.

Cost: Alternative 1 has no direct and immediate costs. Alternative 1 would incur indirect costs associated with loss of redevelopment opportunity, potential regulatory fines, and potential legal liability. These costs are difficult to estimate but could easily reach into the hundreds of thousands of dollars over the life of the structure.

Alternative 2: Partial Asbestos Abatement and Encapsulation/Enclosure of Evans Facilities and Fintube Buildings

Approach Summary: Alternative 2 would involve abatement of all exposed RACM, and either encapsulation or enclosure of both suspected and hidden RACM. In this approach, no attempt to open walls, ceilings or other cavities would be made to find all RACM within the structures. RACM exposed and visible as noted in the Phase I/II documents would be abated in accordance with EPA and OK regulations. Materials remaining behind existing surfaces or within non-accessible structural spaces would be enclosed and/or encapsulated to reduce the risk of damage and/or exposure.

Effectiveness: Alternative 2 would have short-term effectiveness in the reduction of human health and environmental hazards associated with the ACBM. The buildings could be entered by maintenance staff and other site visitors without significant exposure risks. This alternative would be acceptable to regulatory agencies and partial renovation/demolition activities could occur so long as protected ACBM is not disturbed. The long-term effectiveness of Alternative 2 would be limited. The enclosed/encapsulated material would need to be monitored throughout its lifetime and repairs made as needed. The materials may continue to deteriorate behind enclosures and create additional hazards in time. The selection of Alternative 2 would place significant limitations on future renovation/demolition/redevelopment activities.

Implementability: Alternative 2 has moderate implementation demands. An Asbestos Abatement Project Design would need to be developed by an Oklahoma Licensed Project Designer and an Oklahoma Licensed Asbestos Abatement Contractor would need to be retained for the performance of the work activities. A moderate amount of federal and state regulatory oversight would occur throughout implementation and appropriate completion inspections would be required. To document long term maintenance and protection of the encapsulated/enclosed areas, a facility Operations and Maintenance Plan would need to be implemented and followed. Implementation of Alternative 2 would require 30 to 90 days to complete separate regulatory approvals and bid solicitations.

Cost: Cost estimate for Implementation of Alternative 2 could range as shown in Table 1.1.

Table 1.1 – Estimate of Probable Costs Alternative 2

ACTIVITY DESCRIPTION		Estimate of Probable Cost	
		Low Range Estimate	High Range Estimate
Asb 2.1	Development of Project Design	$3,000	$7,000
Asb 2.2	Development of Bid Specifications	$3,000	$7,000
Asb 2.3	Solicitation and Selection of Abatement Contractor	$1,000	$2,000
Asb 2.4	Permits and Regulatory Fees	$1,000	$2,000
Asb 2.5	Abatement of Exposed RACM	$1,000	$5,000
Asb 2.6	Disposal of RACM Waste	$1,000	$2,000
Asb 2.7	Encapsulation/Enclosure of ACBM	$1,000	$2,000
Asb 2.8	Electric, water, sewer	$50	$200
Asb 2.9	Third Party Oversight of Abatement Contractor	$2,500	$6,000
Asb 2.10	Third Party Air Monitoring	$2,000	$4,000
Asb 2.11	Development of O&M Plan	$2,500	$5,000
Asb 2.12	Maintenance/Inspection of O&M (yearly)	$1,000	$2,000
Asb 2.13	20% Contingency	$3,810	$8,840
	Estimated Total Cost Range	**$22,860**	**$53,040**

Alternative 3: Full Asbestos Abatement of Both the Evans and Fintube Facilities

Approach Summary: Alternative 3 would involve the complete abatement of all exposed RACM identified in the Phase I/Phase II documents. Additionally, Alternative 3 would involve aggressive work to identify, locate, and abate additional RACM not accessible during the initial Phase II work. This may include hidden pipe insulation within wall cavities, ceiling spaces, or utility chases. Alternative 3 would include selective demolition to fully expose hidden materials. Investigation derived non-ACBM waste from this selective demolition would be left on site.

Effectiveness: Alternative 3 would be the most effective choice in both achieving human health and environmental objectives and future site planning goals. The resulting structure would be free of asbestos related limitations to renovation/demolition and would not require the development of an O&M Plan for long term maintenance and oversight. Long term legal liabilities and OSHA concerns relative to site workers and contractors is also mitigated.

Implementability: The implementation efforts for Alternative 3 are moderate and only slightly increased over Alternative 2. An Asbestos Abatement Project Design would be required to be developed by an Oklahoma Licensed Project Designer and an Oklahoma Licensed Asbestos Contractor would need to be secured. A moderate amount of regulatory oversight would occur throughout implementation and third

party project monitoring on behalf of the City of Tulsa would be preferred. Final documentation of the abatement efforts, disposal of asbestos waste, and air clearance levels would be performed and no further efforts relative to ACBM would be required prior to renovation/demolition. Implementation of Alternative 3 could require up to one month separate of regulatory approvals and bid solicitation.

Cost: Cost estimate for Implementation of Alternative 3 could range as shown in Table 1.2.

Table 1.2 – Estimate of Probable Costs Alternative 3

ACTIVITY DESCRIPTION		Estimate of Probable Cost	
		Low Range Estimate	High Range Estimate
Asb 3.1	Development of Project Design	$3,000	$7,000
Asb 3.2	Development of Bid Specifications	$3,000	$7,000
Asb 3.3	Solicitation and Selection of Abatement Contractor	$1,000	$2,000
Asb 3.4	Permits and Regulatory Fees	$1,000	$2,000
Asb 3.5	Abatement of ACBM	$3,000	$6,000
Asb 3.6	Disposal of ACBM Waste	$2,000	$4,000
Asb 3.7	Electric, water, sewer	$50	$100
Asb 3.8	Third Party Air Monitoring	$2,000	$4,000
Asb 3.9	Third Party Oversight of Abatement Contractor	$2,000	$6,000
Asb 3.10	20% Contingency	$3,410	$7,620
	Estimated Total Cost Range	**$20,460**	**$45,720**

Alternative 4: Full Asbestos Abatement of the Evans Facility and No Action at the Fintube Buildings

Approach Summary: Alternative 4 would involve the complete abatement at the Evans Facility of all exposed RACM identified in the Phase I/Phase II documents. Additionally, Alternative 4 would involve aggressive work to identify, locate, and abate additional RACM not accessible during the initial Phase II work. This may include hidden pipe insulation within wall cavities, ceiling spaces, or utility chases. Alternative 4 would include selective demolition to fully expose hidden materials. Investigation derived non-ACBM waste from this selective demolition would be left on site as in Alternative 3.

The Fintube Building would be left in its current condition. The current hazards would remain and would expand as site conditions deteriorate.

Effectiveness: Alternative 4 would not be the most effective choice in both achieving human health and environmental objectives and future site planning goals. The resulting Evans Facility structure would be free of asbestos related limitations to renovation/demolition and would not require the development of

an O&M Plan for long term maintenance and oversight. Long term legal liabilities and OSHA concerns relative to site workers and contractors is also mitigated.

The Fintube Buildings would continue to deteriorate and be an eyesore for any staff or site visitors to the Evans Facilities. The current hazards would remain and would expand as site conditions deteriorate. Furthermore, this approach would significantly impact the ability to perform redevelopment or demolition efforts at the site as even demolition of the buildings would require asbestos abatement for worker safety and OSHA compliance.

Implementability: An Asbestos Abatement Project Design would be required to be developed by an Oklahoma Licensed Project Designer and an Oklahoma Licensed Asbestos Contractor would need to be secured. A moderate amount of regulatory oversight would occur throughout implementation and third party project monitoring on behalf of the City of Tulsa would be preferred. Final documentation of the abatement efforts, disposal of asbestos waste, and air clearance levels would be performed and no further efforts relative to ACBM would be required prior to renovation/demolition. Implementation of Alternative 3 could require up to one month separate of regulatory approvals and bid solicitation.

Cost: Cost estimate for Implementation of Alternative 3 could range as shown in Table 1.3.

Table 1.3 – Estimate of Probable Costs Alternative 4

EVANS FACILITY - ACTIVITY DESCRIPTION		Estimate of Probable Cost	
		Low Range Estimate	High Range Estimate
Asb 4.1	Development of Project Design	$2,100	$4,900
Asb 4.2	Development of Bid Specifications	$2,100	$4,900
Asb 4.3	Solicitation and Selection of Abatement Contractor	$700	$1,400
Asb 4.4	Permits and Regulatory Fees	$700	$1,400
Asb 4.5	Abatement of ACBM	$2,100	$4,200
Asb 4.6	Disposal of ACBM Waste	$1,400	$2,800
Asb 4.7	Electric, water, sewer	$35	$70
Asb 4.8	Third Party Air Monitoring	$1,400	$2,800
Asb 4.9	Third Party Oversight of Abatement Contractor	$1,400	$4,200
Asb 4.10	20% Contingency	$2,387	$5,334
	Estimated Total Cost Range	**$14,322**	**$32,004**

LEAD BASED PAINT

ENERCON evaluated cleanup/abatement alternatives in response to the Phase I/II findings noted in previous sections of this report. These alternatives include the following:

Alternative 1 No Action
Alternative 2 Partial LBP Stabilization and Re-Painting of the Evans Facility and No Action at the Fintube Buildings
Alternative 3 Full LBP Abatement of the Evans Facility and No Action at the Fintube Facility
Alternative 4 Full LBP Abatement of both the Evans and Fintube Buildings

Alternative 1: No Action Alternative

Approach Summary: Alternative 1 would leave the identified LBP in place and no abatement activities would occur.

Effectiveness: Alternative 1 would have little effectiveness in reducing the human health and environmental hazards associated with LBP. The current hazards would remain and would expand as site conditions deteriorate. Furthermore, this approach would significantly impact the ability to perform reuse efforts at the site unless the buildings were to be demolished.

Implementability: Alternative 1 is easily implemented and requires no additional effort beyond the status quo.

Cost: Alternative 1 has no direct and immediate costs. Alternative 1 would incur indirect costs associated with loss of redevelopment opportunity, potential regulatory fines, and potential legal liability. These costs are difficult to estimate but could easily reach into the hundreds of thousands of dollars over the life of the structure.

Alternative 2: Partial LBP Stabilization and Re-Painting of the Evans Facility and No Action at the Fintube Buildings

Approach Summary: Alternative 2 would involve stabilization of all LBP surfaces at the Evans Facility **both above and below** the EPA threshold of 5,000 ppm. In this approach, there would be surface preparation followed by re-painting of LBP surfaces in the Evans buildings. No stabilization and re-painting at the Fintube Buildings would be performed in this alternative.

Effectiveness: Alternative 2 would have short-term effectiveness in the reduction of human health and environmental hazards associated with the LBP. The Evans Facility could be entered by maintenance staff

and other site visitors without significant exposure risks. This alternative would be acceptable to regulatory agencies and partial renovation/demolition activities could occur so long as abrasion/sanding/grinding of the surfaces does not occur. The resulting structure would remain subject to LBP related limitations on renovation/reuse for target housing or child occupied facilities.

The Fintube Buildings would be left in their current state. The current hazards would remain and would expand as site conditions deteriorate. Furthermore, this approach could significantly impact the ability to perform redevelopment if the buildings are left in place and depending upon the proposed final reuse.

Implementability: A moderate amount of federal and state regulatory oversight would occur throughout implementation. The removal or surface prep of LBP would require surface preparation (sanding, scraping, etc.). The sanding of LBP requires that the employer follow OSHA 29 CFR 1926 for potential worked lead exposure. Compliance with 29 CFR 1926.1126 and 29 CFR 1926.1127, related to Chrome VI and cadmium exposure, respectively, could also be required, depending on the make-up of the primer that was used before the paint was applied. RCRA rules for toxicity characteristic leaching procedure (TCLP) for waste disposal would also need to be implemented.

Cost: For Alternative 2, the distribution of lead containing surfaces is assumed to be evenly distributed between the buildings, as no breakdown of area by location was provided in the Phase II ESA. Cost estimates for Implementation of Alternative 2 could range as shown in Table 1.4.

Table 1.4 – Estimate of Probable Costs Alternative 2

EVANS FACILITY - ACTIVITY DESCRIPTION		Estimate of Probable Cost	
		Low Range Estimate	High Range Estimate
LBP 2.1	Development of Bid Specifications	$1,500	$3,500
LBP 2.2	Solicitation and Selection of Contractor	$500	$1,000
LBP 2.3	Labor and Overhead for Contractor	$50,000	$70,000
LBP 2.4	Supplies and Materials	$20,000	$35,000
LBP 2.5	Third Party Air Monitoring	$2,000	$3,000
LBP 2.6	Scaffolding, equipment, and miscellaneous	$10,000	$15,000
LBP 2.7	Water, electric, sewer	$1,500	$2,500
LBP 2.8	Equipment Rental	$5,000	$10,000
LBP 2.9	20% Contingency	$18,100	$28,000
	Estimated Total Cost Range	**$108,600**	**$168,000**

Alternative 3: Full LBP Abatement of the Evans Facility and No Action at the Fintube Facility

Approach Summary: Alternative 3 would involve abatement of the LBP surfaces **above** the EPA threshold of 5,000 ppm at the Evans Facility and No Action in the Fintube Buildings. In this approach, there would be wet removal methods (wet scraping or water blasting) applied to LBP-containing surfaces at the Evans buildings. No LBP abatement would be conducted in the Fintube buildings.

Effectiveness: Alternative 3 would be the most effective choice in both achieving human health and environmental objectives and future site planning goals for the Evans buildings. The resulting Evans structures would be free of LBP related limitations to renovation or reuse in accordance with EPA and HUD regulations pertaining to target housing or child occupied facilities. OSHA regulations for worker safety would remain applicable to renovation efforts in lead containing areas.

Alternative 3 would have no effectiveness in the reduction of human health and environmental hazards associated with the LBP in the Fintube building. The current hazards would remain and would expand as site conditions deteriorate. Furthermore, this approach would significantly impact the ability to perform reuse efforts at the site unless the Fintube buildings were to be demolished.

Implementability: Alternative 3 has moderate implementation demands. A moderate amount of federal and state regulatory oversight would occur throughout implementation. The removal of LBP in the Evans buildings would require the use of wet methods to remove LBP. Compliance with 29 CFR 1926.1126 and 29 CFR 1926.1127 related to Chrome VI and cadmium exposure, respectively, may be required, depending on the make-up of the primer that was used before the paint was applied. RCRA rules for toxicity characteristic leaching procedure (TCLP) for characterizing wastes would also need to be implemented. Implementation of Alternative 3 would require 30 to 90 days to complete separate of regulatory approvals and bid solicitations.

Alternative 3 is easily implemented at the Fintube buildings and would require no additional effort.

Cost: For Alternative 3, the distribution of lead containing surfaces is assumed to be evenly distributed between the buildings, as no breakdown of area by location was provided in the Phase II ESA. Cost estimates for Implementation of Alternative 3 could range as shown in Table 1.5.

Table 1.5 – Estimate of Probable Costs Alternative 3

ACTIVITY DESCRIPTION		Estimate of Probable Cost	
		Low Range Estimate	High Range Estimate
LBP 3.1	Development of Bid Specifications	$1,500	$3,500
LBP 3.2	Solicitation and Selection of Abatement Contractor	$500	$1,000
LBP 3.3	Labor and Overhead for Abatement Contractor	$35,000	$45,000
LBP 3.4	Supplies and Materials	$5,000	$7,000
LBP 3.5	Third Party Air Monitoring	$2,000	$3,000
LBP 3.6	Scaffolding, equipment, and miscellaneous	$5,000	$7,000
LBP 3.7	Water, electric, sewer	$1,500	$2,500
LBP 3.8	Equipment Rental	$2,500	$3,500
LBP 3.9	20% Contingency	$10,600	$14,500
	Estimated Total Cost Range	**$63,600**	**$87,000**

Alternative 4: Full LBP Abatement of Both Facilities

Approach Summary: Alternative 4 would involve complete abatement of the LBP surfaces above the EPA threshold of 5,000 ppm at both the Evans and Fintube facilities. In this approach, there would be wet removal methods (wet scraping or water blasting) applied to LBP-containing surfaces at all affected buildings.

Effectiveness: Alternative 4 would be the most effective choice in both achieving human health and environmental objectives and future site planning goals. The resulting structure would be free of LBP related limitations to renovation or reuse in accordance with EPA and HUD regulations for target housing or child occupied facilities. OSHA regulations for worker safety would remain applicable to renovation efforts in lead containing areas.

Implementability: Alternative 4 has moderate implementation demands. A moderate amount of federal and state regulatory oversight would occur throughout implementation. The removal of LBP would require wet methods to remove LBP. Compliance with 29 CFR 1926.1126 and 29 CFR 1926.1127 related to chrome VI and cadmium exposure, respectively, would be required, depending on the make-up of the primer that was used before the paint was applied. RCRA rules for toxicity characteristic leaching procedure (TCLP) for wastes would also need to be implemented. Implementation of Alternative 4 would require 30 to 90 days to complete separate of regulatory approvals and bid solicitations.

Cost: Cost estimates for Implementation of Alternative 4 could range as shown in Table 1.6.

Table 1.6 – Estimate of Probable Costs Alternative 4

ACTIVITY DESCRIPTION		Estimate of Probable Cost	
		Low Range Estimate	High Range Estimate
LBP 4.1	Development of Bid Specifications	$3,000	$7,000
LBP 4.2	Solicitation and Selection of Abatement Contractor	$1,000	$2,000
LBP 4.3	Labor and Overhead for Abatement	$60,000	$80,000
LBP 4.4	Supplies and Materials	$10,000	$15,000
LBP 4.5	Disposal and Transportation	$15,000	$20,000
LBP 4.6	Third Party Air Monitoring	$4,000	$6,000
LBP 4.7	Scaffolding and equipment	$20,000	$30,000
LBP 4.8	Water, electric, sewer	$3,000	$5,000
LBP 4.9	Third Party Confirmation Sampling	$3,000	$6,000
LBP 4.10	Equipment Rental	$10,000	$20,000
LBP 4.11	20% Contingency	$25,800	$38,200
	Estimated Total Cost Range	**$154,800**	**$229,200**

3.0 PREFERRED REMOVAL ACTION ALTERNATIVE

The objective of this ABCA was to provide a thorough evaluation of reliable cleanup strategies consistent with technical feasibility, property redevelopment initiatives, and cost. Applicable cleanup approaches were outlined and evaluated based upon ENERCON's experience with similar projects, local planning objectives, and professional judgment.

Based upon our review of previous site assessment reports and the additional considerations discussed herein, ENERCON has developed the following conclusions and recommendations regarding subsequent measures to address asbestos-containing materials and the lead based paint related conditions:

1. Brownfields Cleanup evaluations were performed consistent with EPA and ODEQ guidance and the scope of services outlined in ENERCON's proposal dated. ENERCON's review of previous Phase I/II assessment activities for the Site indicate historical information and data usable for continued brownfield cleanup planning. However, certain unknown conditions remain and are discussed in the applicable sections of this report.

2. ENERCON established costs for four alternative strategies for ACBM at the Site. Estimates ranged from $0 for the No Action Alternative (Alternative 1) to $53,040 for the high range of the Partial Abatement/Encapsulation Alternative (Alternative 2). Specific cost details are outlined in the cost summary tables provided in Section 2 of this report.

3. ENERCON established costs for four alternative strategies for LBP at the Site. Estimates ranged from $0 for the No Action Alternative (Alternative 1) to $229,200 for the high range of the Full LBP at Both Locations (Alternative 4). Specific cost details are outlined in the cost summary tables provided in Section 2 of this report.

4. Redevelopment objectives for the Site at this time include a combination of reuse for the Evans facility and redevelopment (demolition) for the Fintube facility. ENERCON recommends **Alternative 3: Full Asbestos Abatement of Both the Evans and Fintube Facilities**, which would abate all asbestos in both the Evans and Fintube facilities. The estimated range of costs for the alternative is **$20,460 to $45,720**. This step would be preferable whether both facilities are left in place or demolished.

5. ENERCON recommends **Alternative 3: Full LBP Abatement of the Evans Facility and No Action at the Fintube Facility**, which would render the Evans facility suitable for the range of reuse opportunities and would render the Fintube facility suitable for demolition or limited reuse. The range of estimated costs for this alternative would be **$63,600 to $87,000**.

6. Total estimated range of costs for execution of the two recommended alternatives would be **$84,060 to $132,720**.

7. Alternatives relating to Encapsulation of ACM and Stabilization of LBP could create additional cost burdens at the time of future renovation/demolition activities by way of exposing previously hidden ACBM and LBP substantially increasing construction costs.

8. The No Action Alternatives reviewed in this report would not address the liabilities, potential contaminant sources, or potential limitations on future use and brownfield redevelopment potential. In both cases, the No Action Alternative may actually escalate long term costs beyond the costs of the preferred alternatives.

4.0 RECOMMENDATIONS

Property reuse and redevelopment without specific measures to address the documented environmental conditions would likely increase exposure risks and associated liabilities. Due to the restrictions associated with partial abatement and encapsulation/enclosure methods, ENERCON recommends a clean-up protocol consistent with **Full Asbestos Abatement of Both the Evans and Fintube Facilities and Full LBP Abatement of the Evans Facility and No Action at the Fintube Facility** as presented in Section 2 of this report. Recommended measures in support of these cleanup alternatives include the following:

- Prior coordination with the ODEQ, ODOL, and USEPA to determine regulatory oversight procedures and applicable cleanup standards.

- Development of an Asbestos Abatement Project Design by an Oklahoma Licensed Project Designer to further support the preferred alternative as presented above.

- Development of a Solicitation for Bid package for contractor selection and implementation of project work. This process may occur before or following Work Plan development based on the desired selection approach – e.g. contractor with oversight versus consultant/contractor to manage all aspects of the subsequent work.

- Clear communication of previous Phase I/Phase II and ABCA Report findings and recommendations between all project stakeholders.

GENERAL CONTINGENCIES

This report has been prepared as a general planning document and is not intended to provide the engineering or bidding specifications required to pursue specific cleanup measures. ENERCON therefore considers subsequent development of Work Plans or Specifications for these purposes.

The conclusions and recommendations provided herein are primarily based on limited Phase I/Phase II assessments performed by others. This analysis assumes site conditions remain consistent with those previously documented. A contingency factor of 20% has been applied to each alternative discussed in Section 2 of this report. Further discoveries may warrant further investigation and or material evaluations not specifically described herein.

5.0 FINAL DECISION DOCUMENT

A copy of this draft Analysis of Brownfield Cleanup Alternatives document will be made available for public review and comment as described in the Community Relations Plan for a period of 30 days. Any public comments received will be responded to and incorporated into the Final Decision Document for the site. A copy of the Final Decision Document will be inserted here and maintained for the site administrator's records.

6.0 REFERENCES

All Consulting, LLC. (2010). Final Report, Targeted Brownfields Assessment, Phase II Environmental Site Assessment, 186 N. Lansing Ave, Tulsa, Ok. Tulsa: All Consulting, LLC.

All Consulting, LLC. (2011). Phase I Environmental Site Assessment: Tulsa Fintube, City Of Tulsa, Tulsa County, Oklahoma. Tulsa: All Consulting, LLC.

U.S. Army Corp Of Engineers. (2011). Targeted Brownfields Assessement (Tba) Phase III Cleanup Plan/Cost Estimate, Fintube Site, 150 & 186 North Lansing, City Of Tulsa, Tulsa County, Oklahoma.

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APPENDIX A

Selected Documentation from Phase I and Phase II Environmental Site Assessments

EXECUTIVE SUMMARY

This Phase II Environmental Site Assessment (ESA) Report has been prepared for the United States Army Corps of Engineers (USACE)-Tulsa District by ALL Consulting under contract No. W912BV-08-D-2008, Task Order 0021. This ESA is funded by the U.S. Environmental Protection Agency's (USEPA) Targeted Brownfields Assessment (TBA) Program. The USEPA Region 6 Brownfields Team tasked USACE-Tulsa District to execute the ESA. This Report describes the field activities carried out to perform the Phase II ESA on the Fintube TBA Site located in Tulsa, Oklahoma. The purpose of the Phase II ESA is to evaluate the property and to sample the potential sources of contamination identified in the previous Phase I ESA. Existing data has been obtained from a Phase I ESA completed by ALL Consulting dated September 28, 2009.

The Site is bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244 in the City of Tulsa, Tulsa County, Oklahoma. The Site is located northeast of downtown Tulsa, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The Site currently consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three north-south oriented buildings to the north and two east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four buildings oriented north-south and one smaller building to the southeast that is oriented east-west.

Field activities performed during this Phase II ESA included drilling ten (10) soil borings, sampling surface and subsurface soils, sampling groundwater from the temporary wells, well abandonment, temporary storage and disposal of investigative-derived waste, inspection of suspect Lead-Based Paint (LBP), and inspection and sampling of suspect Asbestos Containing Material (ACM) and Other Regulated Material (ORM). A total of ninety-seven (97) surface soil samples, thirteen (13) subsurface soil samples, thirteen (13) groundwater samples, twenty (20) suspect LBP samples, and thirty (30) suspect ACM samples were collected. The soil samples were selectively analyzed for the presence Volatile Organic Compounds (VOCs); Semi-volatile Organic Compounds (SVOCs); Total Petroleum Hydrocarbons (TPH) as Gasoline Range Organics (>C6 to C12), Diesel Range Organics (>C12 to C28), and Lube Oil Range Organics

(>C28 to C35); herbicides; Polychlorinated Biphenyls (PCBs); and Priority Pollutant (PP) Metals. The groundwater samples were selectively analyzed for the presence of VOCs, SVOCs, Diesel-Range Organics (DRO), Gasoline Range Organics (GRO), herbicides, PCBs, and PP Metals.

Surface and subsurface (greater than 6 inches) soils analytical results were compared to USEPA Regional Screening Levels (RSLs) for industrial soil screening levels. The analytical results for groundwater testing were screened against the USEPA MCLs or USEPA RSLs for Residential Tap Water (USEPA 2010) when MCLs were not available. DRO and GRO values were compared to the action level limits set by the Oklahoma Department of Environmental Quality (ODEQ). All exceedances for surface soil, soil boring, and groundwater samples are tabulated in **Section 6: Summary**.

- A total of ninety-seven (97) surface soil samples were collected from April 13 to April 15, 2010. Of the ninety-seven surface soil samples, 13 were collected from the ten (10) soil boring locations and the remaining eighty-four surface soil samples were collected in a 115-foot grid pattern throughout the Site. Of the surface soil samples collected at soil boring locations, ten (10) were normal samples, one (1) sample was a duplicate, one (1) sample was a Matrix Spike (MS), and one (1) sample was an Matrix Spike Duplicate (MSD). Of the grid surface soil samples, seventy-one (71) were normal samples, seven (7) samples were duplicates, three (3) samples were an MS, and three (3) samples were an MSD. Each of the thirteen (13) surface soil samples collected at soil boring locations and 27 (approximately 30%) of the grid surface soil samples were analyzed for VOCs, SVOCs, TPH, PCBs, herbicides, and PP Metals. The remaining fifty-seven (57) surface soil samples were analyzed for TPH, PCBs, and PP Metals only. Arsenic exceeded its RSL of 1.6 mg/kg in all but three (78 of 81) normal surface soil samples tested for metals. Only samples FIN-SSB11, FIN-SSC07, and FIN-SSD04 were below the RSL of 1.6 mg/kg for arsenic. Samples FIN-SSC14, FIN-SSD10, FIN-SSD11, FIN-SSD14, and FIN-SSD15 exceeded the Lead RSL of 800 mg/kg. Twelve (12) surface soil samples exceeded RSLs for SVOCs in one or more parameters. No VOCs parameters exceeded RSLs. No herbicides exceeded RSLs. No samples exceeded TPH GRO (>C6-C12) action limits of 500 mg/kg set by ODEQ. Nine (9) of the samples exceeded TPH DRO (>C12-C28) action limits of 2,500 mg/kg set by ODEQ. Seven (7) samples exceeded ODEQ's action limits of 5,000 mg/kg for TPH Lube Oil (>C28-C35). Fifteen (15) samples exceeded the ODEQ

Tier 1 generic TPH (>C6-C35) action level. Thirteen (13) surface soil samples exceeded RSLs for PCBs in one or more parameters.

- A total of thirteen (13) subsurface soil samples were collected from varying depths from the ten (10) soil borings. This total includes ten (10) normal samples, one (1) duplicate, one (1) MS, and one (1) MSD. Sample FIN-SB01-DS01-01 exceeded SVOC RSLs for Benzo(a)pyrene, Benzo(b)fluoranthene, and Dibenzo(a,h)anthracene. Sample FIN-SB04-DS01-01 exceeded the RSL of 740 µg/kg for Aroclor 1260 at 124,000 µg/kg. The only other parameter to exceed RSLs for subsurface soil samples was Arsenic in all samples. No other parameters exceeded RSLs.
- It should be noted that Arsenic was the most prevalent analyte detected above its regulatory limit of 1.6 mg/kg in soils. However, the U.S. Geological Survey (USGS) has also reported that naturally occurring Arsenic levels in Oklahoma soils typically range from 0 to 32 mg/kg. Additionally, mean soil metals background concentrations for Oklahoma as reported by the USEPA in Office of Solid Waste and Emergency Response Directive 9285.7-55 (EPA 2003) for Arsenic was reported at 7.0 mg/kg.
- A total of thirteen (13) groundwater samples were taken from the ten (10) soil borings. This total includes ten (10) normal samples, one (1) duplicate, one (1) MS, and one (1) MSD. Five (5) samples exceeded Metals RSLs in one or more parameters, with Arsenic being the most common parameter exceeded. The VOC parameter, Chloroform, exceeded its USEPA Tap water screening level of 0.15 µg/L in samples FIN-SB01-GW01-01 and FIN-SB10-GW01-01, with the results "J" flagged as estimated value at 0.77J µg/L and 0.67J µg/L, respectively. The SVOC parameter 1,2,4-Trichlorobenzene exceeded its MCL of 70 µg/L in sample FIN-SB04-GW01-01 at 846 µg/L. Naphthalene also exceeded its MCL of 0.14 µg/L in sample FIN-SB04-GW01-01 at 2.4 µg/L. No other parameters exceeded MCLs or RSLs.
- An asbestos inspection was conducted on April 16, 2010, at the Fintube TBA Site by a USEPA accredited and Oklahoma Department of Labor (ODOL) licensed asbestos inspector/management planner with Environmental Hazard Control, Inc (EHCI). During the inspection, there were sixteen (16) homogeneous areas identified for sample collection and analysis from the Fintube Building Complex and seven (7) homogeneous

areas from the Evans Building Complex. After collection of the Suspect ACM, the samples were sent to Quantem Laboratories in Oklahoma City, Oklahoma, for analysis using polarized light microscopy. A total of twenty-one (21) samples were analyzed from the sixteen (16) homogeneous areas within Fintube Building Complex and nine (9) samples were analyzed from the seven (7) homogeneous areas within Evans Building Complex. The laboratory analysis determined that approximately 10 linear feet and 10 square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of Fintube main building and approximately 34 linear feet of asbestos containing thermal system pipe insulation located in main warehouse of Evans facility are considered to be Regulated Asbestos Containing Materials (RACM). **Appendix F** contains the full asbestos inspection report.

- A LBP inspection was conducted on April 16, 2010, at the Fintube TBA Site by an accredited and licensed LBP Inspector/Risk Assessor (License # OKRASR11105) with EHCI. A total of 73 samples from the Fintube Building Complex and 71 samples from the Evans Building complex were screened using a Scitec XRF-MAP 4 Spectrum Analyzer in the unlimited mode. Based on the screenings, ten (10) paint chip samples were collected from each of the building complexes (20 total samples) and submitted to Quantem Laboratories for lead analysis using USEPA Method 7420, Atomic Absorption. The results of the screening and lab analysis indicated that LBP was present within both buildings above the permissible level of 1.0 mg/cm2, or 5,000 parts per million in several areas. **Appendix G** contains the full LBP inspection report.

- The ORM inspection at the Fintube TBA Site was conducted on April 15, 2009. This inspection consisted of a visual walkthrough evaluating the type and locations of all fluorescent light ballasts and location of any mercury containing thermostats. Fluorescent lights were observed in the Offices and Maintenance Shop at the Evans Building Complex, and within the Locker Room and Break Room at the Fintube Building Complex as previously noted in the Phase I ESA prepared by ALL (ALL 2009). Reportedly, approximately 38 fluorescent light ballasts were replaced at the Fintube Building Complex after 2000. A mercury thermostat switch was observed in both the Locker Room and Break Room at the Fintube Building Complex. Fluorescent lights and

ballasts, and mercury switches are classified as universal wastes for disposal purposes. No other suspected ORM was observed during the inspection. No samples were taken.

- Two unlabeled drums and two bulging drums labeled as containing Xylenes identified in the previous Phase I ESA conducted by ALL were no longer present at the time of the Phase II ESA field activities. Information provided by Doug Wilson, with the City of Tulsa, indicated that the drums had been removed by the owner, Evans Electric, to their new facility. Additionally, subsequent to the prior Phase I ESA conducted by ALL, the City has been renting the Fintube Site to Manhattan Construction and Sherwood Construction (Sherwood) for materials storage and staging for the ongoing highway construction projects. Sherwood had a batch concrete plant with associated aggregate material piles on the eastern portion of the Evans Building Complex portion of the site. Materials were being stored in both building complexes, with light manufacturing also occurring in the Evans Building Complex.

Prior to any future development within the Site, confirmation sampling should be performed to validate the original detected exceedances and to identify the vertical and horizontal extent of contamination within the proposed area(s) of development. This will allow risk-based management for future on-site development.

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ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material
ALL	ALL Consulting
bgs	Below Ground Surface
cm	Centimeter
COC	Chain of Custody
DoD QSM	Department of Defense Quality System Manual
DOT	Department of Transportation
DRO	Diesel Range Organics
EHCI	Environmental Hazard Control, Inc.
ESA	Environmental Site Assessment
GPS	Global Positioning System
GRO	Gasoline Range Organics
GWI	Groundwater Interface
HUD	Department of Housing and Urban Development
IDW	Investigation-Derived Wastes
kg	Kilograms
L	Liter
LBP	Lead-based paint
LORO	Lube Oil Range Organics
MCL	Maximum Contaminant Level
MCPP	Meta-chlorophenylpiperazine
MDL	Minimum Detection Limit
mg	milligrams
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Non-detect
NELAP	National Environmental Laboratory Accreditation Program
ODEQ	Oklahoma Department of Environmental Quality
ODOL	Oklahoma Department of Labor
ORM	Other Regulated Material
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PCB	Polychlorinated Biphenyls
PCP	Pentachlorophenol
pH	Hydrogen Reactivity
PID	Photo-ionization Detector
PLM	Polarized Light Microscopy
PP	Priority Pollutant
ppm	Parts per million
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RACM	Regulated Asbestos Containing Materials
RCI	Reactivity, Corrosivity, and Ignitability
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSL	Regional Screening Levels
SAP	Sampling and Analysis Plan
SB	Soil Boring
SOP	Standard Operating Procedure
SVOC	Semi-volatile Organic Compound
TBA	Targeted Brownfields Assessment
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound
µg	Micrograms
^{o}C	Degree Centigrade

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE)-Tulsa District contracted ALL Consulting (ALL) under contract No. W912BV-08-D-2008, Task Order No. 0021, to perform a Phase II Environmental Site Assessment (ESA) of the Fintube Targeted Brownfields Assessment (TBA) Site located in Tulsa, Tulsa County, Oklahoma. This ESA is funded by the U.S. Environmental Protection Agency's (USEPA) TBA Program. The USEPA Region 6 Brownfields Team tasked USACE-Tulsa District to execute the ESA.

This ESA was performed in accordance with the following planning documents:

- *Scope of Work for the Fintube TBA Site, Tulsa, Oklahoma.* Contract Number W912BV-08-D-2008, Task Order No. 0021, US Army Corp of Engineers, Tulsa District, February 2, 2010.
- U.S. Environmental Protection Agency (USEPA), *Quality Assurance Guidance for Conducting Brownfields Site Assessments,* USEPA 540-R-98-038, September 1998.
- ASTM E-1903-97, *Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process,* 2002.
- *Phase II Work Plan for the Fintube TBA Site, Tulsa, Oklahoma.* Includes, *Standard Operating Procedures (SOP), Sampling and Analysis Plan (SAP), and the Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP).* Contract Number W912BV-08-D-2008, Task Order No. 0021, US Army Corp of Engineers, Tulsa District, April 09, 2010.

1.1 Project Objectives

The purpose of the Phase II ESA is to evaluate the property and to sample the potential sources of contamination identified in the previous Phase I ESA performed by ALL dated September 28, 2009 (ALL 2009). The prior Phase I ESA identified the following possible environmental concerns: oil stained wooden bricks; railroad operations within the Site; open trenches, pits, sumps, and floor drains; two (2) unlabeled 55-gallon drums; piles of fill material; furnace refractory material; a lead-acid battery within a drainage ditch; leaking transformer and electric

motors; oily floor staining; natural gas engine oil leak; hazardous materials in a dumpster; former presence of Bethlehem Steel Works, Bankoff Scrap Metals, Big Four Foundry, and Storey Wrecker Storage Lot; lack of closure for 1994 sampling event; former presence of fuel storage tanks; former polychlorinated biphenyls (PCB) spill (Traband PCB Site); and suspect Lead-Based Paint (LBP) and Asbestos Containing Material (ACM) within the Site. The end data users for this project are the Tulsa Industrial Authority and the Tulsa Development Authority. Various field tasks such as surface and subsurface soil sampling, drilling soil borings, installing temporary monitoring wells, groundwater grab sampling, abandoning temporary monitoring wells, an LBP inspection, an ACM inspection, and an Other Regulated Materials (ORM) inspection were performed as part of this Phase II ESA. The field work for this ESA was scheduled to be completed April 12-16, 2010; however, two extra days of field work were required on April 29 and 30, 2010, to re-drill SB03 in order to re-collect the groundwater sample that was lost in the shipping process. The work elements of the field investigation for the Site consisted of the following:

- April 12 – April 16, 2010
    - Soil boring and surface soil sample location survey.
    - Collection of ninety-seven (97) surface soil samples from eighty-one (81) locations throughout the Site.
    - Drilling of ten (10) soil borings using a hollow-stem auger drilling rig; installing temporary monitoring wells using 2″ diameter, Schedule 40 Polyvinyl Chloride (PVC) casing; well abandonment; temporary storage of Investigation-Derived Waste (IDW); and site restoration.
    - Collection of thirteen (13) subsurface soil samples from the ten (10) soil borings.
    - Collection of thirteen (13) groundwater grab samples from the ten (10) soil borings using 1.5″ diameter disposable bailers.
    - Asbestos, lead-based paint (LBP), and other regulated materials (ORM) inspections and sampling. Twenty (20) suspect LBP samples and thirty (30) suspect asbestos containing material (ACM) samples were collected.
- April 29 and 30, 2010

- Drilling of one (1) soil boring (SB03) using a hollow-stem auger drilling rig; installing a temporary monitoring well using 2" diameter, Schedule 40 PVC casing; well abandonment; temporary storage of IDW; and site restoration.
- Collection of one (1) groundwater grab sample from SB03 using 1.5" diameter disposable bailers.
- Collection of two (2) IDW composite soil samples for disposal characterization purposes.

1.2 Report Organization

This report consists of six sections and eight appendices. **Section 1.0** contains an introduction to the report. **Section 2.0** describes the work activities performed at the Site. The sampling and analytical methods and procedures are presented in **Section 3.0**. **Section 4.0** describes the regional and local geologic and hydrogeologic settings. **Section 5.0** presents the soil and groundwater sampling results, results of the ACM inspection, results of the LBP inspection and results of the ORM inspection. **Section 6** is a summary of the investigations. References used in the preparation of this report are included in **Section 7.0**. The figures referenced in this report are included at the end of each respective section.

1.3 Site Location

The subject property, henceforth referred to as the "Site," is located northeast of downtown Tulsa, Tulsa County, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The Site is bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244. **Figure 1-1** provides a topographic map of the site and surrounding area.

Access is available to the Site via N. Lansing Ave. to the east. The Evans Building Complex consists of three north-south oriented buildings to the north and two east-west oriented buildings to the south. The Fintube Building Complex, consists of four buildings oriented north-south and one smaller building to the southeast that is oriented east-west. An empty, 20'x20', open faced, metal shed is located in the far northwest corner of the Site.

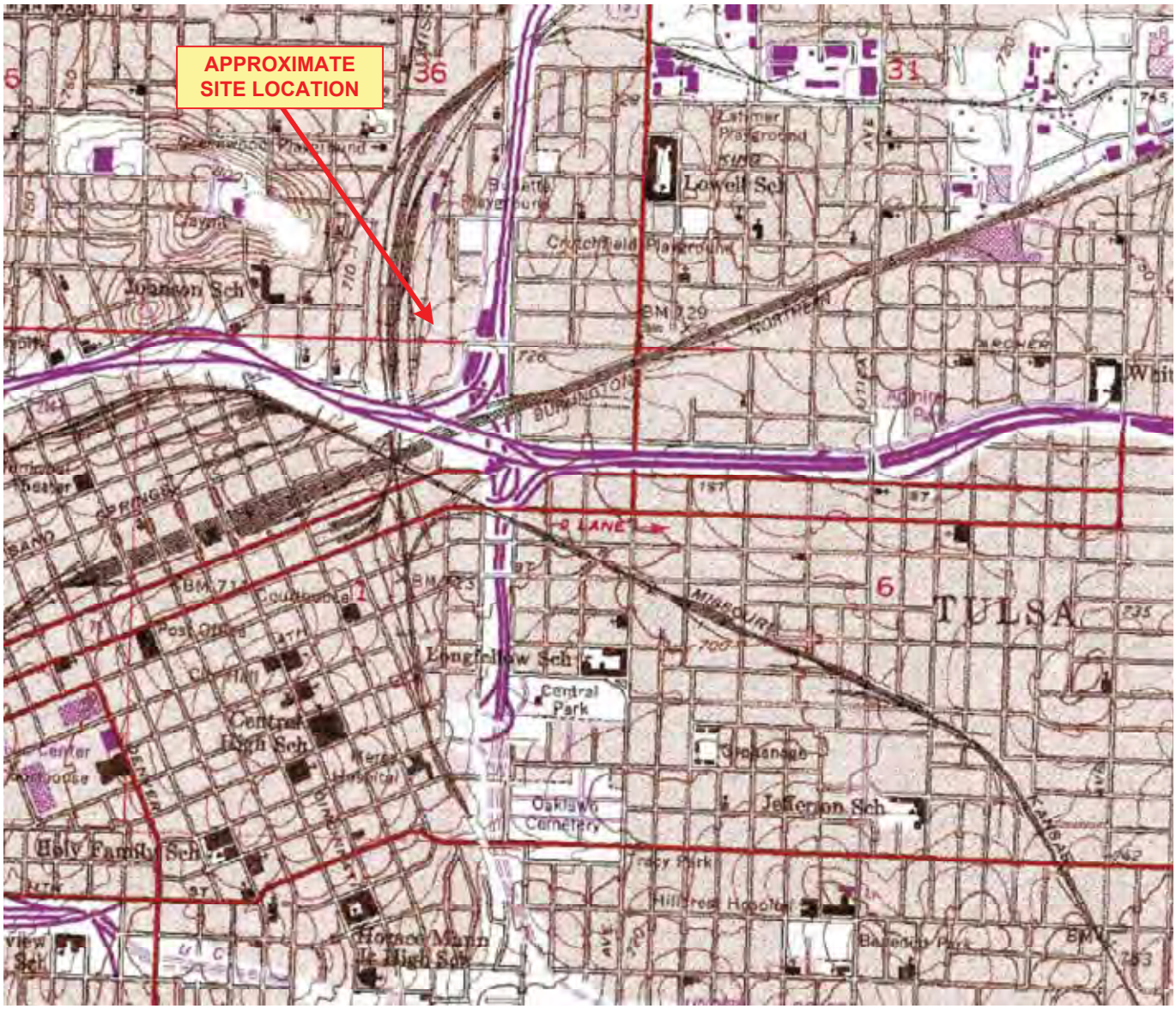
The latitude and longitude coordinates for the Site are 36.1629; (36° 9′ 46.4″N) and -95.9813; (95° 58′ 52.7″ W) (NAD83/WGS84).

1.4 Site Description and History

The Fintube TBA Site consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three (3) north-south oriented buildings to the north connected to two (2) east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four (4) north-south oriented buildings connected to one (1) smaller building to the southeast that is oriented east-west. **Figure 1-2** provides a layout map of the Site.

Two unlabeled drums and two bulging drums labeled as containing Xylenes identified in the previous Phase I ESA conducted by ALL (ALL 2009) were no longer present. Information provided by Doug Wilson, with the City of Tulsa, indicated that the drums had been removed by the owner, Evans Electric, to their new facility. Additionally, subsequent to the prior Phase I ESA conducted by ALL, the City has been renting the Fintube Site to Manhattan Construction and Sherwood Construction (Sherwood) for materials storage and staging for the ongoing highway construction projects. Sherwood had a batch concrete plant with associated aggregate material piles on the eastern portion of the Evans Building Complex portion of the site. Materials were being stored in both building complexes, with light manufacturing also occurring in the Evans Building Complex.

According to the historical Sanborn Maps for the Site reviewed during the prior Phase I ESA conducted by ALL, the Evans Building Complex was formerly a steel manufacturing facility that contained a foundry on the northern end. The vacant lot located east of the Evans Building Complex was formerly used as a paper recycling facility. The Fintube Building Complex was formerly used as a metal manufacturing facility and a producer of heat exchangers that consisted of a concrete reservoir, a forge, and welding and fabrication shops. The vacant lot east of the Fintube Building Complex was formerly a residential area.



TARGET QUAD
NAME: Tulsa, OK
MAP YEAR: 1979
SERIES: 7.5
SCALE: 1:24,000

SITE NAME: FINTUBE TBA
ADDRESS: 186 N. LANSING ST.
TULSA, OK 74120
LAT/LONG: 36.1697/-95.9844

ALL Consulting
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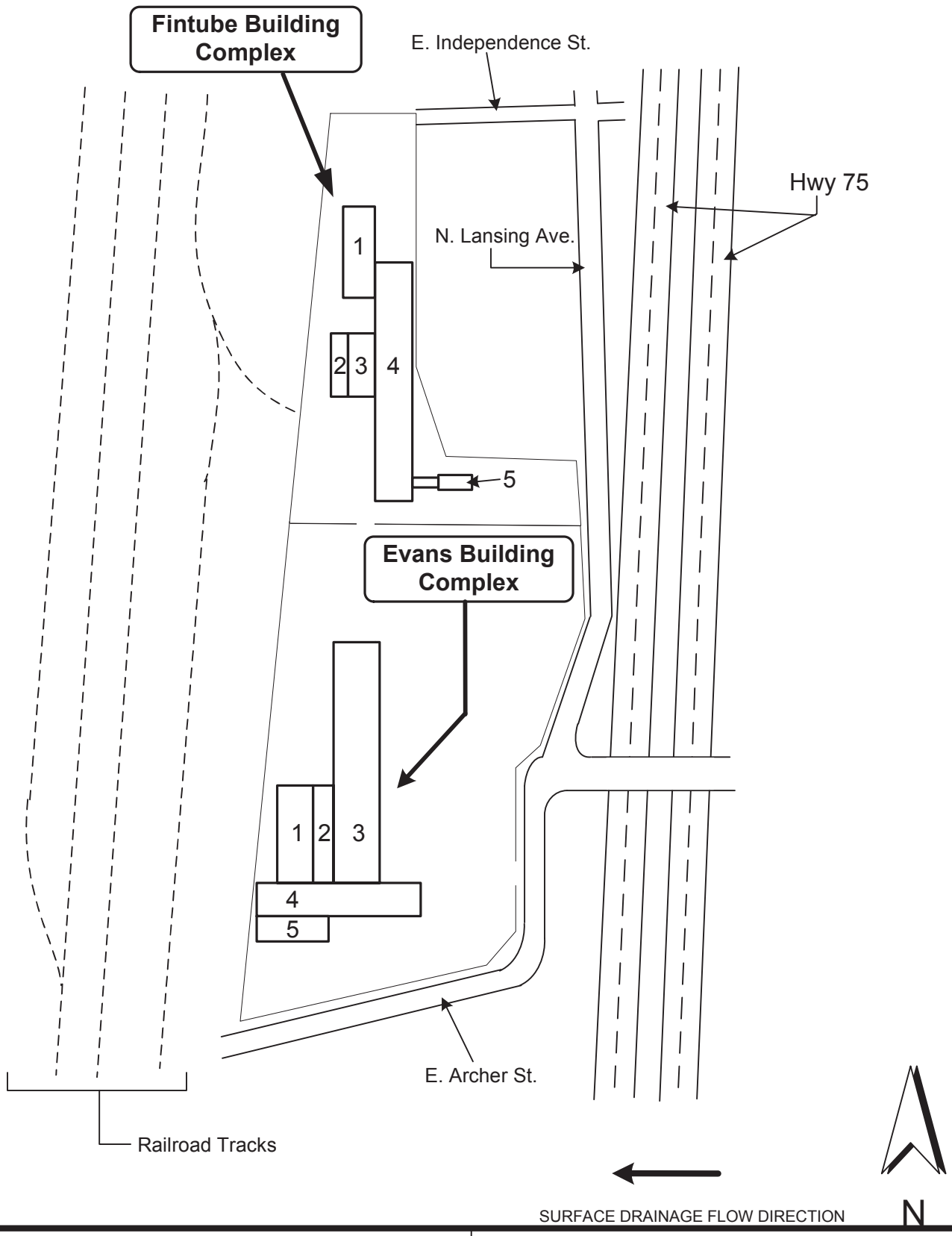
TOPOGRAPHIC MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
1:24000	05/20/2010	Figure 1-1
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.RPT.00



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SITE LAYOUT MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
AS SHOWN	05/20/2010	Figure 1-2
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.RPT.00

2. SUMMARY OF ESA FIELD ACTIVITIES

This ESA included drilling ten (10) soil borings, sampling surface and subsurface soils, sampling groundwater from the temporary wells, well abandonment, temporary storage and disposal of investigative-derived waste, inspection of suspect LBP, and inspection and sampling of suspect ACM and ORM. A total of ninety-seven (97) surface soil samples, thirteen (13) subsurface soil samples, thirteen (13) groundwater samples, Twenty (20) suspect LBP samples, and thirty (30) suspect ACM samples were collected. All activities were completed in accordance with the Phase II ESA Work Plan (ALL 2010) except for notations mentioned below in each subsection.

2.1 Borehole Drilling and Subsurface Soil Sample Collection

Oklahoma One Call was utilized to ensure that underground utilities within the area (e.g. electric, gas, telephone, cable television, municipal water supply, sanitary sewer or stormwater drain) would not be compromised by the subsurface drilling. Locations for the surface soil samples and soil borings were selected based on the previous Phase I ESA performed by ALL (ALL 2009), discussions with USACE-Tulsa District, historical use of the Site, and current conditions of the Site. **Table 2-1** provides a summary of the locations and investigatory purposes for each of the soil borings. All soil borings were drilled to groundwater depth or to a target depth of approximately 25 feet below ground surface (bgs). The locations of the soil borings are shown in **Figure 2-1**.

Under the supervision of ALL, Mohawk Drilling, Inc. (Mohawk) of Tulsa, Oklahoma, advanced five (5) soil borings on April 13, 2010, and five (5) soil borings on April 14, 2010. A temporary monitoring well was installed in each of the borings. During the re-drilling of SB03, Jett Drilling of Tulsa, Oklahoma, advanced one (1) soil boring and installed a temporary monitoring well.

Table 2-1
Soil Boring Locations
Fintube TBA

Soil Boring Number	Description of Area
SB01	NW Corner of Fintube Complex near old storage pit.
SB02	NE Corner of Site near intersection of Independence Street and Lansing Avenue.
SB03	East-Central side of Fintube Complex.
SB04	South-Central side of Fintube Complex near former 15,000 gallon fuel storage tank.
SB05	Central NW Corner of Evans Complex.
SB06	Central NE Corner of Evans Complex.
SB07	Central East Side of Evans Complex near former fuel oil storage tank (north tank).
SB08	Central East Side of Evans Complex near former fuel oil storage tank (south tank).
SB09	Southwest Side of Evans Complex near Building 5.
SB10	Southeast Side of Evans Complex near Archer Street.

Decontaminated 6" hollow-stem augers were advanced to the target depth of 25 feet or the groundwater interface in each of the soil borings. Initial groundwater depth was determined based on the moisture content of the drill cuttings brought up by the augers (split spoon sample analysis) and the amount of force needed to drill through the soil.

A subsurface soil sample was collected from each of the ten (10) soil borings with a decontaminated split spoon from one of the following depths (listed in order of priority):

1. High Photo-ionization Detector (PID) reading;
2. Visible Staining;
3. Groundwater Interface; and,
4. Total Depth of the Borehole.

A total of thirteen (13) subsurface soil samples were collected from the soil borings. Of the subsurface soil samples collected, ten (10) were normal samples, one (1) sample was a duplicate, one (1) sample was a Matrix Spike (MS), and one (1) sample was a Matrix Spike Duplicate (MSD). The subsurface soil samples were submitted to Accutest Laboratories of Orlando, Florida, a National Environmental Laboratory Accreditation Program (NELAP) certified laboratory, for analysis of Volatile Organic Compounds (VOCs); Semi-volatile Organic Compounds (SVOCs); Total Petroleum Hydrocarbons (TPH) as Gasoline Range Organics (>C6

to C12), Diesel Range Organics (>C12 to C28), and Lube Oil Range Organics (>C28 to C35); herbicides; PCBs; and Priority Pollutant (PP) Metals.

2.2 Surface Soil Sample Collection

A total of ninety-seven (97) surface soil samples were collected from April 13 to April 15, 2010. Of the ninety-seven surface soil samples, 13 were collected from the ten (10) soil boring locations and the remaining eighty-four surface soil samples were collected in a 150-foot grid pattern throughout the Site. Of the surface soil samples collected at soil boring locations, ten (10) were normal samples, one (1) sample was a duplicate, one (1) sample was an MS, and one (1) sample was an MSD. Of the grid surface soil samples, seventy-one (71) were normal samples, seven (7) samples were duplicates, three (3) samples were an MS, and three (3) samples were an MSD. Each of the thirteen (13) surface soil samples collected at soil boring locations, and 27 (approximately 30%) of the grid surface soil samples were submitted to Accutest Laboratories of Orlando, Florida, for analysis of VOCs, SVOCs, TPH, PCBs, herbicides, and PP Metals. The remaining fifty-seven (57) surface soil samples were submitted to Accutest Laboratories of Orlando, Florida, for analysis of TPH, PCBs, and PP Metals only.

Table 2-2 provides a summary of the locations and investigatory purposes for each surface soil sample and **Figure 2-1** depicts the locations of the surface soil samples.

Table 2-2
Surface Soil Sampling Locations
Fintube TBA

# of Surface Samples	Soil Sample Location
70 (+1)	Locations throughout site based upon a grid pattern as seen in **Figure 2-1**. 30% of the samples will be tested for the full suite of analyses and 70% will be analyzed for PP Metals, PCBs, and TPH (DRO/GRO). (One additional sample was collected off grid)
10	Locations determined by soil boring locations.
81	**TOTAL (Excludes Duplicates and MS/MSD Samples)**

2.3 Temporary Monitoring Well Installation

Installation of temporary monitoring wells within the soil borings was completed for the collection of groundwater grab samples. The temporary monitoring wells were constructed of 2", Schedule 40 PVC casing, ten (10) feet of slot size #10 screen, and a sand/gravel filter pack.

Surface elevations were not determined for the temporary monitoring wells because this investigation was designed to test only the constituents of the groundwater. **Table 2-3** presents borehole drill depth and depth to groundwater for the temporary monitoring wells installed at the Site.

Table 2-3
Temporary Well Details
Fintube TBA

Temporary Well ID	Total Depth	Depth to Water
SB01	9.5'	4.1'
SB02	25.0'	13.4'
SB03	20.3'	10.0'
*SB03A**	25.0'	8.2'
SB04	20.2'	4.6'
SB05	15.3'	7.3'
SB06	20.3'	5.3'
SB07	15.0'	7.5'
SB08	20.0'	8.2'
SB09	15.0'	7.3'
SB10	18.0'	14.4'

***** SB03 was re-drilled and designated SB03A due to sample lost in shipping.

2.4 Survey of Temporary Monitoring Wells

ALL surveyed each of the soil borings and surface soil locations at the Site. Global positioning system (GPS) points were taken at each of the ten (10) borehole and the seventy (70) surface sampling locations, with the survey data presented in **Appendix B**.

2.5 Temporary Monitoring Well Sampling

Groundwater grab samples were collected from each of the temporary monitoring wells using 1.5"diameter dedicated, disposable hand bailers. All temporary wells contained enough groundwater volume to allow for proper sample collection for all analyses. Development of wells did not take place prior to samples being taken from the temporary wells. Groundwater grab samples from all temporary monitoring wells were submitted to Accutest Laboratories for selective analysis of VOCs, SVOCs, Diesel Range Organics/Gasoline Range Organics

(DRO/GRO), herbicides, PCBs, and PP Metals. **Table 2-4** shows the specific analyses performed for each area.

Table 2-4 – Sample Quantity and Analysis

Matrix	No. Field Samples	No. Discretionary Samples	No. Duplicate Samples	No. Field Blanks	Trip Blank **	Equipment Rinsate Blank	MS/MSD Samples	Total	Analysis/Method
Surface Soil	81	-	8	-	-	-	4	93	Metals 6020/7471
	31	-	3	-	-	-	1	35	VOCs 5035/8260
	31	-	3	-	-	-	1	35	SVOCs 8270
	81	-	8	-	-	-	4	93	PCBs 8082
	81	-	8	-	-	-	4	93	TPH TX 1005
	31	-	3	-	-	-	1	35	Herbicides 8151A
Subsurface Soil	10	-	1	-	-	-	1	12	Metals 6020/7471
	10	-	1	-	-	-	1	12	VOCs 5035/8260
	10	-	1	-	-	-	1	12	SVOCs 8270
	10	-	1	-	-	-	1	12	PCBs 8082
	10	-	1	-	-	-	1	12	TPH TX 1005
	10	-	1	-	-	-	1	12	Herbicides 8151A
Groundwater	10	-	1	-	-	-	1	12	Metals 6020/7470
	10	-	1	-	2	-	1	14	VOCs 5030/8260
	10	-	1	-	-	-	1	12	SVOCs 8270
	10	-	1	-	-	-	1	12	PCBs 8082
	10	-	1	-	-	-	1	12	DRO/GRO 8015M/8100M
	10	-	1	-	-	-	1	12	Herbicides 8151A
Investigative Derived Waste	2	-	-	-	-	-	-	2	TCLP Metals 6010B
	2	-	-	-	-	-	-	2	TCLP VOCs 8260B
	2	-	-	-	-	-	-	2	TCLP SVOCs 8270C
	2	-	-	-	-	-	-	2	Reactivity, Corrosion, Ignitability

** Trip blank for water VOC samples, one for every sample delivery group containing VOC samples, or one per day.
- One QC Duplicate sample should be collected every 10 samples, per media.
- One MS/MSD sample should be collected for every 20 samples, per media.
- MS/MSD sample is 2 times the sample volume required for normal analyses.

2.6 Temporary Monitoring Well Abandonment

Following groundwater sampling activities, the temporary monitoring wells were abandoned in accordance with State of Oklahoma regulations prior to demobilization from the Site. Abandonment was accomplished by removing the 2-inch PVC well casing and screen and backfilling the entire boring from total depth to surface with bentonite.

2.7 Investigation-Derived Waste

Investigation-derived wastes (IDW), including soil cuttings generated during borehole drilling, were collected and placed into Department of Transportation (DOT) approved, open-top 55-gallon waste drums. The drums were sealed, labeled, and staged within the Site prior to removal and disposal. Waste characterization samples of the IDW were collected and analyzed for Toxicity Characteristic Leaching Procedure (TCLP); VOCs; SVOCs; eight (8) Resource Conservation and Recovery Act (RCRA) metals; and Reactivity, Corrosivity, and Ignitability (RCI) by Accutest Laboratories.

See **Section 3.4** for more details on IDW.

2.8 Asbestos Inspection and Sampling

An asbestos inspection was conducted on April 16, 2010, at the Fintube TBA Site by a USEPA accredited and Oklahoma Department of Labor (ODOL)-licensed asbestos inspector /management planner with Environmental Hazard Control, Inc (EHCI). During the inspection, there were sixteen (16) homogeneous areas identified for sample collection and analysis from the Fintube Building Complex and seven (7) homogeneous areas from the Evans Building Complex. After collection of the Suspect ACM, the samples were sent to Quantem Laboratories in Oklahoma City, Oklahoma, for analysis using polarized light microscopy. A total of twenty-one (21) samples were analyzed from the sixteen (16) homogeneous areas within Fintube Building Complex and nine (9) samples were analyzed from the seven (7) homogeneous areas within Evans Building Complex. Types of materials sampled included:

- Thermal system pipe fittings in locker room area of Fintube main building
- Flooring debris from locker room of Fintube main building
- Thermal system pipe insulation from main warehouse in Evans Building Complex

Appendix F contains the full asbestos inspection report.

2.9 Lead-Based Paint Inspection and Sampling

A LBP inspection was conducted on April 16, 2010, at the Fintube TBA Site by an accredited and licensed LBP Inspector/Risk Assessor (License # OKRASR11105) with EHCI. A total of 73

samples from the Fintube Building Complex and 71 samples from the Evans Building complex were screened using a Scitec XRF-MAP 4 Spectrum Analyzer in the unlimited mode. Based on the screenings, ten (10) paint chip samples were collected from each of the building complexes (20 total samples) and submitted to Quantem Laboratories for lead analysis using USEPA Method 7420, Atomic Absorption. **Appendix G** contains the full LBP inspection report.

2.10 ORM Inspection

The ORM inspection at the Fintube TBA Site was conducted on April 15, 2010. This inspection consisted of a visual walkthrough evaluating the type and locations of all fluorescent light ballasts and location of any mercury containing thermostats. Fluorescent lights were observed in the Offices and Maintenance Shop at the Evans Building Complex and within the Locker Room and Break Room at the Fintube Building Complex as previously noted in the Phase I ESA prepared by ALL (ALL 2009). Reportedly, approximately 38 fluorescent light ballasts were replaced at the Fintube Building Complex after 2000. A mercury thermostat switch was observed in both the Locker Room and Break Room at the Fintube Building Complex. Fluorescent lights and ballasts, and mercury switches are classified as universal wastes for disposal purposes. No other suspected ORM was observed during the inspection. No samples were taken.

2.11 Site Restoration and Demobilization

Following completion of the ESA site activities on the weeks of April 12 and April 26, 2010, the drilling equipment was decontaminated and demobilized. Disturbed areas were returned to their previous site conditions by Mohawk Drilling and ALL Consulting.


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3. SAMPLING PROCEDURES AND ANALYTICAL METHODS

The following sections discuss the procedures used for collecting soil and groundwater samples, including field documentation, quality assurance (QA)/quality control (QC), and methods used for laboratory analysis. These procedures are consistent with the Phase II ESA Work Plan (ALL, 2010). Analytical results are discussed in **Section 5.0**.

3.1 Sampling Procedures

Soil and groundwater sampling procedures are presented in the following sections.

3.1.1 Surface Soil Sampling Procedures

As discussed in **Section 2.2**, surface soil samples were taken from strategic locations based upon historical information and field observations. Surface soil sample collection procedures were as follows:

- Surface debris (e.g., leaves, twigs) was removed from sampling location using a stainless steel trowel.
- Grab samples were collected for laboratory analysis by filling the appropriate number and type of sample containers described in **Table 3-1** and **Table 3-2**.
- Sample labels were filled out with sample identification numbers in accordance with sample identification protocol outlined in the Standard Operating Procedures (SOP) of the Phase II ESA Work Plan (ALL 2010), including sample identification, collection date and time, and requested analysis.
- The sample bottles were wrapped in plastic bubble-wrap bags, and placed on ice in a cooler to achieve a temperature of below 4 °C before shipment to the laboratory.
- At the completion of the each day, a Chain of Custody (COC) was filled out for each packed cooler to identify samples and the requested analysis.
- Prior to shipment to Accutest Laboratories, the coolers were sealed with custody seals, taped for shipping, and shipped via Federal Express.

Table 3-1
Sampling and Analytical Requirements
Fintube TBA

Site	Matrix	Number of Normal Samples	Quality Control Samples	Parameter	Method	Turn-around-Time (TAT)
Fintube TBA	Surface Soil	81	See Note	PP Metals	SW-846 6020/7471	6 Months
				VOC	SW-846 8260	48 Hours*
				SVOC	SW-846 8270	14 Days
				PCB	SW-846 8082	14 Days
				Herbicides	SW-846 8151	14 Days
				TPH	TX 1005	14 Days
	Subsurface Soil	10	See Note	PP Metals	SW-846 6020/7471	6 Months
				VOC	SW-846 8260	48 Hours*
				SVOC	SW-846 8270	14 Days
				PCB	SW-846 8082	14 Days
				Herbicides	SW-846 8151	14 Days
				TPH	TX 1005	14 Days
	Groundwater	10	See Note	PP Metals	SW-846 6020/7471	6 Months
				VOC	SW-846 8260	14 Days
				SVOC	SW-846 8270	7 Days
				PCB	SW-846 8082	7 Days
				Herbicides	SW-846 8151	14 Days
				DRO	8015C	7 Days
				GRO	8015C	14 Days

Note: Field duplicate samples were collected at a frequency of 10 percent, MS/MSDs at a frequency of 5 percent
** sample must be frozen or extracted within 48 hours, if frozen sample may be held for 14 days.*

Table 3-2
Sample Volume, Containerization, Preservation, and Holding Times
Fintube TBA

Matrix	Analysis Method	Containers for one sample (number, size, type)	Preservation	Maximum Holding Times
Soil	PP Metals 6020/7471	8 oz glass jar	Ice to 4°C	6 months
	VOCs 5035/8260	3 X 40 ml VOA vial	De-Ionized water (2 vials), Methanol (1 vial), Ice to 40C	48 hours*
	SVOCs 8270	8 oz glass jar	Ice to 40C	14 days
	PCBs 8082	8 oz glass jar	Ice to 40C	14 days
	Herbicides	8 oz glass jar	Ice to 40C	14 days
	TX 1005	4 oz glass jar	Ice to 40C	14 days
Groundwater	PP Metals 6020/7470	500 ml plastic	HNO3, Ice to 4°C	6 months
	VOCs 5030/8260	3 X 40 ml VOA vial	HCl, Ice to 40C	14 days
	SVOCs 8270	2 X 1L amber glass	Ice to 40C	7 days
	PCBs 8082	2 X 1L amber glass	Ice to 40C	7 days
	Herbicides	8 oz glass jar	Ice to 40C	14 days
	DRO 8015C	2 X 1L amber glass	H2SO4Ice to 40C	7 days
	GRO 8100C	3 X 40 ml VOA vial	HCl, Ice to 4°C	14 days

** Sample must be frozen or extracted within 48 hours; frozen sample may be held for 14 days.*

3.1.2 Subsurface Soil Sampling Procedures

As discussed in **Section 2.1**, one (1) normal subsurface soil sample was collected from each of the ten (10) soil borings at one of the depth intervals listed in **Table 3-3**.

Subsurface soil sample collection procedures were as follows:

- Prior to sampling, the augers, drill bits, and the split-spoon samplers were decontaminated in accordance with the procedure outlined in the SOP. (See Phase II ESA Work Plan; ALL, 2010).
- The split-spoon sampler was retrieved from the borehole and opened so that the contents could be viewed.
- The entire length of the core was measured and a visual log of the lithology was prepared, using the Unified Soil Classification System (USCS); both were recorded on a drilling log form (see **Appendix A**).

Table 3-3
Subsurface Soil Sample Depths
Fintube TBA

Boring Number	Subsurface Sample (feet)	Rationale
SB1	7'-9'	GWI – Black Stain
SB2	22'-23'	Total Depth
SB3	18'-20'	Total Depth
SB4	14'-15'	GWI
SB5	12'-14'	GWI
SB6	12'-15'	GWI
SB7	13'-15'	Total Depth
SB8	14'-15'	High PID
SB9	11'-13'	GWI
SB10	15'-18'	Total Depth

Subsurface soil sample collection depths (**Table 3-3**) were chosen based on the following criteria (listed in order of priority):

1. High PID reading,
2. Visible Staining,
3. Groundwater Interface (GWI), and
4. Total Depth of the Borehole.

- Soil samples were collected for laboratory analysis by filling the appropriate number and type of sample containers described in **Table 3-1** and **Table 3-2**. Subsurface soil samples were sent to Accutest Laboratories in Orlando, Florida.
- Sample labels were filled out with sample identification numbers in accordance with sample identification protocol outlined in the SOP of the Phase II ESA Work Plan (ALL, 2010), including collection date and time, and requested analysis.
- The appropriate sample label was affixed to each sample container, which was enclosed in a plastic bubble wrap bag and placed on ice in a cooler to achieve a temperature of below four degrees centigrade (4°C) before shipment to the laboratory.

- At the completion of the each day, a COC was filled out for each packed cooler to identify the samples and the requested analysis.
- Prior to shipment to Accutest Laboratories, the coolers were sealed with custody seals, taped for shipping, and then shipped via Federal Express.

3.1.3 Groundwater Sampling Procedures

Groundwater samples were collected from each of the temporary monitoring wells using dedicated, disposable bailers. Groundwater sample collection procedures were as follows:

- Dedicated, disposable bailers were used to obtain groundwater samples; therefore, bailer decontamination was not required.
- Bailers were gently lowered into the temporary well to minimize disturbance of the water column as much as possible and retrieved to obtain groundwater samples. This process was repeated as necessary until all necessary sample jars were full.
- Groundwater samples were collected for laboratory analysis by filling the appropriate number and type of sample containers described in **Table 3-1** and **Table 3-2**. Groundwater samples were sent to Accutest Laboratories in Orlando, Florida.
- Sample labels were filled out with sample identification numbers in accordance with sample identification protocol outlined in the SOP of the Phase II ESA Work Plan (ALL 2010), including collection date and time, and requested analysis.
- The appropriate sample label was affixed to each sample container, which was enclosed in a plastic bubble wrap bag and placed on ice in a cooler to achieve a temperature of below four degrees centigrade (4°C) before shipment to the laboratory.
- At the completion of the each day, a COC was filled out for each packed cooler to identify samples and the requested analysis.

Prior to shipment to Accutest Laboratories, custody seals were affixed to the coolers and sealed with shipping tape. The coolers were then shipped via Federal Express.

Groundwater samples were sent to Accutest Laboratories in Orlando, Florida. Accutest is accredited by NELAP, and is compliant with the most recently published version of the

Department of Defense Quality System Manual (DoD QSM), and is certified for analysis of the parameters listed in **Table 3-1 and Table 3-2**. Analytical results are discussed in **Section 5.0**.

3.2 Analytical Methods

The following analytical methods (USEPA 1996) were used for soil and groundwater sample analysis:

- PP Metals – SW 846 Method 6020/7471 for soils and Method 6020/7470 for groundwater
- VOCs – SW 846 Method 5035/8260 for soils and Method 5030/8260 for groundwater.
- SVOCs – SW 846 Method 8270 for soils and groundwater.
- PCBs – SW 846 Method 8082 for soils and groundwater.
- GRO/DRO – Method TX 1005 for soils and SW 846 Method 8015C for groundwater.
- pH –field test for groundwater.
- Herbicides – SW 846 Method 8151A for soils and groundwater.
- ACM – USEPA Method 600R-93/116 - Polarized Light Method (PLM)
- LBP - SW-846 Method 7420 - Atomic Absorption.

The analytical methods used for IDW sample analysis are discussed in **Section 3.4**.

Individual analytical constituents for each of the methods and associated detection limits are listed in **Appendix D**.

3.3 Field Documentation and Sample Custody

Individual field crew members were responsible for maintaining daily field notes on drilling and sampling activities, including:

- Name and title of author, date and time of entry, and weather/environmental conditions during the field activity
- Location of sampling activity
- Name and title of field crew
- Name and title of site visitors
- Sample media (i.e. groundwater and soils)
- Sample collection method
- Number and volume of sample(s) taken
- Date and time of collection
- Sample identification number(s)
- Field observations.

In addition to recording sampling information in the field notes, COC forms were completed in the field by the sampling personnel and placed inside the cooler with the respective samples and shipped to the analytical laboratory. Each unique sample number, time of collection, sample matrix, number of sample containers, requested analysis name and method number, laboratory QA/QC level, and TAT was entered on the COC form prior to sealing the cooler.

At the end of each day, samples were securely packed on ice inside coolers with a completed COC form. Custody seals were affixed to the outside of the cooler, which was then taped closed with clear packing tape. The coolers were taken to a Federal Express facility in Tulsa, Oklahoma, for overnight shipment to Accutest Laboratories in Orlando, Florida.

3.4 Management of Investigation-Derived Waste

Investigation-derived wastes were managed in accordance with the SOPs developed for the Fintube TBA (ALL 2010). Characterization of waste streams was accomplished in accordance with the procedures outlined in the Sampling and Analysis Plan (SAP) developed for the Fintube TBA (ALL 2010). Soil cuttings generated during borehole drilling were contained within DOT approved 55-gallon drums, sampled, and staged within the Site for subsequent waste characterization and final disposal.

Composite samples from the soil cuttings were submitted to Accutest Laboratories for analysis for:

- TCLP VOCs (USEPA Method SW-846 8260B),
- TCLP SVOCs (USEPA Method SW-846 8270C),
- TCLP 8 RCRA Metals (USEPA Method 6010B),
- RCI Corrosivity (USEPA Method SW-846 CHAP7 and 1010).

All IDW tested non-hazardous and will be disposed of by A & M Engineering and Environmental Services, Inc. (A & M Engineering). A copy of the disposal records will be included in **Appendix G** with the final report.

3.5 Data Quality

The primary objective of the field investigation was to obtain reproducible, defensible data of sufficient quality and quantity to determine if impacted soil or groundwater is present in the

investigated portions of the Site at concentrations exceeding screening criteria. A particular objective was to determine if site conditions would pose a potential health, environmental, or safety risk for human activity. Data quality objectives, including data quality indicators for precision, accuracy, representativeness, completeness, comparability, and sensitivity were established to achieve this goal. To ensure data quality, samples were documented from collection through reporting.

3.5.1 Field Quality Control Samples

Quality control samples such as field duplicates and trip blanks were collected during the ESA. Samples were used to test for field contamination that might impact the primary analytical results. The QC samples were collected in accordance with procedures outlined in the SAP (ALL 2010).

3.5.2 Laboratory Quality Control Samples

Laboratory QC samples were used to measure the accuracy and precision of the analytical method and to evaluate matrix interference. Laboratory QC samples included method blanks, laboratory control samples, and MS/MSD samples. The Project Chemist performed a QC assessment of each data package and an overall data quality review for the project. The results of the data quality assessments, together with the complete laboratory analytical reports, are provided on compact disk, which is included as **Appendix D**.

3.5.3 Data Validation Results

Data validation was performed on all of the analytical results with a summary given below. In general, the analytical data produced from the collected samples are useful for their intended purpose as stated by the data quality objectives in the Work Plan (ALL 2010).

There were instances of MS/MSD relative percent difference calculations exceeding the prescribed control limits for some constituents and some MS/MSD percent recoveries outside of acceptable limits. Some of these did lead to flagged associated data as "J", estimated. All field duplicate results were within project-specified limits for the detected analytes. It was also indicated that a few samples were not preserved to a pH <2 with the reported results being considered the minimum values. The detected analytes in the associated field samples were flagged as estimated – "J". There were several instances of Methylene Chloride, a common lab

contaminant, found in the Method Blanks, with several samples flagged "U", not detected, or "B", found in the blank. For some PCBs, there were some values that were estimated due to the presence of multiple overlapping Aroclor patterns. A complete data validation report is presented in **Appendix D**.

4. GEOLOGY, HYDROGEOLOGY, AND SOILS

4.1 Regional Geology

The Geologic Map of Oklahoma shows the geologic units underlying subject area to consist of the Upper Pennsylvanian-age Seminole Formation, comprised mainly of shale with interbedded siltstone and sandstone.

Regionally, the Site lies within the Central Lowland which stretches from the northern border of Minnesota to central Texas. The Central Lowlands are characterized by gently rolling plains with occasional steep bluffs and a number of valleys. Elevations range from 300 to 2,000 feet and the area consists of some nearly flat portions and other areas of rounded hills.

4.2 Regional Hydrogeology

The Vamoosa Formation is a member of the Vamoosa-Ada aquifer of east-central Oklahoma, an important source of water underlying parts of Osage, Pawnee, Payne, Creek, Lincoln, Okfuskee, and Seminole Counties. The aquifer consists of very fine-grained sandstone, siltstone, shale, and conglomerate interbedded with very thin limestones.

The nearest surface water feature to the Site is the Arkansas River which is located approximately 1.75 miles southwest of the Site (see **Figure 1-1**).

4.3 Site-Specific Soils

According to the United States Department of Agriculture - Natural Resources Conservation Service Soil Map the soil at the Site consists mostly of Urban Land (NRCS 2000). Urban Land typically has 0 to 8% slopes, a very high runoff rate, and is not typically subject to flooding or ponding. Urban Land's land capability classification is 8s, and is not assigned as an ecological site. The Urban Land at the Site is the result of intermingling native soil with fill material introduced during the prior development of Site and surrounding properties, which makes it impractical to distinguish the native soil types. Often, the development of a site involves the stripping of the top soil horizon and placement of fill material on top.

4.4 Site-Specific Groundwater

Groundwater was encountered in soil borings at depths of approximately 4 to 15 feet bgs. This Phase II sampling project was not intended to establish a groundwater profile of the Site. Instead the wells were allowed to produce enough groundwater in the temporary wells to meet the required volume for testing only. Therefore, groundwater elevation and flow direction was not determined.

5. RESULTS AND FINDINGS

5.1 Soil Analytical Results

This section summarizes the analytical results from surface and subsurface soil samples collected at the Fintube Site. The analytical results from all surface soil samples (less than six [6] inches deep) and all subsurface soil samples were compared to USEPA Regional Screening Levels (RSLs) for industrial soil screening levels (USEPA 2010) or USEPA Regional Maximum Contaminant Level (MCL)-based Soil Screening Levels when the RSLs were not available. The Oklahoma Department of Environmental Quality (ODEQ) risk-based screening levels for GRO (500 milligrams per kilogram (mg/kg), DRO (2500 mg/kg), and Lube Oil Range Organics (5000 mg/kg) were used to screen all collected soil samples (ODEQ 2009). **Appendix C** includes data tables that list every sample for which at least one constituent was detected above the Method Detection Limit (MDL). Complete copies of the analytical results, COC forms, and data validation report are contained on compact disk in **Appendix D**. Results of the screenings for surface soil and subsurface soil are discussed in the following sections.

5.1.1 Surface Soil Samples

A total of ninety-seven (97) surface soil samples were collected from points that were selected for potential contamination based upon historical data and on-site observations. The total number of samples includes eighty-one (81) normal samples, eight (8) QC duplicate samples, three (3) MS samples, and three (3) MSD samples.

The VOCs acetone, benzene, 2-hexanone, 4-methyl-2-pentanone, methyl ethyl ketone, and toluene were detected at concentrations below their RSLs throughout the Site. None of the VOC detections exceeded their RSLs in any of the surface soil samples.

The SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected above their RSLs in sixteen (16) surface soil samples. Benzo(a)anthracene was detected at a concentration of 2,130 µg/kg in SSD10 which exceeds its RSL of 2,100 µg/kg. Benzo(a)pyrene concentrations ranged from non-detect (ND) to 4,270 µg/kg and exceeded its RSL of 210 µg/kg in sixteen (16) surface soil samples (SSA01, SSA03,

SSB05, SSB08, SSC01, SSC03, SSC05, SSC12, SSD10, SSE06, SSE11, SSE16, SB01, SB02, SB05, and SB06). Benzo(b)fluoranthene concentrations ranged from ND to 9,480 µg/kg and exceeded its RSL of 2,100 µg/kg in samples SSA03 and SSD10. Dibenzo(a,h)anthracene concentrations ranged from ND to 1,690 µg/kg and exceeded its RSL of 210 µg/kg in samples SSA03, SSB08, SSD10, SSE06, and SB05. Indeno(1,2,3-cd)pyrene was detected at a concentration of 7,570 µg/kg in SSD10 which exceeds its RSL of 2,100 µg/kg. The SVOC exceedances in surface soils at the Site are scattered throughout the Site, with more exceedances occurring in the northern portion. It is likely that a greater number of SVOC exceedances would have been detected in the surface soil samples, however only thirty percent of the grid samples were analyzed for SVOCs.

Pentachlorophenol (PCP), identified in both the SVOC and herbicides lists, was detected in surface soil sample SSF14 at a concentration of 14.1 µg/kg. This detection does not exceed the RSL for PCP of 9,000 µg/kg. Another component of herbicides, Meta-chlorophenylpiperazine (MCPP) was detected in surface soil sample SSC15 at a concentration of 33,000 µg/kg. This MCPP detection does not exceed the RSL of 620,000 µg/kg. No other herbicide components were detected in any other surface soil samples.

GROs were detected at a concentration of 44.6 mg/kg in sample SSD11. This detection did not exceed the ODEQ risk-based action limit of 500 mg/kg. GROs were not detected in any other surface soil samples. Analysis of thirty-five (35) surface soil samples detected the presence of DROs above the method detection limit. The ODEQ risk-based action limit of 2,500 mg/kg was exceeded in the following eleven (11) samples: SSC14, SSD04, SSD05, SSD10, SSD11, SSD12, SSD13, SSD14, SSE12, SSE14, and SSF14. Sample SSD05 displayed the highest DRO concentration at 44,200 mg/kg. Two (2) of the DRO exceedances occurred in the western portion of the Fintube Building Complex, and the remaining nine (9) exceedances occurred throughout the Evan's Building Complex. Thirty-five (35) surface soil samples were analyzed and detected the presence of Lube Oil Range Organics (LOROs) above the method detection limit. The ODEQ risk-based action limit of 5,000 mg/kg was exceeded in the following four samples: SSD04, SSD11, SSD12, and SSD13. Sample SSD04 displayed the highest LORO concentration at 39,500 mg/kg. The LORO exceedance at SB04 occurred within the western portion of the Fintube Building Complex and the remaining three exceedances occurred within the eastern portion of the Evan's Building Complex.

PP Metals were screened and detected in each of the surface soil samples, although arsenic and lead were the only metals detected above their RSLs. Arsenic ranged from ND to 70 mg/kg and exceeded its RSL of 1.6 mg/kg in all but three samples. The United States Geological Survey (USGS) has reported that naturally occurring Arsenic levels in Oklahoma soils typically range from 0 to 32 mg/kg. Lead concentrations ranged from ND to 4,310 mg/kg and were detected above its RSL of 800 mg/kg in samples SSC14, SSD10, SSD11, SSD14, and SSD15.

PCB concentrations were detected above their RSL of 740 µg/kg in eight (8) surface soil samples. The single detection of PCB 1248 occurred in sample SSC12 at a concentration of 1,160 µg/kg, which exceeds the RSL. PCB 1254 concentrations ranged from ND to 18,000 µg/kg and exceeded the RSL in one (1) surface soil sample (SSD12). PCB 1260 concentrations ranged from ND to 16,400 µg/kg and exceeded the RSL in twelve (12) surface soil samples (SSD04, SSD05, SSD07, SSD10, SSD11, SSD12, SSD14, SSE12, SSE13, SSF14, and SB04). As shown in **Figure 5-1**, two PCB-1260 hotspots are located within the Site, which indicate two potential sources of the PCB plume. The first hotspot, with a detection of 16,400 µg/kg is located at SSD05 on the exterior of the southwest portion of the Fintube Building Complex. The second hotspot, with a detection of 6,250 µg/kg, occurs within the east-central portion of the Evans Building Complex. **Figure 5-2** depicts a PCB plume map which indicates surface soil PCB concentrations exceeding 1.0 mg/kg, the unrestricted cleanup value established for High Occupancy Areas.

Figure 5-3 depicts the locations of the surface soil exceedances, except arsenic, at the Site. Arsenic exceedances are depicted on **Figure 5-4** since all but three (3) samples contained detections above the RSL. **Table 5-1** presents the detections of analytes above the regulatory levels for surface soil samples for each analysis group.

Table 5-1
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SSA01		FIN-SSA02	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	7	J	5	
Benzo(a)pyrene	210	µg/kg	371		ND	

Parameter	Limit	Sample Number	FIN-SSA03		FIN-SSA04	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	12	J	5.8	
Benzo(a)pyrene	210	µg/kg	1220		ND	
Benzo(b)fluoranthene	2100	µg/kg	2500		ND	
Dibenzo(a,h)anthracene	210	µg/kg	475		ND	

Parameter	Limit	Sample Number	FIN-SSA05		FIN-SSA06	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	6.5		4.7	

Parameter	Limit	Sample Number	FIN-SSA07		FIN-SSA08	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	2.8	J	4.9	

Parameter	Limit	Sample Number	FIN-SSA09		FIN-SSA10	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	5.7		3.8	J

Parameter	Limit	Sample Number	FIN-SSA11		FIN-SSB01	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	5.7		5.8	

Parameter	Limit	Sample Number	FIN-SSB02		FIN-SSB03	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	5.6	J	10.5	

Parameter	Limit	Sample Number	FIN-SSB04		FIN-SSB05	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	5.9		4.5	
Benzo(a)pyrene	210	µg/kg	136	J	330	

Table 5-1 - Continued
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SSB06		FIN-SSB07	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**4.1**		**4.5**	J

Parameter	Limit	Sample Number	FIN-SSB08		FIN-SSB09	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**4.9**		**3.6**	
Benzo(a)pyrene	210	µg/kg	**911**		ND	
Dibenzo(a,h)anthracene	210	µg/kg	**218**		ND	

Parameter	Limit	Sample Number	FIN-SSB10		FIN-SSB11	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**3.7**		ND	

Parameter	Limit	Sample Number	FIN-SSB12		FIN-SSB13	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**5.7**		**4.7**	

Parameter	Limit	Sample Number	FIN-SSB14		FIN-SSC01	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**2.3**		**3.7**	
Benzo(a)pyrene	210	µg/kg	ND		**293**	

Parameter	Limit	Sample Number	FIN-SSC02		FIN-SSC03	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**6.4**		**6**	J
Benzo(a)pyrene	210	µg/kg	ND		**320**	

Parameter	Limit	Sample Number	FIN-SSC04		FIN-SSC05	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**8.3**		**3.4**	
Benzo(a)pyrene	210	µg/kg	ND		**543**	

Parameter	Limit	Sample Number	FIN-SSC06		FIN-SSC07	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**3.2**		ND	

Table 5-1 - Continued
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SSC08		FIN-SSC09	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**5.1**		**7.8**	

Parameter	Limit	Sample Number	FIN-SSC10		FIN-SSC11	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**6.1**		**6.5**	

Parameter	Limit	Sample Number	FIN-SSC12		FIN-SSC13	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1248	740	µg/kg	**1160**		ND	
Arsenic	1.6	mg/kg	**5.7**		**4.1**	
Benzo(a)pyrene	210	µg/kg	**532**		ND	

Parameter	Limit	Sample Number	FIN-SSC14		FIN-SSC15	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	**7890**		ND	
Arsenic	1.6	mg/kg	**4.2**		**11.5**	
Lead	800	mg/kg	**832**		61.3	

Parameter	Limit	Sample Number	FIN-SSD01		FIN-SSD02	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**4.9**		**3**	J

Parameter	Limit	Sample Number	FIN-SSD03		FIN-SSD04	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	1400		**38100**	J
TPH (>C28-C35)	5000*	mg/kg	2010		**39500**	
Aroclor 1260	740	µg/kg	141	J	**767**	J
Arsenic	1.6	mg/kg	**11.5**		ND	

Parameter	Limit	Sample Number	FIN-SSD05		FIN-SSD06	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	**44200**		181	
Aroclor 1260	740	µg/kg	**16400**		ND	
Arsenic	1.6	mg/kg	**4.1**		**6.3**	

Table 5-1 - Continued
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SSD07		FIN-SSD08	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	**759**		100	J
Arsenic	1.6	mg/kg	**6.9**		**3.8**	

Parameter	Limit	Sample Number	FIN-SSD09		FIN-SSD10	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	ND		**11000**	
TPH (>C28-C35)	5000*	mg/kg	ND		**12800**	
Aroclor 1260	740	µg/kg	222		**1640**	
Arsenic	1.6	mg/kg	**4**		**19.7**	
Lead	800	mg/kg	95.9		**2560**	
Benzo(a)anthracene	2100	µg/kg	ND		**2130**	J
Benzo(a)pyrene	210	µg/kg	ND		**4270**	
Benzo(b)fluoranthene	2100	µg/kg	ND		**9480**	
Dibenzo(a,h)anthracene	210	µg/kg	ND		**1690**	J
Indeno(1,2,3-cd)pyrene	2100	µg/kg	ND		**7570**	

Parameter	Limit	Sample Number	FIN-SSD11		FIN-SSD12	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	**33500**		**34200**	
TPH (>C28-C35)	5000*	mg/kg	**22000**		**17800**	
Aroclor 1254	740	µg/kg	ND		**18000**	J
Aroclor 1260	740	µg/kg	**929**		**6250**	
Arsenic	1.6	mg/kg	**14.3**		**7.8**	
Lead	800	mg/kg	**4310**		351	

Parameter	Limit	Sample Number	FIN-SSD13		FIN-SSD14	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	**7890**		**3380**	
TPH (>C28-C35)	5000*	mg/kg	**8920**		3510	
Aroclor 1260	740	µg/kg	662		**1810**	
Arsenic	1.6	mg/kg	**7.8**		**9.8**	
Lead	800	mg/kg	153		**1700**	

Table 5-1 - Continued
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SSD15		FIN-SSD16	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**70**		**6.7**	
Lead	800	mg/kg	**1180**		77.5	

Parameter	Limit	Sample Number	FIN-SSE04		FIN-SSE05	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**6.3**		**14.3**	

Parameter	Limit	Sample Number	FIN-SSE06		FIN-SSE07	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**11.6**		**34.5**	
Benzo(a)pyrene	210	µg/kg	**721**		ND	
Dibenzo(a,h)anthracene	210	µg/kg	**346**		ND	

Parameter	Limit	Sample Number	FIN-SSE08		FIN-SSE09	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**6.1**		**5.5**	

Parameter	Limit	Sample Number	FIN-SSE10		FIN-SSE11	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**7.6**		**16.8**	
Benzo(a)pyrene	210	µg/kg	ND		**255**	

Parameter	Limit	Sample Number	FIN-SSE12		FIN-SSE13	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	**2050**		2370	
Aroclor 1260	740	µg/kg	**2080**		**2070**	
Arsenic	1.6	mg/kg	**5.5**		**7.2**	

Parameter	Limit	Sample Number	FIN-SSE14		FIN-SSE15	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	**7790**		ND	
TPH (>C28-C35)	5000*	mg/kg	**8270**		ND	
Arsenic	1.6	mg/kg	**3.9**		**13.9**	

Table 5-1 - Continued
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SSE16		FIN-SSF14	
		Units	Detection	DVQ	Detection	DVQ
TPH (>C12-C28)	2500*	mg/kg	108		**7260**	
TPH (>C28-C35)	5000*	mg/kg	127		**7100**	
Aroclor 1260	740	µg/kg	ND		**1220**	
Arsenic	1.6	mg/kg	**4.8**		**11.8**	
Benzo(a)pyrene	210	µg/kg	**1060**		ND	

Parameter	Limit	Sample Number	FIN-SSF15		FIN-SB01-SS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	480		117	
Arsenic	1.6	mg/kg	**8.1**		**6.4**	
Benzo(a)pyrene	210	µg/kg	ND		**463**	

Parameter	Limit	Sample Number	FIN-SB02-SS01-01		FIN-SB03-SS01-01	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**9.8**		**4.9**	
Benzo(a)pyrene	210	µg/kg	**1040**		164	J

Parameter	Limit	Sample Number	FIN-SB04-SS01-01		FIN-SB05-SS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	**1270**		ND	
Arsenic	1.6	mg/kg	**9.1**		**43.8**	
Benzo(a)pyrene	210	µg/kg	ND		**1190**	
Dibenzo(a,h)anthracene	210	µg/kg	ND		**217**	

Parameter	Limit	Sample Number	FIN-SB06-SS01-01		FIN-SB07-SS01-01	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**6**		**6.3**	
Benzo(a)pyrene	210	µg/kg	**480**		ND	

Table 5-1 - Continued
Surface Soil Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SB08-SS01-01		FIN-SB09-SS01-01	
		Units	Detection	DVQ	Detection	DVQ
Arsenic	1.6	mg/kg	**4**		**4.4**	

Parameter	Limit	Sample Number	FIN-SB10-SS01-01	
		Units	Detection	DVQ
Arsenic	1.6	mg/kg	**9.1**	

Notes and Abbreviations:
Source: U.S. Environmental Protection Agency Regional, Industrial Soil Screening Levels, Ver. 2009
** ODEQ Regulatory Limit*
***Bolded** and yellow shaded area exceed screening levels*
J - Estimated Values
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
DVQ- Validation qualifier assigned by project chemist - reason code definitions provided in the validation reports

5.1.2 Subsurface Soil Samples from Borings

A total of thirteen (13) subsurface soil samples were collected from the ten (10) soil borings. This total includes ten (10) normal samples, one (1) duplicate, one (1) matrix spike, and one (1) matrix spike duplicate.

The following VOCs were detected in the subsurface soil samples above their MDLs: 2-methylnaphthalene (SB02 and SB06), 1,2,4-trichlorobenzene (SB04), benzene (SB04), and chlorobenzene (SB04). None of the VOC detections were above their RSLs in the subsurface soil samples.

The only subsurface soil sample which contained SVOCs above their MDLs was SB01. Benzo(a)pyrene was detected at a concentration of 1,250 µg/kg which exceeds its RSL of 210 µg/kg . Benzo(b)fluoranthene was detected at a concentration of 4,980 µg/kg which exceeds its RSL of 2,100 µg/kg. Dibenzo(a,h)anthracene was detected at a concentration of 515 µg/kg which exceeds its RSL of 210 µg/kg.

PCP, identified in both the SVOC and herbicide lists, was detected in subsurface soil sample SB04 at a concentration of 11 µg/kg. This detection does not exceed the RSL for PCP of 9,000 µg/kg. MCPP, another component of herbicides, was detected in subsurface soil sample SSB09 at a concentration of 33,000 µg/kg. This MCPP detection does not exceed the RSL of 620,000 µg/kg. No other herbicide components were detected in any other surface soil samples.

GROs were detected in samples SB02 and SB03 at concentrations of 103 and 9.04 mg/kg. These GRO detections did not exceed the ODEQ risk-based action limit of 2,500 mg/kg. GROs were not detected in any other subsurface soil samples. DROs were detected in samples SB02, SB03, SB04, and SB10 at concentrations of 10.7 to 101 mg/kg. These DRO detections did not exceed the ODEQ risk-based action limit of 2,500 mg/kg. DROs were not detected in any other subsurface soil samples. LOROs were not identified in any of the subsurface soil samples.

PP Metals were screened and detected in each of the ten (10) normal surface soil samples, although arsenic was the only metal detected above its RSL. Arsenic concentrations ranged from 2.4 to 30.3 mg/kg and exceeded its RSL of 1.6 mg/kg in all subsurface soil samples. The USGS has reported that naturally occurring arsenic levels in Oklahoma soils typically range from 0 to 32 mg/kg.

PCB concentration was detected above the RSL for PCB-1260 of 740 µg/kg in one (1) subsurface soil sample. The single exceedance of PCB-1260 was in sample SB04 at a concentration of 124,000 µg/kg. There were no other PCB detections that exceeded their RSLs in the subsurface soils.

Figure 5-5 depicts the locations of the subsurface soil exceedances at the Site. **Table 5-2** presents the detections of analytes above the regulatory levels for subsurface soil samples for each analysis group.

Table 5-2
Subsurface Soil Samples Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SB01-DS01-01		FIN-SB02-DS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	218		ND	
Arsenic	1.6	mg/kg	**2.4**		**9.6**	
Benzo(a)pyrene	210	µg/kg	**1250**		ND	
Benzo(b)fluoranthene	2100	µg/kg	**4980**		ND	
Dibenzo(a,h)anthracene	210	µg/kg	**515**		ND	

Parameter	Limit	Sample Number	FIN-SB03-DS01-01		FIN-SB04-DS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	ND		**124000**	
Arsenic	1.6	mg/kg	**14**		**13.3**	
Benzo(a)pyrene	210	µg/kg	ND		ND	
Benzo(b)fluoranthene	2100	µg/kg	ND		ND	
Dibenzo(a,h)anthracene	210	µg/kg	ND		ND	

Parameter	Limit	Sample Number	FIN-SB05-DS01-01		FIN-SB06-DS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	ND		ND	
Arsenic	1.6	mg/kg	**8.3**		**30.3**	
Benzo(a)pyrene	210	µg/kg	ND		ND	
Benzo(b)fluoranthene	2100	µg/kg	ND		ND	
Dibenzo(a,h)anthracene	210	µg/kg	ND		ND	

Parameter	Limit	Sample Number	FIN-SB07-DS01-01		FIN-SB08-DS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	ND		ND	
Arsenic	1.6	mg/kg	**18.7**		**12.1**	
Benzo(a)pyrene	210	µg/kg	ND		ND	
Benzo(b)fluoranthene	2100	µg/kg	ND		ND	
Dibenzo(a,h)anthracene	210	µg/kg	ND		ND	

Table 5-2 - Continued
Subsurface Soil Samples Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SB09-DS01-01		FIN-SB10-DS01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	740	µg/kg	ND		ND	
Arsenic	1.6	mg/kg	**23.7**		**6.8**	
Benzo(a)pyrene	210	µg/kg	ND		ND	
Benzo(b)fluoranthene	2100	µg/kg	ND		ND	
Dibenzo(a,h)anthracene	210	µg/kg	ND		ND	

Notes and Abbreviations:

Source: U.S. Environmental Protection Agency Regional, Industrial Soil Screening Levels, Ver. 2009

***Bolded** and yellow shaded area exceed screening levels*

mg/kg - milligrams per kilogram

µg/kg - micrograms per kilogram

DVQ- Validation qualifier assigned by project chemist - reason code definitions provided in the validation reports

5.2 Groundwater Analytical Results

A total of thirteen (13) groundwater samples were collected from soil borings throughout the Site. The total number of samples includes ten (10) normal samples, one (1) QC duplicate sample, one (1) MS sample, and one (1) MSD sample. The analytical results were screened against the USEPA MCLs or USEPA RSLs for Residential Tap Water (USEPA 2010) when MCLs were not available. The ODEQ risk-based screening level of 1.0 mg/L for GRO and DRO was used to screen all collected groundwater samples (ODEQ 2009). **Appendix C** includes data tables that list every sample for which at least one constituent was detected above the Method Detection Limit. Complete copies of the analytical results, chain of custody forms, and the data validation report are contained on compact disk in **Appendix D**. **Figure 5-6** depicts the locations of the groundwater exceedances at the Site.

The following VOCs were detected in the groundwater samples above their MDLs: acetone (SB01), chloroform (SB01 and SB10), chlorobenzene (SB04), 1,2-dichlorobenzene (SB04), 1,4-dichlorobenzene (SB04), 1,1-dichloroethane (SB02), cis-1,2-dichloroethylene (SB02), methyl chloride (SB09), 1,2,4-trichlorobenzene (SB04), and trichloroethylene (SB02). The detection of 1,2,4-trichlorobenzene in sample SB04 (846 µg/L) exceeded its RSL of 70 µg/L. Additionally, the

detections of chloroform in samples SB01 and SB10 (0.77 and 0.67 µg/L, respectively) exceeded its RSL of 0.15 µg/L.

The following SVOCs were detected in the groundwater samples above their MDLs: acenaphthene (SB05), benzo(b)fluoranthene (SB01), benzo(g,h,i)perylene (SB01), chrysene (SB01), dibenzofuran (SB05), fluorene (SB05), 2-methylnaphthalene (SB02), naphthalene (SB02), phenanthrene (SB02 and SB05), and pyrene (SB01). The detection of naphthalene in sample SB02 (2.4 µg/L) exceeded its RSL of 0.14 µg/L. No other SVOCs exceeded their RSLs in any of the groundwater samples.

There were no detections of any herbicide constituents above their MDLs in any of the groundwater samples.

GROs were detected above their MDL in samples SB04 at a concentration of 0.0722 mg/L. This GRO detection did not exceed the ODEQ risk-based action limit of 1 mg/L. GROs were not detected in any other groundwater samples. DROs were detected in samples SB01, SB04, SB05, SB07, SB08, SB09, and SB10 at concentrations of 0.168 to 0.827 mg/L. These DRO detections did not exceed the ODEQ risk-based action limit of 1 mg/L. DROs were not detected in any other groundwater samples.

PP Metals were screened and detected in each of the ten (10) normal groundwater samples. The metals arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, thallium, and zinc were detected above their RSLs in the groundwater samples. Arsenic concentrations ranged from ND to 646 µg/L and exceeded its RSL of 10 µg/L in samples SB01, SB02, SB05, SB06, and SB09. Beryllium concentrations ranged from ND to 82.9 µg/L and exceeded its RSL of 4 µg/L in samples SB01, SB02, SB06, and SB09. Cadmium concentrations ranged from ND to 433 µg/L and exceeded its RSL of 5 µg/L in samples SB01, SB02, and SB09. Chromium concentrations ranged from ND to 2,230 µg/L and exceeded its RSL of 100 µg/L in samples SB01, SB02, and SB09. Copper concentrations ranged from ND to 3,860 µg/L and exceeded its RSL of 1330 µg/L in samples SB01 and SB02. Lead concentrations ranged from ND to 16,000 µg/L and exceeded its RSL of 15 µg/L in samples SB01, SB02, and SB09. Mercury concentrations ranged from ND to 8.6 µg/L and exceeded its RSL of 2 µg/L in sample SB01. Nickel concentrations ranged from ND to 3,240 µg/L and exceeded its RSL of 730 µg/L in samples SB01 and SB02. Thallium concentrations ranged from ND to 13.2 µg/L and exceeded its RSL of 2 µg/L in samples SB01 and SB02. Zinc

concentrations ranged from ND to 0.77 µg/L and exceeded its RSL of 0.15 µg/L in samples SB01. A majority of the metals exceedances occurred in samples SB01, SB02, and SB09. Groundwater samples were collected from undeveloped temporary monitoring wells as grab samples. Therefore, the presence of sediments which could have had adsorbed metals on the sediment particles. As the groundwater samples were unfiltered, the sample preparation would have digested the adsorbed metals from the sediments, adding to the dissolved metals in the groundwater samples.

PCB constituents were detected above their MDLs in only one groundwater sample. PCB-1260 was detected at a concentration of 4.7 µg/L in sample SB04. This detection exceeded the PCB-1260 RSL of 0.034 µg/L. There were no other PCB detections that exceeded their MDLs in the groundwater samples.

Table 5-3
Groundwater Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SB01-GW01-01		FIN-SB02-GW01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	0.034	µg/L	ND		ND	
Arsenic	10	µg/L	**533**		**646**	
Beryllium	4	µg/L	**34.4**		**82.9**	
Cadmium	5	µg/L	**433**		**49.2**	
Chromium	100	µg/L	**838**		**2230**	
Copper	1300	µg/L	**3860**		**1970**	
Lead	15	µg/L	**16000**		**762**	
Mercury	2	µg/L	**8.6**		0.58	J
Nickel	730**	µg/L	**1040**		**3240**	
Thallium	2	µg/L	**13.2**	J	**2.2**	J
Zinc	11000**	µg/L	**192000**		8930	
Naphthalene	0.14	µg/L	ND		**2.4**	J
Chloroform	0.15**	µg/L	**0.77**	J	ND	
1,2,4-Trichlorobenzene	70	µg/L	ND		ND	

Parameter	Limit	Sample Number	FIN-SB03-GW01-01		FIN-SB04-GW01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	0.034	µg/L	ND		**4.7**	
Arsenic	10	µg/L	7.4	J	ND	
Beryllium	4	µg/L	ND		ND	
Cadmium	5	µg/L	ND		ND	
Chromium	100	µg/L	8.4	J	2.5	J
Copper	1300	µg/L	6.4	J	3	J
Lead	15	µg/L	6.1	J	3.4	J
Mercury	2	µg/L	ND		ND	
Nickel	730**	µg/L	15.2	J	5.4	J
Thallium	2	µg/L	0.089	J	0.15	J
Zinc	11000**	µg/L	ND		14.2	J
Naphthalene	0.14	µg/L	ND		ND	
Chloroform	0.15**	µg/L	ND		ND	
1,2,4-Trichlorobenzene	70	µg/L	ND		**846**	

Table 5-3 - Continued
Groundwater Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SB05-GW01-01		FIN-SB06-GW01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	0.034	µg/L	ND		ND	
Arsenic	10	µg/L	**43.2**		**37.9**	
Beryllium	4	µg/L	4		**4.2**	
Cadmium	5	µg/L	1.4	J	ND	
Chromium	100	µg/L	71		89.8	
Copper	1300	µg/L	71.6		73.7	
Lead	15	µg/L	**123**		**93.6**	
Mercury	2	µg/L	0.2	J	ND	
Nickel	730**	µg/L	101		139	
Thallium	2	µg/L	1.84	J	0.7	J
Zinc	11000**	µg/L	201		200	
Naphthalene	0.14	µg/L	ND		ND	
Chloroform	0.15**	µg/L	ND		ND	
1,2,4-Trichlorobenzene	70	µg/L	ND		ND	

Parameter	Limit	Sample Number	FIN-SB07-GW01-01		FIN-SB08-GW01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	0.034	µg/L	ND		ND	
Arsenic	10	µg/L	1.2	J	ND	
Beryllium	4	µg/L	ND		ND	
Cadmium	5	µg/L	ND		ND	
Chromium	100	µg/L	ND		2.3	J
Copper	1300	µg/L	ND		2.8	J
Lead	15	µg/L	3.3	J	4.3	J
Mercury	2	µg/L	ND		ND	
Nickel	730**	µg/L	2.4	J	19.2	J
Thallium	2	µg/L	ND		ND	
Zinc	11000**	µg/L	9	J	17.8	J
Naphthalene	0.14	µg/L	ND		ND	
Chloroform	0.15**	µg/L	ND		ND	
1,2,4-Trichlorobenzene	70	µg/L	ND		ND	

Table 5-3 - Continued
Groundwater Analytical Detections Above Applicable Regulatory Limits
Fintube TBA

Parameter	Limit	Sample Number	FIN-SB09-GW01-01		FIN-SB10-GW01-01	
		Units	Detection	DVQ	Detection	DVQ
Aroclor 1260	0.034	µg/L	ND		ND	
Arsenic	10	µg/L	**377**		ND	
Beryllium	4	µg/L	**17.3**		ND	
Cadmium	5	µg/L	**5.1**	J	1.6	J
Chromium	100	µg/L	**366**		3	J
Copper	1300	µg/L	423		4.1	J
Lead	15	µg/L	**1690**		7.3	J
Mercury	2	µg/L	0.85	J	ND	
Nickel	730**	µg/L	633		39.6	J
Thallium	2	µg/L	5.5	J	ND	
Zinc	11000**	µg/L	1020		42.1	
Naphthalene	0.14	µg/L	ND		ND	
Chloroform	0.15**	µg/L	ND		**0.67**	J
1,2,4-Trichlorobenzene	70	µg/L	ND		ND	

Notes and Abbreviations:

Source: U.S. Environmental Protection Agency, Regional Screening Levels - Water MCL, Ver. 2009

***U.S. Environmental Protection Agency, Regional Screening Levels-Tap water, Ver. 2009*

***Bolded** and yellow shaded area exceed screening levels*

J - Estimated Values

mg/L - milligrams per kilogram

µg/L- micrograms per kilogram

QVQ Validation qualifier assigned by project chemist - reason code definitions provided in the validation reports

5.3 Asbestos Analytical Results

An asbestos inspection was conducted on April 16, 2010, at the Site by a USEPA-accredited and ODOL-licensed asbestos inspector/management planner with Environmental Hazard Control, Inc. During the inspection, twenty-one (21) samples were collected from sixteen (16) homogenous areas from the Fintube Building Complex and nine (9) samples were collected from seven (7) homogenous areas from the Evans Building Complex. The following types of materials were sampled and analyzed for ACM:

- Hard Pack Fittings
- Floor Tile

- Ceiling Tile
- Drywall, Tape, and Joint Compound
- Stucco Finish
- Window Caulking
- Attic Insulation
- Duct Insulation
- Wall Plaster
- Window Putty
- Yellow Kickboard Glue

All samples were analyzed using Polarized Light Microscopy (PLM) in accordance with USEPA Method 600R-93/116. If the presence of asbestos was confirmed, the percentage of asbestos containing material versus non-asbestos containing material was visually estimated by a combination of Polarized Light and Stereo Microscope. A review of laboratory results revealed the following asbestos containing materials were identified above the USEPA threshold of one percent (1%) as determined by PLM Microscopy:

Category I non-friable materials

The following Category I non-friable materials were identified from the inspection process and are currently classified as Category I non-friable materials:

- None

Category II non-friable materials

The following Category II non-friable materials were identified during the inspection process:

- None

Regulated Asbestos Containing Materials (RACM)

The following regulated asbestos containing materials (RACM) were identified during the inspection process:

- Approximately 10 linear feet and 10 square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of main building of the Fintube Building Complex.

- Approximately 34 linear feet of asbestos containing thermal system pipe insulation located in main warehouse of Evans Building Complex.

The full asbestos inspection report is available in **Appendix F**.

5.4 Lead-Based Paint Inspection

An LBP inspection was performed at the Site on May 16, 2010. All assay tests for LBP were taken with Scitec XRF-MAP 4 Spectrum Analyzer Serial Number M41254 in the Unlimited Mode. All paint chip samples were analyzed by Quantem Laboratories using USEPA Method 7420, Atomic Absorption.

For this report a "Positive" refers to a sample that has lead concentration of greater than 1.0 mg/cm^2 by XRF reading or 5,000 parts per million (ppm) by paint-chip analysis. "Negative" refers to a sample that has a lead concentration of less than 1.0 mg/cm^2 by XRF reading or 5,000 ppm by paint-chip analysis.

The following information is pertinent to this report:

1. Lead was banned in residential and commercial used paint in 1978.
2. The Fintube and Evans Buildings were built prior to 1978.
3. There were 73 XRF samples collected and analyzed from Fintube buildings. There were 71 XRF samples collected and analyzed from Evans buildings.
4. There were twenty (20) paint chip samples collected and analyzed, ten from Fintube buildings and ten from Evans buildings.
5. Lead above the permissible level of 1.0 mg/cm^2 or 5,000 ppm ***was found*** within the sampled areas as follows:

Fintube Building Complex

- Exterior large sliding door paint, east wall main building, south wall main building, and west building north wall,
- Exterior and Interior Red iron I-beams columns
- Interior yellow painted stairs along east wall

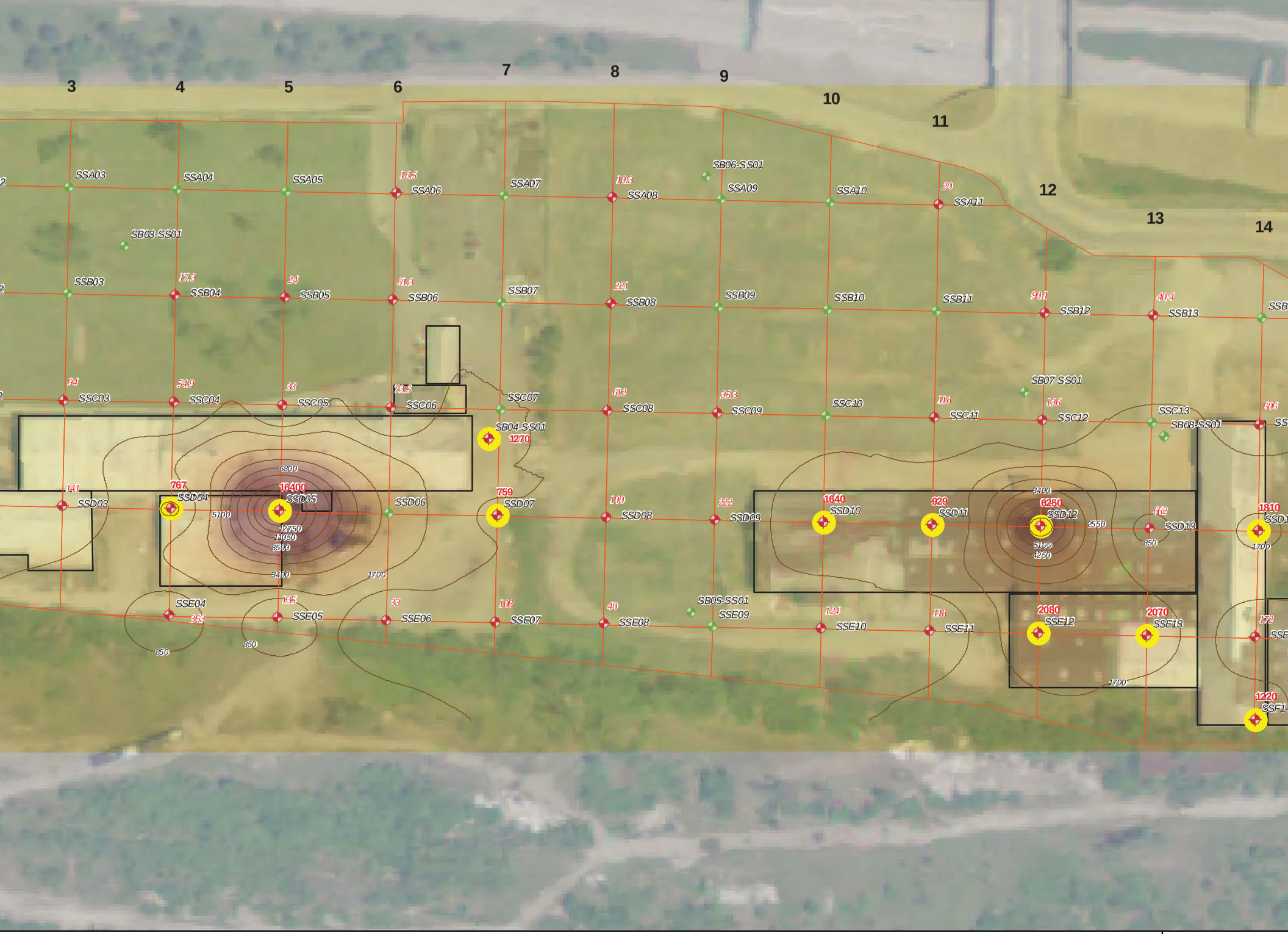
Evans Building Complex

- Interior half wall brick paint
- Interior I-beam columns (red)

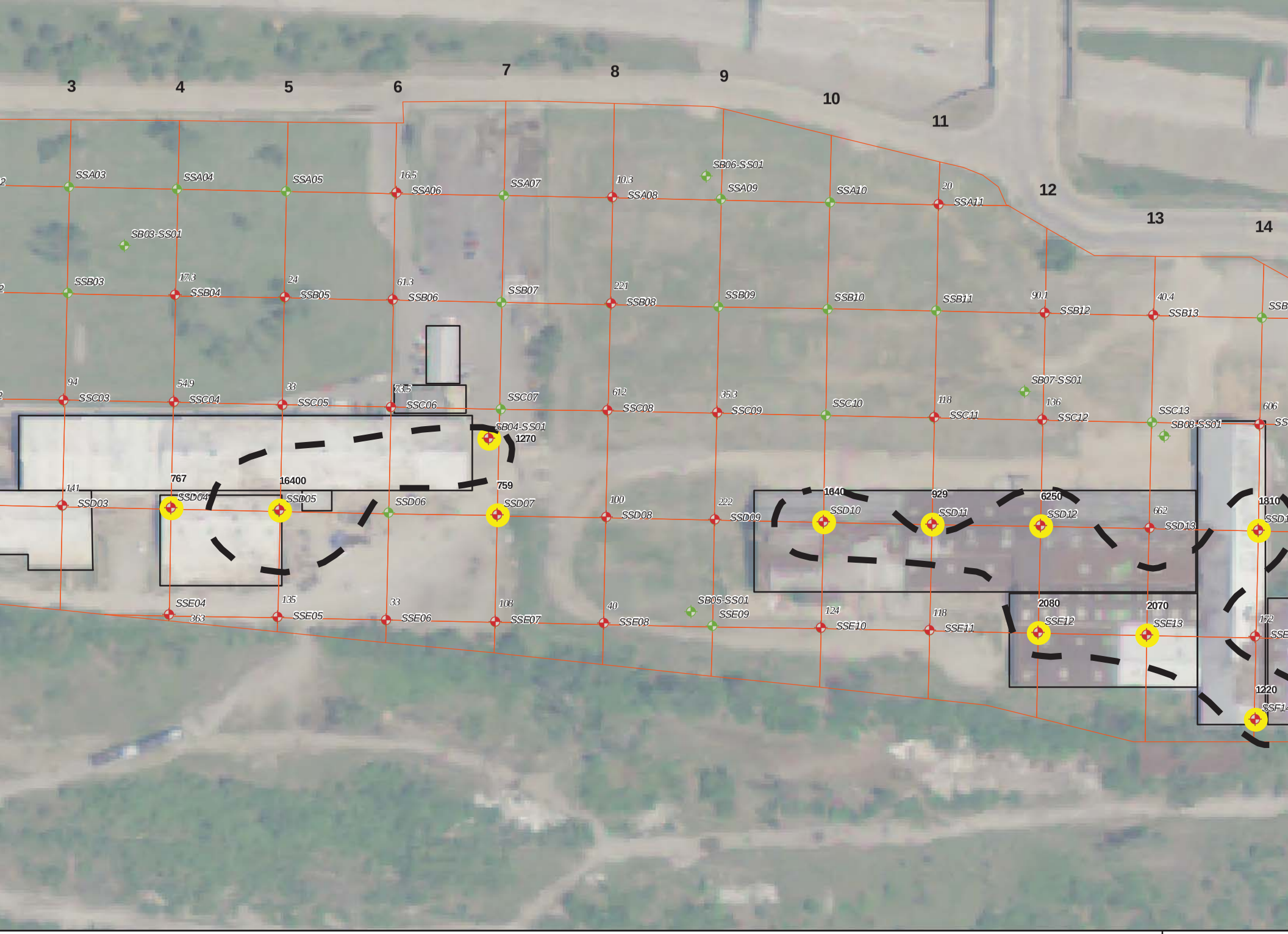
- Interior green concrete stem wall paint
- Interior yellow stairs paint
- Interior I-beam columns (yellow)

6. Lead was found in some concentration in almost all painted surfaces so therefore Occupational Safety and Health Administration (OSHA) regulations will be required to be followed when working with these painted surfaces.
7. No substrate correction was necessary.
8. Walls are numbered in a clockwise manner starting with wall 1 being address side.
9. Department of Housing and Urban Development (HUD) Guidelines classify painted surface conditions using the following standards:

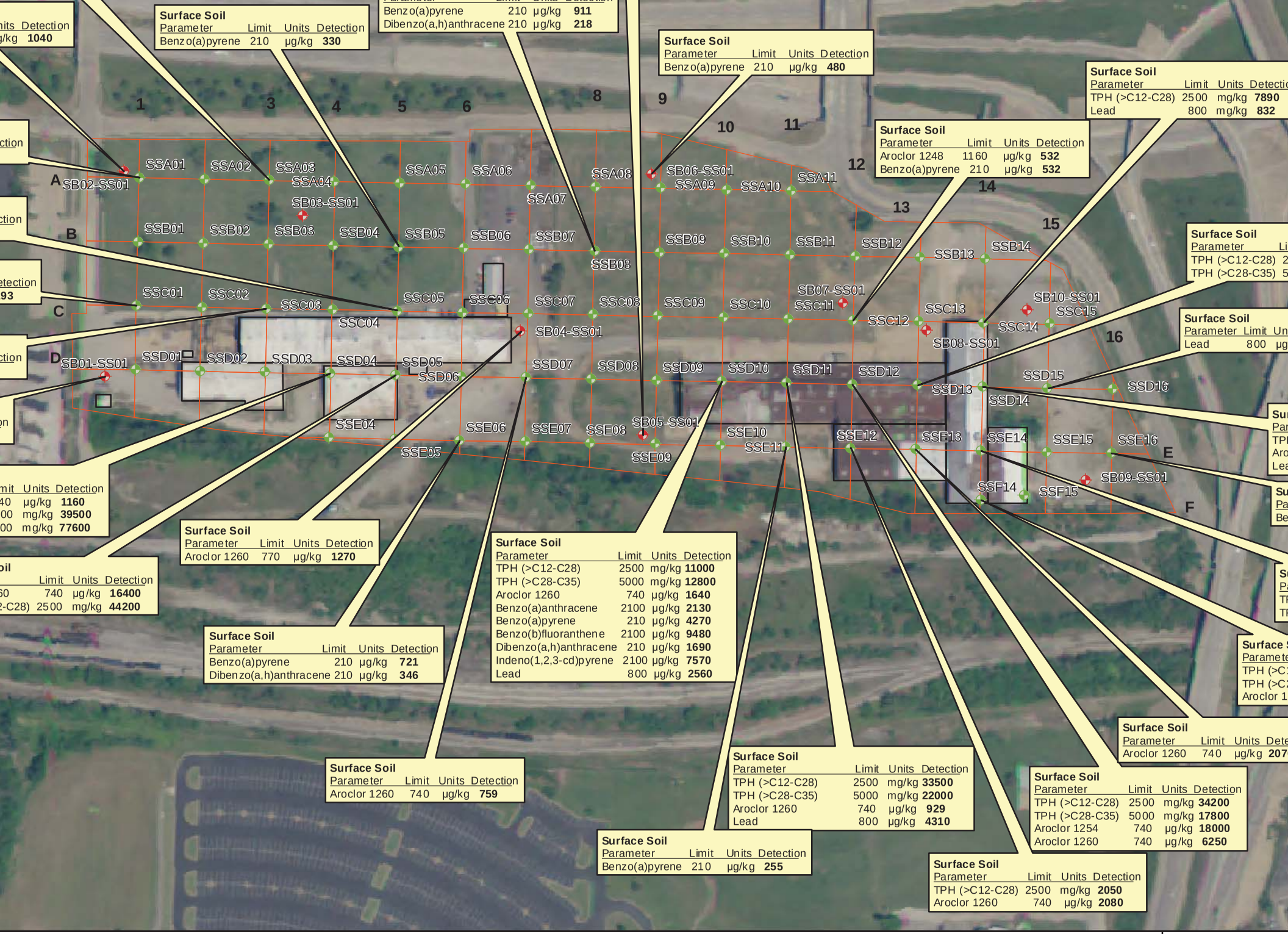
Type of Building Component	Intact (Good)	Fair	Poor
Exterior components with large surface areas	Entire surface is intact	Less than or equal to 10 square feet.	More than 10 square feet.
Interior components with large surface areas	Entire surface is intact.	Less than or equal to 2 square feet.	More than 2 square feet.
Interior and exterior components with small surface areas (window sills, baseboards, soffits, trim).	Entire surface is intact.	Less than or equal to 10 percent of the total surface area of the component.	More than 10 percent of the total surface area of the component.



with PCB Detections (µg/kg)



B Detections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SSE04
SSE05
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SSE09
SSE10
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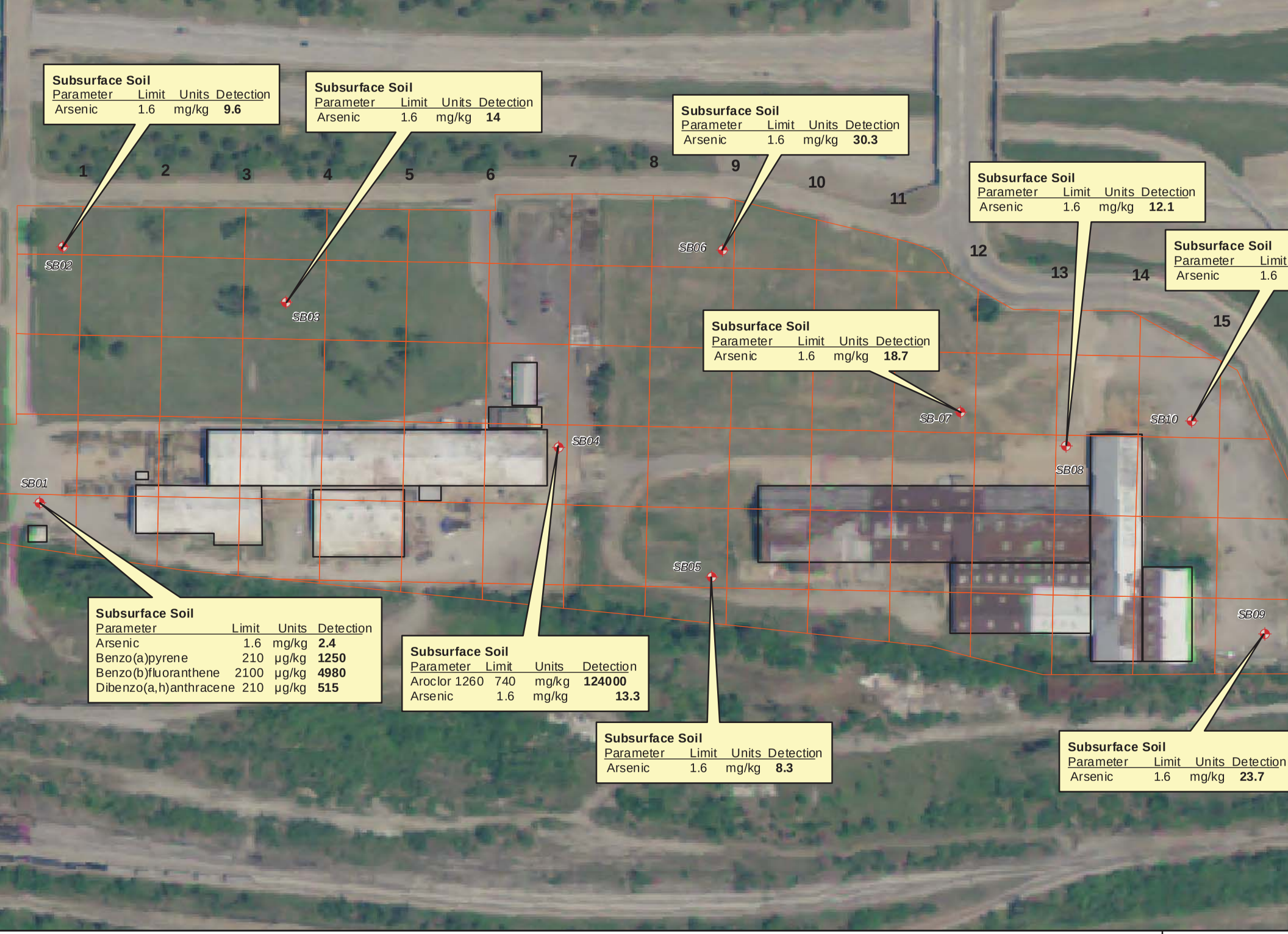
SSE12
SSE13
SSE14
SSE15
SSE16
SSF14
SSF15
SB01-SS01
SB02-SS01
SB03-SS01
SB04-SS01
SB05-SS01
SB06-SS01
SB07-SS01
SB08-SS01
SB09-SS01
SB10-SS01
Surface Soil
Parameter Limit Units Detection
Benzo(a)pyrene 210 µg/kg 911
Dibenzo(a,h)anthracene 210 µg/kg 218
Surface Soil
Parameter Limit Units Detection
Benzo(a)pyrene 210 µg/kg 330
Surface Soil
Parameter Limit Units Detection
Benzo(a)pyrene 210 µg/kg 480
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 7890
Lead 800 mg/kg 832
Surface Soil
Parameter Limit Units Detection
Aroclor 1248 1160 µg/kg 532
Benzo(a)pyrene 210 µg/kg 532
Surface Soil
Parameter Limit Units Detection
Aroclor 1260 770 µg/kg 1270
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 11000
TPH (>C28-C35) 5000 mg/kg 12800
Aroclor 1260 740 µg/kg 1640
Benzo(a)anthracene 2100 µg/kg 2130
Benzo(a)pyrene 210 µg/kg 4270
Benzo(b)fluoranthene 2100 µg/kg 9480
Dibenzo(a,h)anthracene 210 µg/kg 1690
Indeno(1,2,3-cd)pyrene 2100 µg/kg 7570
Lead 800 µg/kg 2560
Surface Soil
Parameter Limit Units Detection
Benzo(a)pyrene 210 µg/kg 721
Dibenzo(a,h)anthracene 210 µg/kg 346
Surface Soil
Parameter Limit Units Detection
Aroclor 1260 740 µg/kg 759
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 33500
TPH (>C28-C35) 5000 mg/kg 22000
Aroclor 1260 740 µg/kg 929
Lead 800 µg/kg 4310
Surface Soil
Parameter Limit Units Detection
Benzo(a)pyrene 210 µg/kg 255
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 34200
TPH (>C28-C35) 5000 mg/kg 17800
Aroclor 1254 740 µg/kg 18000
Aroclor 1260 740 µg/kg 6250
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 2050
Aroclor 1260 740 µg/kg 2080
Surface Soil
Parameter Limit Units Detection
Aroclor 1260 740 µg/kg 16400
TPH (>C12-C28) 2500 mg/kg 44200
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 39500
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 1160
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500 mg/kg 77600
Surface Soil
Parameter Limit Units Detection
TPH (>C28-C35) 2500 mg/kg 1040
Surface Soil
Parameter Limit Units Detection
Aroclor 1260 740 µg/kg 2070
Surface Soil
Parameter Limit Units Detection
Lead 800 µg/kg
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500
TPH (>C28-C35) 5
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500
Aroclor 1260 740
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500
Aroclor 1260 740
Surface Soil
Parameter Limit Units Detection
TPH (>C12-C28) 2500
Aroclor 1260 740
Surface Soil
Parameter Limit Units Detection
Aroclor 1248 1160 µg/kg 532
Benzo(a)pyrene 210 µg/kg 532

Arsenic Concentrations

ts

Arsenic Exc


Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 9.6
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 14
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 30.3
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 12.1
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Arsenic 1.6
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 18.7
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 2.4
Benzo(a)pyrene 210 µg/kg 1250
Benzo(b)fluoranthene 2100 µg/kg 4980
Dibenzo(a,h)anthracene 210 µg/kg 515
Subsurface Soil
Parameter Limit Units Detection
Aroclor 1260 740 mg/kg 124000
Arsenic 1.6 mg/kg 13.3
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 8.3
Subsurface Soil
Parameter Limit Units Detection
Arsenic 1.6 mg/kg 23.7
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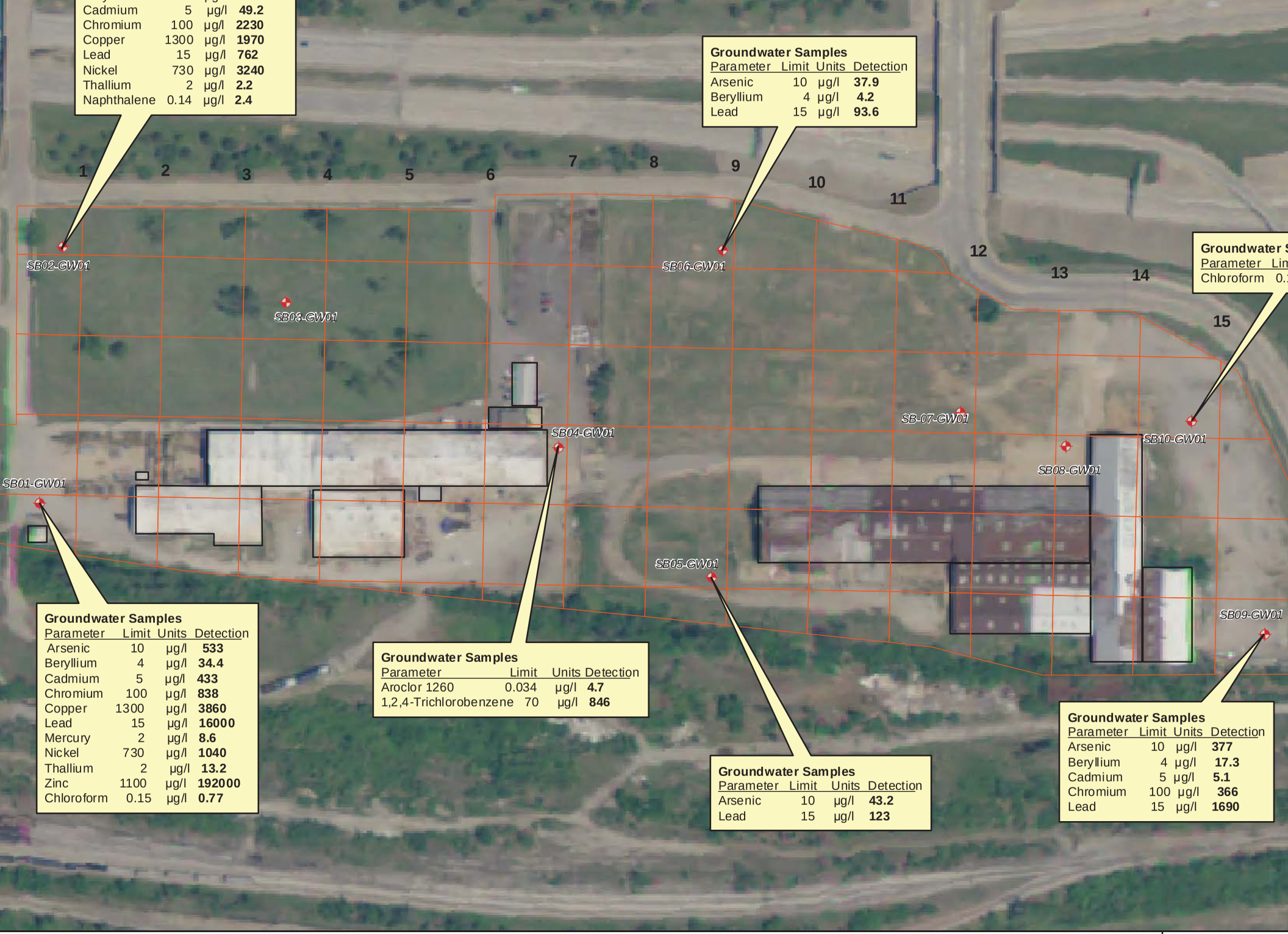
Cadmium 5 µg/l 49.2
Chromium 100 µg/l 2230
Copper 1300 µg/l 1970
Lead 15 µg/l 762
Nickel 730 µg/l 3240
Thallium 2 µg/l 2.2
Naphthalene 0.14 µg/l 2.4
Groundwater Samples
Parameter Limit Units Detection
Arsenic 10 µg/l 37.9
Beryllium 4 µg/l 4.2
Lead 15 µg/l 93.6
Groundwater S
Parameter Lim
Chloroform 0.
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SB02-GW01
SB03-GW01
SB06-GW01
SB04-GW01
SB01-GW01
SB-07-GW01
SB10-GW01
SB08-GW01
SB05-GW01
SB09-GW01
Groundwater Samples
Parameter Limit Units Detection
Arsenic 10 µg/l 533
Beryllium 4 µg/l 34.4
Cadmium 5 µg/l 433
Chromium 100 µg/l 838
Copper 1300 µg/l 3860
Lead 15 µg/l 16000
Mercury 2 µg/l 8.6
Nickel 730 µg/l 1040
Thallium 2 µg/l 13.2
Zinc 1100 µg/l 192000
Chloroform 0.15 µg/l 0.77
Groundwater Samples
Parameter Limit Units Detection
Aroclor 1260 0.034 µg/l 4.7
1,2,4-Trichlorobenzene 70 µg/l 846
Groundwater Samples
Parameter Limit Units Detection
Arsenic 10 µg/l 43.2
Lead 15 µg/l 123
Groundwater Samples
Parameter Limit Units Detection
Arsenic 10 µg/l 377
Beryllium 4 µg/l 17.3
Cadmium 5 µg/l 5.1
Chromium 100 µg/l 366
Lead 15 µg/l 1690

Grou

6. SUMMARY

The following summarizes the findings of this investigation:

The Site mainly consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three north-south oriented buildings to the north and two east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four buildings oriented north-south and one smaller building to the southeast that is oriented east-west. The Site is located in a relatively flat area, gently sloping northwest in its northern portion with a low area between the Fintube Building Complex and the Evans Building Complex, and then sloping southwest on the southern portion of the Site.

Surface and subsurface soil analytical results were compared to USEPA RSLs for industrial soil screening levels (USEPA 2010). The ODEQ risk-based screening levels for GRO (500 mg/kg), DRO (2500 mg/kg) and LORO (5000 mg/kg) were used to screen all collected soil and sediment samples (ODEQ 2009). The analytical results for groundwater testing were screened against the USEPA MCLs or USEPA RSLs for Residential Tap Water (USEPA 2010) when MCLs were not available. The ODEQ risk-based screening levels for GRO (1 mg/L) and DRO (1 mg/L) were used to screen all collected groundwater and surface water samples (ODEQ 2009).

The following is a summary of all exceedances listed according to parameter, constituent, and then by sample number. (Duplicate, MS, and MSD samples are not included in the tabulation.)

Table 6-1
Surface Soil Sample Regulatory Exceedances
81 Soil Samples

PARAMETER	CONSTITUENT	SAMPLE NUMBER*
VOC	None	None
SVOC	Benzo(a)anthracene	SS10
	Benzo(a)pyrene	SSA01, SSA03, SSB05, SSB08, SSC01, SSC03, SSC05, SSC12, SSD10, SSE06, SSE11, SSE16, SB01, SB02, SB05, and SB06
	Benzo(b)fluoranthene	SSA03 and SSD10
	Dibenzo(a,h)anthracene	SSA03, SSB08, SSD10, SSE06, and SB05
	Indeno(1,2,3-cd)pyrene	SSD10
Metals	Arsenic	All but three samples.
	Lead	SSC14, SSD10, SSD11, SSD14, and SSD15
Herbicides	None	None
TPH	GRO	None
	DRO	SSC14, SSD04, SSD05, SSD10, SSD11, SSD12, SSD13, SSD14, SSE12, SSE14, and SSF14
	LORO	SSD04, SSD11, SSD12, and SSD13
PCBs	Aroclor-1248	SSC12
	Aroclor-1254	SSD12
	Aroclor-1260	SSD04, SSD05, SSD07, SSD10, SSD11, SSD12, SSD14, SSE12, SSE13, SSF14, and SB04

Table 6-2
Subsurface Soil Sample Regulatory Exceedances
10 Soil Samples

PARAMETER	CONSTITUENT	SAMPLE NUMBER*
VOC	None	None
SVOC	Benzo(a)pyrene	SB01
	Fluoranthene	SB01
	Dibenzo(a,h)anthracene	SB01
Metals	Arsenic	SB01, SB02, SB03, SB04, SB05, SB06, SB07, SB08, SB09, SB10
Herbicides	None	None
TPH	None	None
PCB	Aroclor-1260	SB04

*All sample numbers are FIN-SBX-01 unless otherwise indicated.

Table 6-3
Groundwater Sample Regulatory Exceedances
10 Groundwater Samples

PARAMETER	CONSTITUENT	SAMPLE NUMBER*
VOC	Chloroform	SB01 and SB10
	1,2,4-Trichlorobenzene	SB04
SVOC	Naphthalene	SB02
Metals	Arsenic	SB01, SB02, SB05, SB06, and SB09
	Beryllium	SB01, SB02, SB06, and SB09
	Cadmium	SB01, SB02, and SB09
	Chromium	SB01, SB02, and SB09
	Copper	SB01 and SB02
	Lead	SB01, SB02, SB09
	Mercury	SB01
	Nickel	SB01 and SB02
	Thallium	SB01 and SB02
	Zinc	SB01
TPH	None	None

The following RACM was identified during the inspection process:

- Approximately 10 linear feet and 10 square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of the main building of the Fintube Building Complex.

- Approximately 34 linear feet of asbestos containing thermal system pipe insulation located in main warehouse of Evans Building Complex.

Lead above the permissible level of 1.0 mg/cm^2 or 5,000ppm was found within the sampled areas as follows:

Fintube Building Complex

- Exterior large sliding door paint, east wall main building, south wall main building, and west building north wall,
- Exterior and Interior Red iron I-beams columns
- Interior yellow painted stairs along east wall

Evans Building Complex

- Interior half wall brick paint
- Interior I-beam columns (red)
- Interior green concrete stem wall paint
- Interior yellow stairs paint
- Interior I-beam columns (yellow)

The following constituents have no specified regulatory limits:

- Acenaphthylene Range: 60 - 150 µg/kg
- Benzo(g,h,i)perylene Range: 130 - 2600 µg/kg
- Phenanthrene Range: 65 - 2600 µg/kg

It should be noted that Arsenic was most prevalent analyte detected above the regulatory limit of 1.6 mg/kg in soils. However, the USGS has also reported that naturally occurring Arsenic levels in Oklahoma soils typically range from 0 to 32 mg/kg. Additionally, mean soil metals background concentrations for Oklahoma as reported by the USEPA in Office of Solid Waste

and Emergency Response Directive 9285.7-55 (USEPA 2003) for Arsenic was reported at 7.0 mg/kg.

6.1 Recommendations

The following summarizes the recommendations based upon the findings of this investigation:

It is recommended that access to the Site be restricted (e.g. fencing or other type barrier) to prevent the unauthorized access and potential exposure to contaminated materials within the Site. Prior to any future development within the Site, confirmation sampling should be performed to validate the original detected exceedances and to identify the vertical and horizontal extent of contamination within the proposed area(s) of development. This will allow risk-based management for future on-site development.

7. REFERENCES

ALL Consulting (ALL). 2009. *Final Phase I Environmental Site Assessment, Fintube TBA, Tulsa, Oklahoma, September, 2009*

ALL Consulting (ALL). 2010. *Final Work Plan, Phase II Environmental Site Assessment, Fintube TBA, Tulsa, Oklahoma, April, 2010.*

Natural Resources Conservation Service (NRCS). 2000. *Soil Survey Supplement of Tulsa County, Oklahoma*.

Oklahoma Department of Environmental Quality. 2004. Site Cleanup Using Risk-Based Decision Making. Land Protection Division. April. http://www.deq.state.ok.us/lpdnew/FactSheets/RiskbasedDecisionGuidanceFinal.pdf

Oklahoma Department of Environmental Quality. 2009. Land: Risk-Based Cleanup Levels for Total Petroleum Hydrocarbons (TPH). Fact Sheet. May. http://www.deq.state.ok.us/factsheets/land/TPH.pdf.

U.S. Environmental Protection Agency (USEPA). 1996. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (SW-846) Update III.

USEPA 2003. Guidance for Developing Ecological Soil Screening Levels. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response Directive 9285.7-55. November 2003.

USEPA 2010. Generic Tables. USEPA Mid-Atlantic Risk Assessment. (updated May 27, 2010) http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm

TARGETED BROWNFIELDS ASSESSMENT
PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA) UPDATE

FINTUBE TBA
186 N. LANSING AVE.
CITY OF TULSA, TULSA COUNTY, OKLAHOMA

PREPARED FOR:

US Army Corps of Engineers – Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128-4813

ORIGINAL DATE OF REPORT
SEPTEMBER 28, 2009

DATE OF REVISION
JULY 12, 2011

PREPARED BY:

ALL Consulting
1718 SOUTH CHEYENNE AVENUE
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July 12, 2011

Mr. Frank Roepke
Environmental Project Manager
US Army Corps of Engineers – Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128-4213

REF: PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA) UPDATE
FINTUBE TBA
186 N. LANSING AVE.
CITY OF TULSA, TULSA COUNTY, OKLAHOMA

Dear Mr. Roepke:

Enclosed please find four (4) hard copies and four (4) electronic copies of the Phase I Environmental Site Assessment (ESA) Update performed on the above referenced site during June and July of 2011 by ALL Consulting (ALL).

The Phase I ESA has been performed to the best of our ability and interpretation in conformance with the scope and limitations of ASTM Practice E 1527-05 for the above referenced site.

We appreciate the opportunity to be of service and hope to assist you again in the future. If you have any questions concerning this report, please do not hesitate to contact me at (918)-382-7581.

Respectfully,

Charles B. McComas, P.E.
Project Manager

Enclosure

Phase I Environmental Site Assessment (ESA)

FINTUBE TBA
186 N. LANSING AVE.
CITY OF TULSA, TULSA COUNTY, OKLAHOMA

1.0 EXECUTIVE SUMMARY

The following is a brief synopsis of the findings based upon the involved research and the June 24, 2011 (Friday) site inspection performed by Mr. Charles McComas and Mr. Stuart Neiman of ALL Consulting (ALL).

1) The subject property, henceforth referred to as the "Site," is bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244 in the City of Tulsa, Tulsa County, Oklahoma. The Site is located northeast of downtown Tulsa, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The Site currently consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three north-south oriented buildings to the north and two east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four buildings oriented north-south and one smaller building to the southeast that is oriented east-west. Inspection of the Site began with a pedestrian perimeter inspection of the Site followed by a grid patterned search of the interior areas.

2) An interview was conducted with the property owner representative Mr. Ray Meldrum (Tulsa Development Authority (TDA)). Interviews were also conducted with former property owner representative Mr. Rusty Thrash (Region 2 Vice President, Evans Enterprises), Mr. David Giacomo (Tulsa Parking Authority (TPA)), Mr. Dale Johnson (ODEQ, Voluntary Cleanup Program (VCP)), Ms. Adrienne Russ (Tulsa Industrial Authority (TIA)), and adjacent property owner representative Mr. Sid Lee, (President, Lee Supply Co.).

3) According to information obtained from Mr. Ray Meldrum (TDA), there are no deed restrictions, environmental liens or any other Activity or Use Limitations (AULs) affecting the Site. According to information provided by Environmental Data Resources, Inc. (EDR), there are no deed restrictions, environmental liens, or other AULs affecting the Site.

FINDINGS:

ALL Consulting has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 on the Fintube Targeted Brownfields Assessment (TBA) Site, bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244 in the City of Tulsa, Tulsa County, Oklahoma. Any exceptions to or deletions from this practice are described in Section 4.3 of this report. Please review the following findings of the inspection.

A) Several areas within the Site contained chemicals such as motor oil, lubricant, paint, herbicides, and pesticides (see **Appendix D**, Photographs 9, 10, 12-15, 17, 22, 24, 25, 28, 31-35, 37-42, 45, 51, and 55). The Offices at the Evans Building Complex contain three (3) 1-gallon containers of evaporator/condenser cleaner, nine (9) 1-gallon bottles of acid-type

condenser cleaner, two (2) 1-gallon containers of refrigeration oil, nine (9) 8-ounce bottles of ice machine cleaner, two (2) 11-ounce containers of CFC Freeze, approximately fifty (50) 1-gallon paint cans, one (1) 5-gallon bucket of seam sealer, four (4) 1-gallon cans of solvent, three (3) 1-gallon containers of Goof Off, two (2) 1-gallon containers of water seal, two (2) 5-gallon buckets of water seal, one (1) 5-gallon bucket of paint, two (2) cases of herbicides, and seven (7) cases of motor oil (see **Appendix D**, Photographs 9, 12-14). The Maintenance Shop within the Evans Building Complex contained carburetor cleaner, fuel conditioner, motor oil, and brake fluid (see **Appendix D**, Photographs 16-17). An approximately 20"x5" stain was observed on the floor underneath the chemicals being stored at the Maintenance Shop. The Supply Room at the Evans Building Complex contained several spray paint cans and approximately fifteen (15) quarts of motor oil (see **Appendix D**, Photographs 22, 24, and 25).

B) Numerous 55-gallon drums without secondary containment were observed throughout the Evans Building and Fintube Building Complexes. A full 55-gallon drum, labeled "Shepler's Premium Release", was observed in the southeast portion of Building 4 at the Evans Building Complex (see **Appendix D**, Photograph 35). Five full 55-gallon drums, one of Shep Cure and four of "P" Prime, were located in the south portion of Building 3 of the Evans Building Complex (see **Appendix D**, Photographs 39 and 40). Minor staining was observed in relation to these drums. Four full 55-gallon drums, one of Spec Strip and three of Chem Trete 40 VOC, were observed on the northeast exterior of Building 4 of the Evans Building Complex (see **Appendix D**, Photograph 55). No staining was noted in relation to these drums. Fifteen full or partially full 55-gallon drums were observed on the southeast exterior of Building 5 of the Fintube Building Complex, with handwritten labels indicating waste oil, burn diesel, and mineral spirits (see **Appendix D**, Photograph 87). A small 3'x3' stain was observed near these drums, which is up-gradient to an open sump (see **Appendix D**, Photograph 88). Seventeen empty 55-gallon drums were observed stored along the west fence line on the south exterior portion of the Evans Building Complex (see **Appendix D**, Photograph 54). No staining was observed in relation to these drums.

C) Five 275-gallon totes of Pave Cure were observed, two partially full within and three empty on the south exterior of Building 3 of the Fintube Building Complex. None of the totes were within a secondary containment system. No evidence of leakage or spills was observed related to these totes.

D) Two (2) liquid applicators were observed within the Evans Building Complex during the site visit (see **Appendix D**, Photographs 15, 43, and 44). An empty 250-gallon herbicide sprayer was observed in both the Maintenance Shop and the west portion of Building 4. A second liquid applicator with a 250-gallon tank was observed also in the Evans Building Complex in the west-central area of Building 3 attached to a concrete cutter machine. The liquid is sprayed as a coolant for the diamond cutter and a lubricant to remove concrete pieces during the cutting process. No leakage or release of tank contents from either the herbicide sprayer or the concrete cutter beneath their respective tanks was observed.

E) Staining due to motor oil leaks and other unknown substances was observed throughout the interiors of both the Evans Building Complex and the Fintube Building Complex. Due to the impervious nature of the concrete flooring, staining on solid portions of the concrete floor presents a low potential for impact to the Site (see **Appendix D**, Photographs 19, 21, 25, 36, and 39). However, portions of the Site contained stains that were on or near cracks in the

concrete floor, trenches, or sumps, which could potentially allow the leaked substance to impact soils or groundwater at the Site (see **Appendix D**, Photograph 33).

Stains were also observed on the west end of Building 4 and 5 near several large electric motors (see **Appendix D**, Photograph 36). During the 2009 Phase I ESA, a large transformer was located in the vicinity of the 4'x5' stain in the western end of Building 5. This transformer was not observed during the 2011 site visit. Based on the historic use of polychlorinated biphenyls (PCB) oil in transformers, the staining located underneath the former pad-mounted transformer is potentially PCB oil. Several floor drains were also observed in the vicinity of the western portions of Buildings 4 and 5.

F) Throughout the interior and exterior of the Evans Building Complex and the Fintube Building Complex, multiple open trenches, pits, sumps, and floor drains were observed (see **Appendix D**, Photographs 33, 79, 89 and 90). The extent of staining throughout the Site suggests that leaking fluids may have potentially drained into these openings throughout the historic use of the Site. Review of the Phase I ESA conducted on the Fintube Building Complex in 2000 revealed the former presence of a large pit, of unknown size, that was used to collect water for hydro-testing in the southwest corner of the Fintube Building Complex. At the time of the previous assessment, this pit contained approximately one inch of hydrocarbon-containing fluid that appeared to be hydraulic fluid. The location of the former hydro-test pit was not identified during the site visit. Additionally, the 2000 Phase I ESA identified two (2) east-west oriented floor drains within the southern portion of the Fintube Building Complex, two (2) large north-south oriented floor drains within the mid-northern portion of the Fintube Building Complex, and one (1) large north-south oriented stormwater drain located immediately east of the central portion of the Fintube Building Complex. These drains identified in the 2000 Phase I ESA were not observed during the 2009 or 2011 site visits. These former and current floor level openings represent a potential open pathway to surface soils, subsurface soils, and groundwater.

G) Throughout Building 3 at the Evans Building Complex, wooden bricks being used as floor covering were observed to be saturated with a hydrocarbon substance and exhibited a hydrocarbon odor. The presence of hydrocarbons on the porous flooring has potentially resulted in hydrocarbon impact to surface and subsurface soils of the Site.

H) During the site visit, one (1) red 55-gallon drum was observed in Building 3 at the Evans Building Complex. The drum was partially filled and appeared to be in good condition. The label of "Red Diesel" is hand written on the drums. No staining that could be attributed to leakage from the drums was observed in the area.

I) Two (2) piles of railroad ties, approximately 5'x5' and 8'x5' were observed within the northern portion of Building 3 at the Evans Building Complex . Railroad ties are commonly treated with polycyclic aromatic hydrocarbons (PAHs), which are known to be carcinogenic.

J) Peeling paint was observed within the interior of the Fintube Building Complex and Evans Building Complex. A 2010 lead-based paint (LBP) inspection was conducted as a part of a previous Phase II ESA (ALL, 2010). Results of LBP sampling indicated the presence of LBP above the permissible level of 1.0 mg/cm^2 in both the Evans Building and Fintube Building Complexes.

K) Suspect asbestos containing material (ACM) was observed within the interior of the Fintube Building Complex and Evans Building Complex in the form of wall and pipe insulation. An ACM inspection was conducted as part of a Phase II ESA (ALL, 2010). The Phase II ESA report provides a listing of locations where ACM concentrations have been defined. Asbestos sampling was not conducted as a part of this Phase I ESA.

L) An approximately 500-gallon diesel above-ground storage tank (AST) was located 100 feet south of Building 5 at the Evans Building Complex (see **Appendix D**, Photograph 51). It is unknown how much diesel is currently contained within the AST. Secondary containment is prefabricated for the AST and no stains or signs of leaking were observed in the area.

M) Observations made at the time of the Site visit along with information obtained from the Sanborn Maps revealed that railroad spurs are located along the east and west sides of the Evans Building Complex and the Fintube Building Complex (see **Appendix D**, Photographs 60, 64, and 65). Several sets of railroad tracks are located on adjacent property west of the Site as well. Historic usage of the Site and adjacent property for railroad transportation has likely resulted in hydrocarbon and/or metals impact to surface and subsurface soils. Additionally, the customary practice of using a spray car to apply herbicides to rail lines and crossings may have led to surface and subsurface impact due to these chemicals.

N) A furnace and an empty approximately 5,000-gallon AST was observed west of Building 4 at the Fintube Building Complex (see **Appendix D**, Photograph 91).

O) The shell of a pole mounted transformer (PMT) located south of Building 3 at the Fintube Building Complex was observed lying on top of a concrete pad (see **Appendix D**, Photograph 84). An approximately 10'x15' stain was observed about two (2) feet south of the transformer and appeared to have travelled approximately thirty (30) feet to the west along a row of soil between two concrete pads (see **Appendix D**, Photograph 85). While the 2000 Phase I ESA stated that each of the four transformers had a "non-PCB" sticker, the Phase II ESA conducted by ALL identified this as being a source of PCB contamination (ALL, 2010).

P) Fluorescent lights were observed in the Offices and Maintenance Shop at the Evans Building Complex, and within the Locker Room and Break Room at the Fintube Building Complex (see **Appendix D**, Photograph 11). Sodium vapor lights were noted in Fintube Building 4. The fluorescent light and sodium vapor light bulbs are known to contain mercury vapors inside their tube and their ballasts have the potential to contain PCB liquids as a dielectric. During the 2000 Phase I ESA at the Fintube Building Complex, a fluorescent light ballast was observed to have overheated and leaked oil on the floor within the Locker Room. Based on recommendations made during the 2000 Phase I ESA, approximately 38 fluorescent light ballasts were replaced at the Fintube Building Complex. A mercury thermostat switch was observed in both the Locker Room and Break Room at the Fintube Building Complex (see **Appendix D**, Photograph 81). Fluorescent lights and ballasts, and mercury switches are classified as universal wastes for disposal purposes. The presence of these materials poses a threat for environmental impact to the Site.

Q) Review of the Sanborn maps for the Site revealed the past presence of an approximately 100'x100'concrete reservoir located approximately 30 feet north of Building 1 at the Fintube Building Complex. It is unknown what the reservoir may have previously contained, or if the

reservoir is still present within the Site. No indications of its presence were observed in the 2009 or 2011 inspections. If the reservoir was used to contain hazardous materials, the soils at the Site could have potentially been impacted during its use or in the process of burial or excavation of the reservoir.

R) A single PMT was observed with a "non-PCB" sticker located east of the Fintube Building Complex (see **Appendix D**, Photographs 56 and 57). Three "non-PCB" PMTs were observed within the Site, east of the Evans Building Complex (see **Appendix D**, Photographs 29 and 30). All of the PMTs appeared to be in good condition, and no soil staining was observed underneath them.

S) As mentioned in the 2000 Phase I ESA, a Limited Phase II ESA conducted in 1994 revealed the presence of 1,1-dichloroethene, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene, cadmium, and lead above regulatory limits in groundwater near the Fintube Building Complex. Additionally, total petroleum hydrocarbon (TPH)-diesel range organics (DRO) were discovered above regulatory limits in the soil at the Site. Based on the recommendations of the 1994 Limited Phase II ESA, Fabsco (the owner of the property at the time of the 1994 assessments) had their consultant supply the Phase II report to ODEQ for review under the Voluntary Cleanup Program (VCP). ODEQ reported that they did receive the 1994 Phase II ESA report on January 6, 1995, and returned the report to the consultant on January 25, 1995, after their review without comment. No further information regarding any site activities is found in ODEQ files (D. Johnson interview, 2011).

T) A search of regulatory records documentation and interviews with persons familiar with the Site has revealed that the Traband PCB Site (EPA ID: OKD987069449) was historically located at the Evans Building Complex. According to the EDR database report, the contamination was discovered on February 2, 1990. After cleanup was complete, the status of the Traband PCB Site was listed as No Further Remedial Actions Planned (NFRAP) on March 11, 1991.

U) Historic resources revealed that Bethlehem Steel Co. occupied the Evans and Fintube Building Complexes from approximately 1939 through 1962. The Bethlehem Steel Co. operated a foundry within the north end of Building 3 at the Evans Building Complex and a forge at the north end of Building 4 at the Fintube Building Complex, both of which consisted of earthen floors. The use of the Site for foundry and forging operations has potentially resulted in hydrocarbons and/or metals impact to surface soils in the area.

V) Bankoff Scrap Metals previously operated within the Site. The historical presence of a scrap metal business presents the potential for metals impacts to the soil within the Site.

W) Storey Wrecker Service previously used the Site as a storage lot for vehicles. The historic presence of wrecked vehicles suggests the potential for soil impacts due to the potential for releases from leaking engine oil, gasoline, and other automobile fluids.

X) Review of the 1939 Sanborn Map depicts the former presence of the following gasoline and fuel oil storage tanks located up-gradient to or within the Site:

- A former Filling Station is depicted off-Site, approximately 750 feet east of the southern end of Building 3 at the Fintube Building Complex and contained one

gasoline tank of unknown size.

- A former Filling Station is depicted off-Site, approximately 700 feet east of the southern end of Building 3 at the Fintube Building Complex and contained three gasoline tanks of unknown size.
- A former gasoline tank of unknown size is depicted off-site, approximately 700 feet southeast of the Building 4 at the Evans Building Complex.
- A former gasoline tank of unknown size is depicted on adjacent property approximately 100 feet of the Southwest corner of the Site.
- A former 15,000-gallon fuel oil tank is depicted was located on-Site, approximately 20 feet south of the east edge of Building 4 at the Fintube Building Complex.
- A former fuel oil tank of unknown size is depicted on-Site, approximately 100 feet east of the central portion of Building 3 at the Evans Building Complex.
- A former oil tank of unknown size is depicted on-site, approximately 100 feet east of the southern portion of Building 3 at the Evans Building Complex.

Although no visual or documented evidence of contamination due to these tanks has been discovered, the lack of environmental regulations and controls in place during the existence of these tanks makes the potential for unreported spills an environmental concern to the Site.

Y) Review of the 1939 and 1962 Sanborn Maps revealed the former presence of the Big Four Foundry located 400 feet west of the southwest portion of the Site. The Big Four Foundry was a manufacturer of iron castings. Due to the potential for airborne deposition of metals onto the soil of the Site, this property is considered an environmental concern to the Site.

Z) A Phase I ESA was conducted for the Site in 2009 (ALL, 2009) and identified the following possible environmental concerns at the Site: presence of stained wooden bricks; historic railroad operations; staining in the vicinity of open pits, sumps, and floor drains; presence of five (5) 55-gallon drums of xylene and other unidentified materials; piles of potentially metal impacted fill material; furnace refractory material; lead-acid battery in a drainage ditch; leaking transformer and electric motors; presence of hazardous materials in a dumpster; former usage of the Site for Bethlehem Steel Works, Bankoff Scrap Metals, and Storey Wrecker Storage Lot, and Big Four Foundry; and the former presence of fuel storage tanks throughout the Site. Most of these are also discussed above.

AA) A Phase II ESA was conducted for the Site in 2010 (ALL, 2010) to determine if the potential environmental concerns identified in the 2009 Phase I ESA had adversely impacted the Site.

- Semi-volatile organic compounds (SVOCs) exceeded their screening levels in twelve (12) surface soil samples and three (3) subsurface soil samples. Arsenic exceeded its screening level in seventy-eight (78) surface soil samples and thirteen (13) subsurface soil samples. DROs exceeded their screening levels in nine (9) surface soil samples. Lube oil range organics exceeded their screening levels in seven (7) surface soil samples. PCBs exceeded their screening levels in one (1) surface soil sample and one (1) subsurface soil sample. Volatile organic compounds (VOCs) exceeded their screening levels in three (3) groundwater samples.

- Results of ACM sampling indicate the presence of approximately ten (10) linear feet

and ten (10) square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of Fintube main building, and approximately thirty four (34) linear feet of asbestos containing thermal system pipe insulation located in the main warehouse of Evans Building Complex are considered to be Regulated ACM.

- Results of LBP sampling indicated the presence of LBP above the permissible level of 1.0 mg/cm^2 in both the Evans Building Complex and Fintube Building Complex.

- An other regulated material (ORM) inspection revealed the presence of fluorescent lights and ballasts in both the Evans Building Complex and Fintube Building Complex, and mercury switches in the Fintube Building complex.

RECOMMENDATIONS:

The Phase II ESA investigation conducted by ALL in 2010 (ALL, 2010) generated environmental soil and groundwater data that confirmed localized areas of concentrations of both metals and chemical that exceed their respective definition of adverse impact at both the Evans Building Complex and the Fintube Building Complexes. Although metals and chemical impacts to soils and groundwater were detected, surface soil sampling was based on a grid pattern and only discrete sampling points were defined within that grid. The borehole placement for subsurface soils and groundwater sampling was determined by historic and observed concerns identified in the prior Phase I ESA (ALL, 2009). Some of those concerns have been removed from this report based on the findings of the Phase II ESA, and others because the source of concern is no longer present. Prior to any future development within the Site, it is recommended that confirmation sampling should be performed to validate the original detected exceedances and to identify the vertical and horizontal extent of contamination within the proposed area(s) of development. This will allow risk-based management for future on-site development.

Based on information obtained during the site visit conducted on June 24, 2011 (Friday), as well as information obtained through historical records review and interviews, this assessment has identified eight (8) Recognized Environmental Conditions, one (1) Historical Recognized Environmental Conditions, two (2) Business Environmental Risks, and five (5) Other Environmental Findings. The environmental findings within each category are summarized below.

Recognized Environmental Conditions (RECs)

1. ***Stained Wooden Bricks.*** The presence of hydrocarbons on the porous wood brick flooring has potentially resulted in hydrocarbon impact to surface and subsurface soils of the Site. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that the wooden bricks be removed from the Site to prevent further hydrocarbon impacts related to their continued presence and that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

2. ***Railroad Operations.*** Historic usage of the Site and adjacent property for railroad transportation has potentially resulted in hydrocarbon impact to surface. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils

collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

3. ***Staining in Proximity to Open Trenches, Pits, Sumps, and Floor Drains.*** Due to the staining observed during the site visit and past usage of the site including the handling of metals and hydrocarbons, these potentially open pathways to soil and groundwater present an environmental threat to the Site. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

4. ***Piles of Fill Material.*** Due to the potential for leaching of metals to surface and subsurface soils, the piles of fill material along the western border of the Evens Building Complex are considered a threat to Site. It is recommended that the fill material be removed from the Site. Sampling may be required for proper characterization and disposal during the removal of these materials.

5. ***Leaking Transformer (Removed) and Electric Motors.*** The former presence of a leaking transformer and continued presence of electric motors in the vicinity of floor drains have resulted in PCB and hydrocarbon impacts to surface soils at the Site. It is recommended that the remaining electric motors and related equipment be removed from the Site and the spilled fluids be remediated with confirmatory sampling conducted following the remedial effort.

6. ***Bethlehem Steel Works.*** Past usage of the Site for foundry and forging operations has potentially resulted in hydrocarbons and/or metals impact to surface soils at the Site. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

7. ***Storey Wrecker Storage Lot.*** The past presence of wrecked vehicles within the Site suggests the potential for impacts due to leaking engine oil, gasoline, and other automobile fluids. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

8. ***Vandalized PMT.*** Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of PCB in surface soils collected from this area that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

Historical Recognized Environmental Conditions (HRECs)

1. ***Traband PCB Site.*** The past PCB spill west of Building 1 at the Evans Building Complex resulted in PCB contamination to the Site. After remediation of the contamination, the PCB levels at the Site were below applicable standards and the EPA determined that no further remedial actions were necessary at the Site; therefore, no additional assessment was recommended in relation to the former PCB Spill.

Business Environmental Risks (BERs)

1. ***LBP.*** A LBP inspection conducted as part of the 2010 Phase II ESA confirmed that LBP is present within the Fintube Building Complex and Evans Building Complex within the Site.
2. ***ACM.*** An ACM inspection conducted as part of the 2010 Phase II ESA confirmed that ACM is present within the interior of the Fintube Building Complex and Evans Building Complex in the form of wall and pipe insulation.

Other Environmental Findings

1. ***Heavy Equipment and Vehicle Storage.*** The presence of heavy equipment and trucks being parked within the Site has potentially impacted the Site due to oil leaks. It is recommended that the equipment and trucks be removed from the Site, and any identified areas of stained soil be remediated.
2. ***Empty 55-Gallon Drums.*** Due to the lack of secondary containment, the empty 55-gallon drums located throughout the Site are considered an environmental threat. It is recommended that the drums be removed from the Site and that any related spilled substances be remediated
3. ***Fluorescent Lights and Mercury Switches.*** The presence of mercury in the switch and fluorescent light bulbs and the potential presence of PCB oil in light ballasts pose a potential threat for environmental impact to the Site. It is recommended that any PCB oil containing ballasts be removed from the Site. Additionally, any damaged fluorescent light bulbs or mercury switches should be removed from the Site.
4. ***Chemical Storage Areas.*** The presence of stains associated with chemical storage in the Maintenance Shop presents an environmental threat to the Site if managed improperly. It is recommended that chemicals be placed on impervious surfaces, or within a secondary containment system to minimize spills or overflows.
5. ***Railroad Ties.*** Since railroad ties are commonly treated with PAHs, the presence of railroad ties poses a threat of environmental impact to the Site. It is recommended that the railroad ties be placed on impermeable materials within Building 4 of the Evans Building Complex.

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Figures

Appendices

2.0 CERTIFICATION

I certify under penalty of law as an Environmental Professional that this document, including the Site reconnaissance, interviews, historical review, and all attachments have been conducted and prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my professional judgment this document has been prepared and the investigation performed to the best of our ability and interpretation in accordance with the scope and limitations of ASTM Practice E 1527-05 and the information compiled is to the best of my knowledge and belief, true, accurate, and complete.

I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professional, as defined in Section 312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of this subject property. I have developed and performed the "all appropriate inquiries" in conformance with the standards and practices set forth in 40 CFR Part 312.

The information submitted describes the environmental conditions at the Fintube TBA Site, bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244 in the City of Tulsa, Tulsa County, Oklahoma. The findings represent the Site conditions as observed on the day of inspection (June 24, 2011). In accordance with ASTM Practice E 1527-05, the Phase I ESA report must be updated after one year to remain valid and the interviews, searches, and inspection portions of the Phase I ESA are only valid for 180 days.

Charles B. McComas, P.E. OK21526
Chemical / Environmental Engineer
ALL Consulting
July 12, 2011

Relevant individual and corporate qualification summaries are shown in Section 16.

3.0 PRIMARY LIST OF ACRONYMS

ACRONYMS

ACM	Asbestos Containing Material
ALL	ALL Consulting
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity and Use Limitations
BER	Business Environmental Risk
CDL	Clandestine Drug Lab
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Act Information System
CFR	Code of Federal Regulations
CORRACTS	Facilities subject to Corrective Action under RCRA
DOD	Department of Defense
DRO	Diesel-Range Organics
EDR	Environmental Data Resources
EPA	Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FINDS	EPA Facility Index System
FIRM	Flood Insurance Rate Map
FUDS	Formerly Used Defense Sites
GRO	Gasoline-Range Organics
HREC	Historical Recognized Environmental Condition
LBP	Lead Based Paint
LLP	Landowner Liability Protection
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MK&O	Missouri, Kansas, and Oklahoma
MK&T	Missouri, Kansas, and Texas
m/l	More or Less
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
NFRAP	No Further Remedial Action Planned
NPL	National Priorities List
ODEQ	Oklahoma Department of Environmental Quality
OCC	Oklahoma Corporation Commission
ORM	Other Regulated Materials
PMT	Pole Mounted Transformer
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
RACM	Regulated Asbestos Containing Material
RCA	Regulatory Compliance Audit
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Act (RCRA) Information System
REC	Recognized Environmental Condition
ROD	Record of Decision
RSL	Regional Screening Levels
SQG	Small Quantity Generator
SVOC	Semi-volatile Organic Compound
TBA	Targeted Brownfields Assessment
TDA	Tulsa Development Authority
TIA	Tulsa Industrial Authority
TPH	Total Petroleum Hydrocarbons
TSD	Treatment, Storage, Disposal facility
USGS	United States Geological Survey
USACE	United States Army Corps of Engineers
UST	Underground Storage Tank
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound

4.0 INTRODUCTION

4.1. PURPOSE

In general, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), which is also referenced as Superfund, provides a means for certain purchasers of real property to potentially defend themselves from CERCLA liability associated with pre-acquisition contamination (hazardous substances and petroleum products) present on the property to be purchased by meeting the requirements of either of the following:

- "innocent landowner defense"
- "contiguous property owners"
- "bona fide prospective purchaser"

Among many other things, such landowner liability protections (LLP) require the purchaser to make "all appropriate inquiry" into previous ownership and uses of the subject property. To date, the standard practice for meeting the requirements of "all appropriate inquiry" is the performance of a Phase I Environmental Site Assessment (ESA) in accordance with American Society for Testing and Materials (ASTM) E 1527-05 protocols and in compliance with the requirements of the Small Business Liability Relief & Revitalization Act (Federal Brownfields Law) and 40 CFR Part 312. This document is not intended to address whether the requirements beyond "All Appropriate Inquiry" or legal obligations with regard to hazardous substances or petroleum products have been met. Only practically reviewable information that yielded reasonably ascertainable data relevant to the Site was evaluated.

The purpose of this Phase I environmental site assessment (ESA) is to identify, to the extent feasible pursuant to the process described herein, recognized environmental conditions (RECs), historical recognized environmental conditions (HRECs), and business environmental risks (BERs) in relation to the subject site. This Phase I ESA is based upon a visual inspection of current surface conditions. An asbestos inspection, lead-based paint inspection, or sub-surface soil borings/ environmental sampling were not conducted within the described scope of work. The Site inspection did not include an evaluation of the structural integrity of the buildings located within the Site. ALL Consulting (ALL) assumes no liability and makes no judgment concerning the Site's subsurface condition based upon the compiled Phase I ESA information and Site inspection findings.

Investigative procedures included a Site study and records review of records and/or interviews with local, State, and Federal government agency representatives. Data reported are based on these records and a site visit/inspection. In addition, ALL relied on interviews from the previous and current occupants of the Site, and other pertinent individuals. Environmental Data Resources, Inc. (EDR) provided additional information regarding regulatory records. ALL has assumed that the information provided by the above personnel and companies is true and correct. If the information provided is discovered to be incorrect, our conclusions and recommendations may not be valid. Findings are applicable to the date of June 24, 2011 (Friday).

This document has been prepared for US Army Corps of Engineers (USACE) - Tulsa District at the request of Mr. John Lambert (Chief, HTRW Design Center – US Army Corps of Engineers – Tulsa District) for use by the Tulsa Industrial Authority (TIA). This project was funded by U.S. Environmental Protection Agency (EPA) Region 6 and was tasked by EPA to USACE Tulsa District in response to a request from the TIA for an ESA through the EPA Targeted Brownfields Assessment (TBA) program. This document is intended to greatly reduce, but not eliminate, speculation and uncertainty pertaining to the potential for recognized environmental degradation on the subject property. This document was prepared for the benefit of the above listed entities and may not be utilized by any other person or entity without their written consent or the approved written consent of ALL. The purpose of this report is to assess, to the extent feasible, the potential for environmental impact or impairment on this Site due to previous land use, site activity or adjacent off-site activity. This project was initiated on June 24, 2011.

4.2. SCOPE-OF-SERVICES

A Phase I ESA inspection was performed on June 24, 2011 (Friday) for the subject site. The Fintube TBA Site is described as being bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244, and as occupying a portion of the southwest quarter of the southeast quarter of Section 36, Township 20 North, Range 12 East, of the Indian Meridian.

The Phase I ESA included the following tasks:

1) Site visit including a visual and physical inspection of the subject site.

2) Interview with Site representatives.

3) Visual and physical observation of the adjacent property condition and land use.

4) Inspection for air and water monitoring devices.

5) Determination of Site drainage and drainage controls.

6) Review of Oklahoma Department of Environmental Quality (ODEQ), Oklahoma Corporation Commission (OCC), Tulsa County Health Department, and EPA records, as well as local government, and tribal records.

7) Review of topographic maps, soil maps, geologic maps, and radon maps.

8) Historical records review (aerial photographs, historic topographic maps, Sanborn maps, city directories, and Tulsa County Assessor documents).

4.3. EXCEPTIONS AND/OR DELETIONS TO ASTM E 1527-05

There were no exceptions to ASTM E 1527-05.

4.4. NON-SCOPE ISSUES

Certain issues are beyond the scope of the Phase I ESA relative to ASTM E-1527-05. Those issues, which were not performed as part of this Phase I ESA include:

- Asbestos-Containing Building Materials
- Biological Agents
- Cultural and Historical Resources
- Ecological Resources
- Endangered Species
- Health and Safety
- Indoor Air Quality
- Industrial Hygiene
- Lead-Based Paint
- Lead in Drinking Water
- Mold
- Radon
- Regulatory Compliance
- Wetlands

5.0 SITE DESCRIPTION

5.1. LOCATION AND LEGAL DESCRIPTION

The Site is located northeast of downtown Tulsa, Tulsa County, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The latitude and longitude coordinates for the Site are 36.1629; (36° 9' 46.4"N) and -95.9813; (95° 58' 52.7" W) (NAD83/WGS84).

The Site is described as occupying portions of the Northwest Quarter of the Northeast Quarter of Section One (1), Township Nineteen (19) North, Range Twelve (12) East of the Indian Meridian, and portions of the of the Southwest Quarter of the Southeast Quarter of Section Thirty-Six (36), Township Twenty (20) North, Range Twelve (12) East of the Indian Meridian all in Tulsa County, Oklahoma. The full legal description is contained within **Appendix A**.

Figure 1 presents a topographic map of the Site. Figure 2-A is a general layout of the Site and adjoining properties.

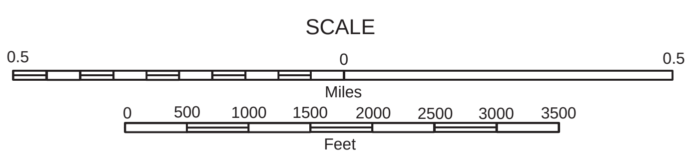
5.2. SITE AND VICINITY CHARACTERISTICS

The Site is located northeast of downtown Tulsa, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The Site is bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244.

5.3. CURRENT USE OF THE SITE

Currently, the Site is being used as a staging area for the construction occurring on west bound Highway 244. Manhattan Road and Bridge and Sherman Construction are using the Site to store supplies such as lumber and sand, and vehicles such as dump trucks and heavy machinery. Additionally, Evans Enterprises still stores equipment within the southernmost building of the Evans Building Complex.

TARGET QUAD
NAME: Tulsa, OK
MAP YEAR: 1979
SERIES: 7.5
SCALE: 1:24,000



SITE NAME: FINTUBE TBA
ADDRESS: 186 N. LANSING ST.
TULSA, OK 74120
LAT/LONG: 36.1697/-95.9844

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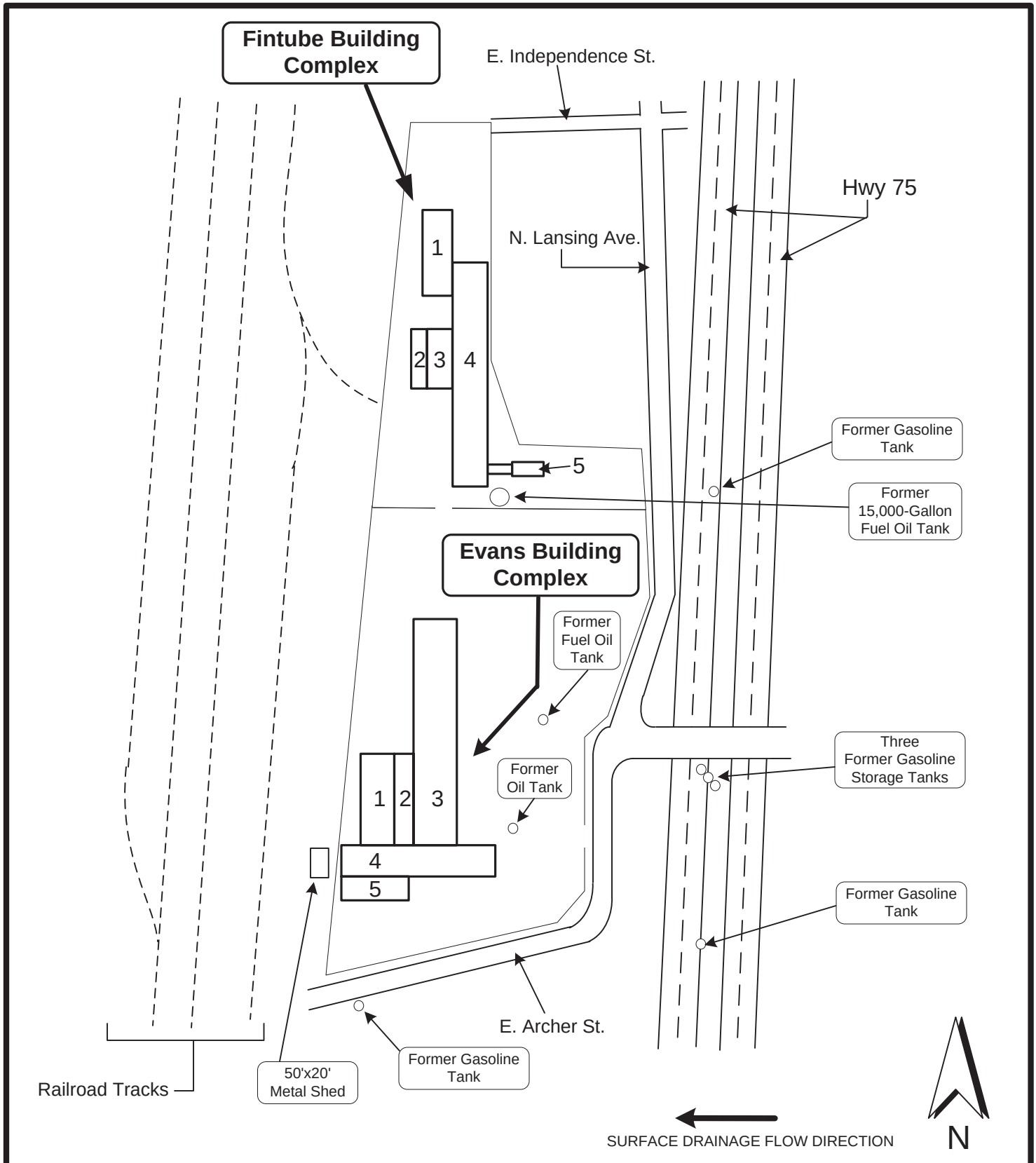
TOPOGRAPHIC MAP		
FINTUBE TBA TULSA, OKLAHOMA		
SCALE: 1:24000	DATE: 07/05/2011	FIGURE NO. Figure 1
APPROVED BY: CBM	DRAWN BY: NDA	PROJECT NO. 1303.PHI.00



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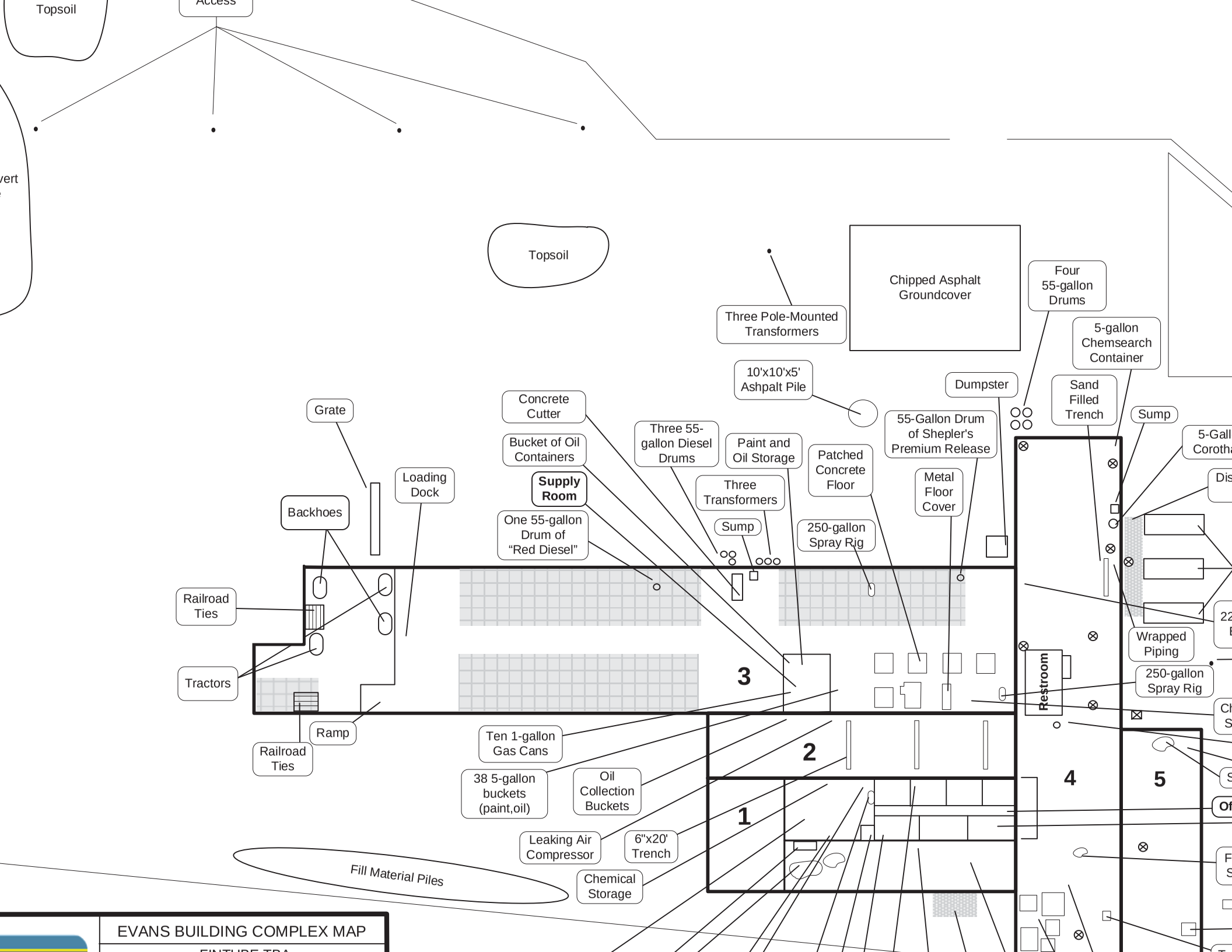
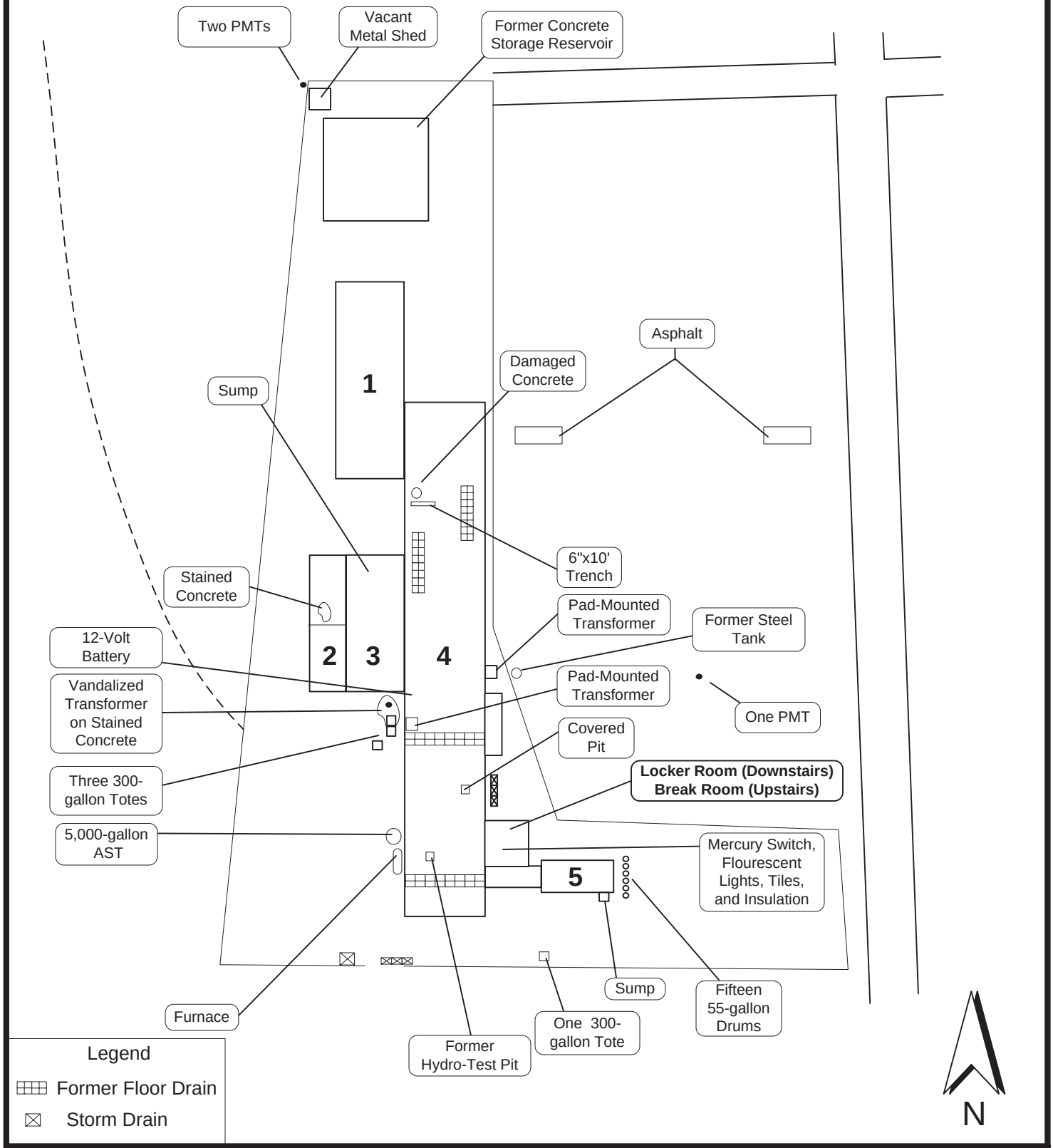
SITE LAYOUT MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
AS SHOWN	07/05/2011	Figure 2-A
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.PHI.00


Topsoil
Access
Topsoil
Three Pole-Mounted Transformers
Chipped Asphalt Groundcover
Four 55-gallon Drums
5-gallon Chemsearch Container
10'x10'x5' Ashpalt Pile
Dumpster
Sand Filled Trench
Sump
Grate
Concrete Cutter
Three 55-gallon Diesel Drums
Paint and Oil Storage
Patched Concrete Floor
55-Gallon Drum of Shepler's Premium Release
Bucket of Oil Containers
Loading Dock
Supply Room
Three Transformers
Metal Floor Cover
Backhoes
One 55-gallon Drum of "Red Diesel"
Sump
250-gallon Spray Rig
Railroad Ties
Wrapped Piping
Tractors
3
Restroom
250-gallon Spray Rig
Ramp
Railroad Ties
Ten 1-gallon Gas Cans
2
4
5
38 5-gallon buckets (paint,oil)
Oil Collection Buckets
1
Leaking Air Compressor
6"x20' Trench
Fill Material Piles
Chemical Storage
EVANS BUILDING COMPLEX MAP



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FINTUBE BUILDING COMPLEX MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
AS SHOWN	07/05/2011	Figure 2-C
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.PHI.00

5.4. Road, Structures, and Other Improvement Descriptions

The Site currently consists of two building complexes and two vacant lots (Figure 2-A). The southern complex (Figure 2-B), identified as the Evans Building Complex, consists of three (3) north-south oriented buildings to the north connected to two (2) east-west oriented buildings to the south. The northern complex (Figure 2-C), identified as the Fintube Building Complex, consists of four (4) north-south oriented buildings connected to one (1) smaller building to the southeast that is oriented east-west. An empty, 20'x20', open faced, metal shed is located in the far northwest corner of the Site.

Access is available to the Site via N. Lansing Ave. to the east.

5.5. Current Uses of Adjoining Properties

Mr. McComas and Mr. Neiman visually inspected the adjoining properties from the subject site property lines and additional vantage points via the adjacent streets. The following table summarizes the adjacent properties:

Direction	Property Name	Property Usage	Gradient
North	Pipe Storage Yard (Lee Supply Co.)	Commercial	Cross Gradient
South	E. Archer St. and Highway 244	Roadway Easement	Up Gradient
East	N. Lansing Ave. and Highway 75	Roadway Easement	Up Gradient
West	Railroad Tracks and Abandoned Building	Railroad Easement / Vacant Building	Down Gradient

6.0 USER PROVIDED INFORMATION

In order to qualify for one of the Landowner Liability Protections offered by the Small Liability Relief and Brownfields Revitalization Act of 2001, the user (Tulsa Development Authority) has provided the following available information:

1. Environmental cleanup liens that are filed or recorded against the Site.

   - There are no recorded environmental liens in place for the Site.

2. Activity and land use limitations that are in place on the Site or that have been filed or recorded in a registry.

   - The Site is not subject to any activity and use limitations (AULs).

3. Specialized knowledge or experience of the person seeking to qualify for the LLP.

   - The Tulsa Development Authority is the managing entity for the Site.

4. Relationship of the purchase price to the fair market value of the property if it were not contaminated.

   - No information on purchase price to fair market value was provided.

5. Commonly known or reasonably ascertainable information about the property.

   -The Site is also the location of the "Treban PCB Site". Information regarding the PCB contamination and its NFRAP status can be found in **Section 14**.

6. The degree of obviousness of the presence or likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation.

   -The Site is listed in several regulatory records databases. See **Section 12** for details of the regulatory records search.

Appendix B provides a copy of the completed User Questionnaire Form.

7.0 SITE RECONNAISSANCE

7.1. METHODOLOGY

A Site inspection was conducted on June 24, 2011, (Friday) by Mr. Charles McComas, and Mr. Stuart Neiman of ALL. The subject site was inspected by the following:

- Walking the perimeter and interior of the Site.
- Visually inspecting the exterior and interior of the buildings within the Site.

The Topographic Map (Figure 1) shows the general Site location and topographic relief. Figures 2-B and 2-C indicate the approximate locations of the features referenced in the following subsections for the Evans Building Complex and the Fintube Building Complex, respectively. The Site Inspection Form is provided in **Appendix C**. The Site Photographs are provided in **Appendix D**.

7.2. SITE SETTING

The Site is located northeast of downtown Tulsa, Oklahoma, within an area consisting of industrial, commercial, and residential properties. The Site is bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244.

7.3. EXTERIOR OBSERVATIONS

The Site currently consists of two building complexes and two vacant lots. The southern complex, identified as the Evans Building Complex, consists of three (3) north-south oriented buildings to the north connected to two (2) east-west oriented buildings to the south. The northern complex, identified as the Fintube Building Complex, consists of four (4) north-south oriented buildings connected to one (1) smaller building to the southeast that is oriented east-west. A detailed description of the observations from the site visit follows:

During the 2009 Phase I site investigation, ALL observed heavy equipment, including trucks and cranes, southeast of Building 4 on the Evans Building Complex. This portion of the Site was being used as a staging area for nearby highway construction and ALL had observed no signs of staining in the areas of heavy equipment storage that would be considered above de minimis (ALL, 2009). Observations of the area during this Update Phase I found the equipment is no longer stored and had been removed from this area. Observations of the soils within the same area are consistent with descriptions provided in the 2009 Phase I Report.

An approximately 500-gallon diesel "red" fuel oil above-ground storage tank (AST) was located about 100 feet south of Building 5 at the Evans Building Complex (see **Appendix D**, Photograph 51). It is unknown how much diesel is currently contained within the AST. The AST is constructed with its own secondary containment system attached and no stains or signs of leaking were observed in the area.

Several sets of former railroad spurs were observed within the Site west of both the Fintube and

Evans Building Complex (see **Appendix D**, Photograph 60, 61, 64-67, 69 and 78). Several sets of railroad tracks were also observed on adjacent property west of the Site.

Three (3) piles of topsoil, the largest about 50'x50'x6', were observed along access roads and open areas in the northeastern portion of the Evans Building Complex (see **Appendix D**, Photographs 62 and 63). According to John Pool, Assistant Project Manager for Manhattan Road & Bridge, the piles are being stored and will be used on another construction site that is not on the subject site.

Neat and orderly small piles of railroad ties, metal, pieces of wood and other materials were observed in the former railroad spur area west of Building 3 in the Evans Building complex (see **Appendix D**, Photograph 54). Formed galvanized steel pieces were observed to be neatly stacked on the former loading dock immediately north of Building 3 on the Evans Building complex waiting for shipment to their final destination at another construction site.

Four (4) manhole covers for a sewage line were observed within the Site in the empty field east of the Evans Building Complex (see **Appendix D**, Photograph 72).

The shell of a vandalized pole-mounted transformer located south of Building 3 at the Fintube Building Complex was observed lying on top of a concrete pad (see **Appendix D**, Photograph 84). An approximately 10'x15' stain was observed approximately two (2) feet south of the transformer and appeared to have travelled approximately thirty (30) feet to the west along a row of soil between two concrete pads. The stain was caused by leaking oil containing polychlorinated biphenyls (PCBs) (see **Appendix D**, Photograph 85) as determined through sampling conducted by ALL in the 2010 Phase II ESA (ALL 2010).

The exterior portions of the Fintube Complex contained three empty 275-gallon chemical totes on the west and fifteen 55–gallon drums on the southeast with hand written labels indicating waste oil, burn oil, and mineral spirits (See **Appendix D**, Photographs 83, 84, and 87).

Two sets of three (3) pole-mounted transformers (PMTs) were observed with "non-PCB" stickers during this investigation: a) on-site, east and south of the Evans Building Complex, and; b) off-site, at the central portion of the adjacent vacant lot located northeast of the Fintube Building Complex site (see **Appendix D**, Photographs 56, 57, and 86). All of the PMTs appeared to be in good condition, and no soil staining was observed underneath them.

7.4. INTERIOR OBSERVATIONS

The following observations of the interior of the Evans Building Complex and the Fintube Building Complex were made during the site visit:

Several areas within the Site contained chemicals such as motor oil, lubricants, paints, insulation and other maintenance chemicals related to construction activities and/or office equipment (see **Appendix D**, Photographs 12-14, 17, 21, 22, 24, 25, 27, 28, 31-35, 38-42, 45, 55, 87, and 88). The Offices at the Evans Building Complex contain about 100 fluorescent light bulbs, three (3) 1-gallon containers of evaporator/condenser cleaner, approximately twenty-five (25) 1-gallon paint cans, two (2) 1-gallon cans of solvent, two (2) 1-gallon containers of Goof Off, two (2) 1-gallon containers of

water seal, two (2) 5-gallon buckets of water seal, one (1) 5-gallon bucket of paint, and five (5) cases of motor oil (see **Appendix D**, Photographs 8-14).

The Maintenance Shop within the Evans Building Complex contained carburetor cleaner, fuel conditioner, motor oil, and brake fluid (see **Appendix D**, Photographs 15-17). An oil stain, triangular in shape and about 6 feet on the sides and 3 feet on its bottom, was observed within a concrete depression in the Maintenance Shop (see **Appendix D**, Photograph 18). The Supply Room at the Evans Building Complex contained several spray cans of paints, oils, and lubricants and several different sized cans and containers of motor oil (see Appendix D, photographs 21, 22, 24, and 25).

Staining due to isolated instances of leaking oil and other unknown substances was observed throughout the interiors of both the Evans Building Complex and the Fintube Building Complex. Due to the impervious nature of the concrete flooring, staining on solid portions of the concrete floor presents a low potential for impact to the Site (see **Appendix D**, Photographs 19, 21, 25, 33, 35, 36, 37, and 38). However, several portions of the Site contained stains that were on , near, or adjacent to floor cracks or floor pads pours in the concrete floor, which could potentially allow the leaked substance to impact soils or groundwater from downward migration at the Site (see **Appendix D**, Photographs 19, 21, 25, 33, 35, 36, 37, and 38).

Stains were observed near a former large transformer location and several large electric motors on the west end of Buildings 4 and 5 at the Evans Building Complex. According to ALL's previous Phase I ESA Report (2009), Evans Enterprises formerly stored several 3,500 horsepower motors in the northwest corner of Building 4. At the time of the site visit for this Update Phase I ESA, some of the motors had been removed but the staining was still observed on the floor (see **Appendix D**, Photograph 36). An oily stain on the floor was observed in the southwest corner of Building 5 at the Evans Building Complex. The staining is located near a former pad mounted transformer that potentially contained PCB oil. Several floor drains were observed in the vicinity of the transformer and motors in the western portions of Buildings 4 and 5.

Throughout the interior and exterior of the Evans Building Complex and the Fintube Building Complex, multiple open trenches, pits, sumps, and floor drains were observed (see **Appendix D**, Photographs 33, 37, 79, 89, and 90).

Throughout Building 3 at the Evans Building Complex, wooden bricks being used as floor covering within working areas that were defined by large areas enclosed by concrete. The wooden blocks were observed to be saturated with a dark hydrocarbon substance and exhibited a hydrocarbon odor similar to that of creosote. The condition of the wooden blocks appeared to be in good to excellent condition, but the subsurface materials beneath the wooden blocks appeared to have been disturbed from heavy equipment installed within the enclosed areas and the wooden floors exhibited significant peaks and valleys from heaving and overloading the subsurface materials.

Two (2) piles of railroad ties, approximately 5'x5' and 8'x5' were observed within the northern portion of Building 3 at the Evans Building Complex.

Peeling paint was observed within the interior of the Fintube Building Complex and Evans Building Complex. A recent Phase II ESA investigation confirmed the presence of Lead Based Paint (LBP) and recommended additional activities as a result of those findings (ALL, 2010). As a result of the LBP findings, this Phase I ESA defers to the recommendations in the previous Phase II ESA report.

Suspect asbestos containing material (ACM) was observed within the interiors of the Fintube Building Complex and Evans Building Complex in the form of wall and pipe insulation. Due to the age of the structures, the potential exists that the insulation observed within the Site is ACM. Asbestos sampling was not conducted as a part of this Phase I ESA. However, as with the LBP, a recent ACM Assessment as part of the Phase II ESA investigation revealed the presence of regulated asbestos containing materials within the subject properties (ALL, 2010). As a result, this Phase I ESA defers to the recommendations in the previous ACM report regarding any subsequent activities associated that may disturb identified ACM (ALL, 2010).

Fluorescent lights were observed in the Offices at the Evans Building Complex, and within the Locker Room and Break Room at the Fintube Building Complex. The fluorescent light bulbs contain mercury vapors inside the tube, and the fluorescent light fixture ballasts potentially contain PCB oils. A mercury thermostat switch was observed in both the Locker Room and Break Room at the Fintube Building Complex. Also, sodium vapor lamps were observed within both the Evans Building complex and Fintube complex. Sodium vapor lamps also contain mercury (see **Appendix D**, Photographs 8, 14, and 80, 81).

Two (2) liquid applicators were observed within the Evans Building Complex during the site visit (see **Appendix D**, Photographs 15 and 44). An empty 250-gallon herbicide sprayer was observed in the Maintenance Shop. The second liquid applicator is a concrete cutter with a tank sprayer attachment for road applications.

The Site's utilities are provided by the following:

Utility	Utility Company
Potable Water	City of Tulsa
Natural Gas	Oklahoma Natural Gas
Electricity	Public Service Company of Oklahoma
Trash	City of Tulsa
Sewer	City of Tulsa

Site Characteristics

7.5. TOPOGRAPHY

According to the USGS 7.5-Minute Topographic Map, Tulsa Quadrangle, the subject property is located in a relatively flat area, gently sloping northwest. The Site elevation is approximately 730 feet above Mean Sea Level (MSL). Figure 1 is a topographic map of the Site and surrounding area.

7.6. FLOOD PLAIN INFORMATION

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 40143C0365H for Tulsa County, Oklahoma, indicates that the Site is mapped in Zone X (areas outside100-year and 500-year floodplains). Zone X corresponds to areas outside the 1-percent annual chance floodplain, areas of 1 percent annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1 percent annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1 percent annual chance flood by levees. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones on FEMA FIRM panels.

According to the EDR overview map, the Site is not located within a 100-Year or 500-Year floodplain. No visual evidence of recent flooding or prolonged surface water retention was observed on-site during the inspection. Figure 3 is a Flood Map for the area.

7.7. SOIL

According to the United States Department of Agriculture - Natural Resources Conservation Service Soil Map the soil at the Site consists mostly of Urban Land. Urban Land typically has 0 to 8% slopes, a very high runoff rate, and is not typically subject to flooding or ponding. Urban Land's land capability classification is 8s, and is not assigned as an ecological site. The Urban Land at the Site is the result of intermingling native soil with fill material introduced during the prior development of Site and surrounding properties, which makes it impractical to distinguish the native soil types. Often, the development of a site involves the stripping of the top soil horizon and placement of fill material on top. Figure 4 is a Soils Map of the area.

7.8. GEOLOGY

The Geologic Map of Oklahoma shows the geologic units underlying subject area to consist of the Upper Pennsylvanian age Seminole Formation, comprised mainly of shale with interbedded siltstone and sandstone. Figure 5 is a Geology Map of the area.

7.9. RADON

Radon gas potential is a low-risk environmental hazard for the Site. According to the Oklahoma Geologic Survey Radon-Potential Map of Oklahoma (GM-32), Tulsa lies in a White Zone, an area with low radon concentrations and minimum potential for radon health hazards. Radon is a naturally occurring radioactive gas formed by the spontaneous decay of isotopically unstable uranium to stable

SCALE

0.5 0 0.5
Miles

0 500 1000 1500 2000 2500 3000 3500
Feet

LEGEND

ZONE	EXPLANATION
AE	AN AREA INUNDATED BY 100-YEAR FLOODING FOR WHICH BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED
X	AREAS LOCATED OUTSIDE THE 100-YEAR OR 500-YEAR FLOOD ZONES

SOURCE:
FLOOD INSURANCE RATE MAP
FEDERAL EMERGENCY MANAGEMENT AGENCY
TULSA COUNTY, OKLAHOMA
PANEL 365 OF 725
MAP NUMBER 40143C0365 H
EFFECTIVE DATE: SEPTEMBER 22, 1999

N

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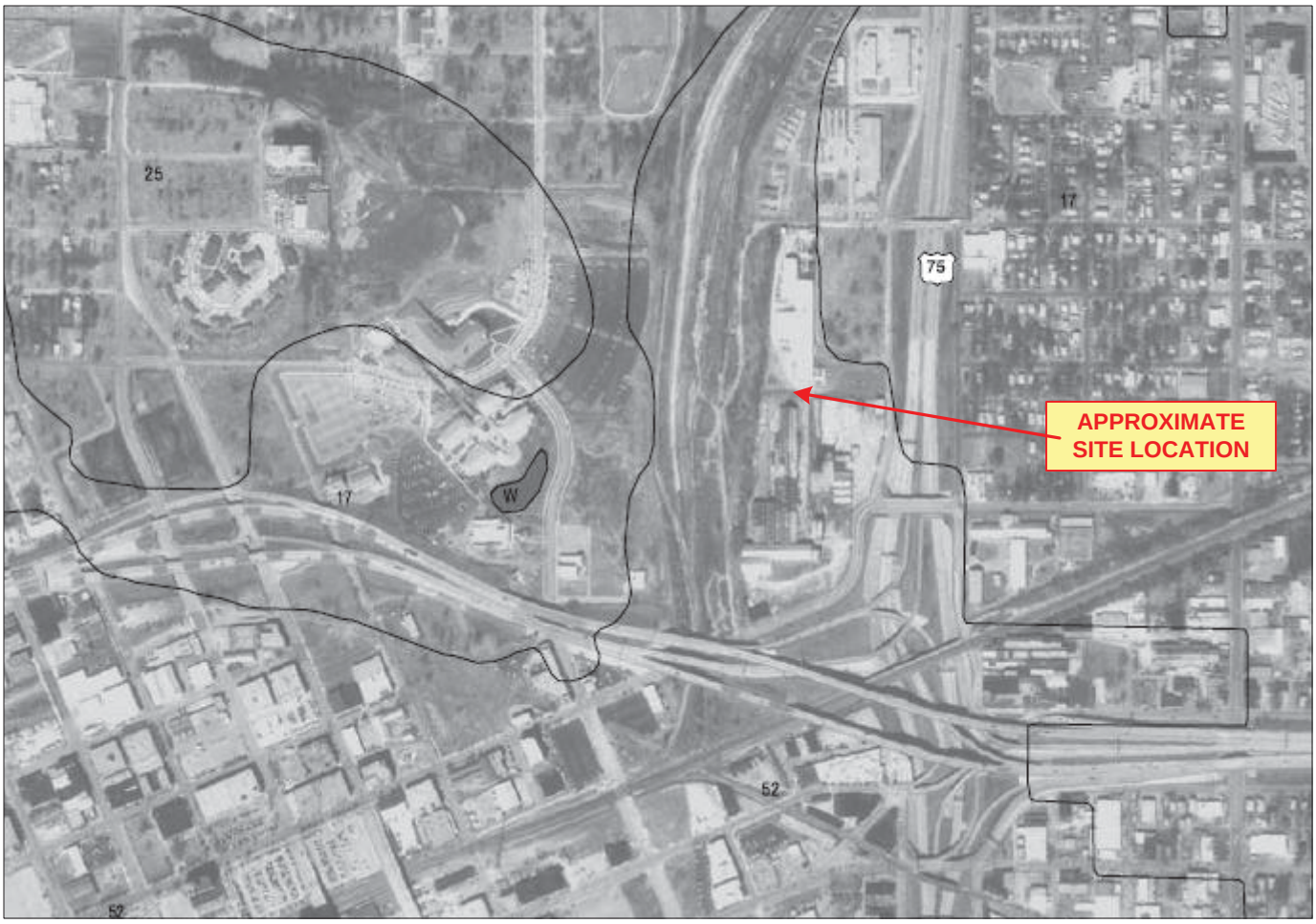
FLOOD MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
AS SHOWN	07/05/2011	Figure 3
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.PHI.00



SCALE

0.5 0 0.5
Miles

0 500 1000 1500 2000 2500 3000 3500
Feet

N

LEGEND

17 - URBAN LAND - DENNIS COMPLEX, 0 TO 5 PERCENT SLOPES
25 - KAMIE URBAN LAND COMPLEX, 1 TO 8 PERCENT SLOPES
52 - URBAN LAND
W - WATER

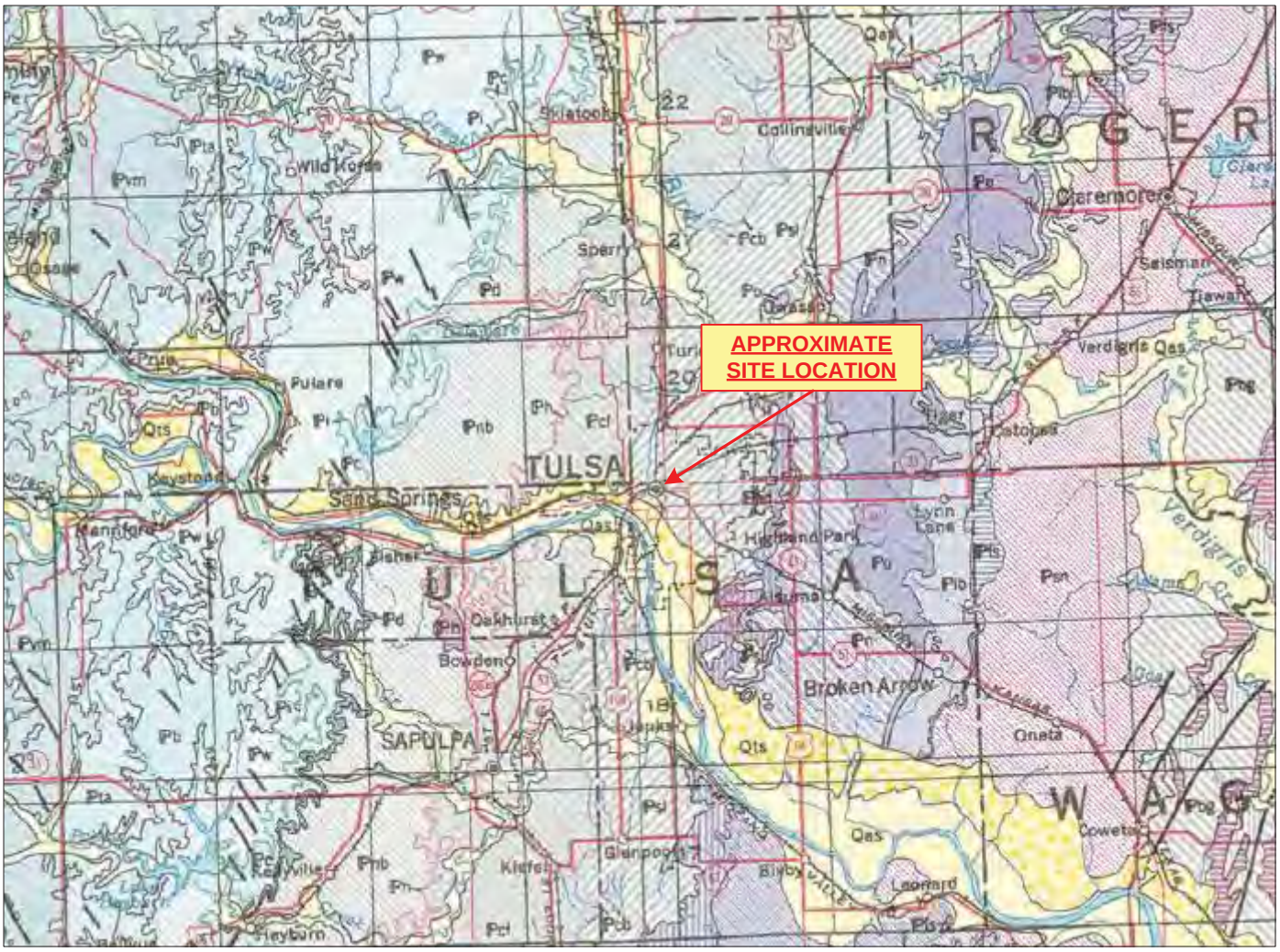
SOURCE:
TULSA COUNTY SOIL SURVEY
UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCE CONSERVATION SERVICE
MAP 26
2006

ALL Consulting
engineering · environmental · planning · technology

SOIL MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
1:24000	07/05/2011	Figure 4
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.PHI.00



SCALE

10 0 10 20 30 40

Miles

N

LEGEND

Pnb- NELLY BLY FORMATION
Pe- ELGIN SANDSTONE
Pvm- VAMOOSA FORMATION
Pi- IOLA LIMESTONE
Pcb- CHECKERBOARD LIMESTONE
Qas- ALLUVIIUM
Pcf- COLLINGS RANCH FORMATION
Psi- SEMINOLE FORMATION
Pb- BARNSDALL FORMATION
Pw- WANN FORMATION
Phd- HOLDENVILLE SHALE
Ph- HOSHOOTER LIMESTONE

SOURCE:
GEOLOGIC MAP OF OKLAHOMA
U.S. GEOLOGICAL SURVEY
HUGH D. MISER
1954

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GEOLOGY MAP

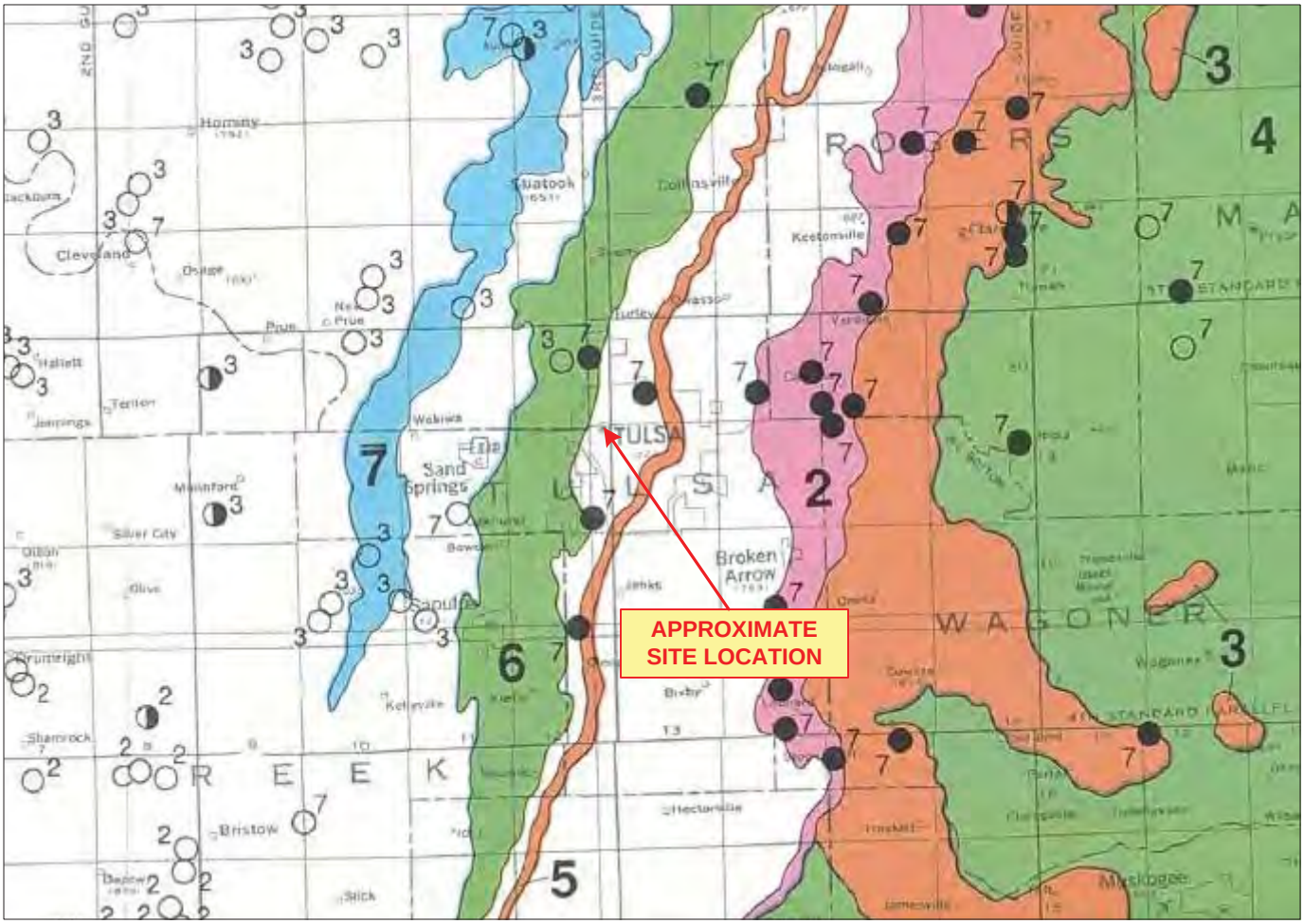
FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
1:500 000	07/05/2011	Figure 5
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.PHI.00

lead. Some amount of uranium is found in all rocks and soils. Radon is generated in the top 10-20 feet of the ground and either decays to a solid in the ground or escapes to the air. In air, the radon is generally diluted to very low concentrations before decaying. However, in buildings and houses, radon can accumulate to concentrations considered to present a health hazard. Hazards occur in low places such as basements and unventilated spaces. Figure 6 is a Radon Map of the area.

7.10. Oil and Gas Wells

A review of information provided by Sooner Well Log Services, Inc., revealed no records of oil and gas wells within the southwest quarter of the southeast quarter of Section 36, Township 20 North, Range 12 East, of the Indian Meridian.



SCALE

10 0 10 20 30 40

Miles

RADON POTENTIAL

- LOCALLY MODERATE TO HIGH (Areas 1,2,15,18,19)
- LOCALLY MODERATE (Areas 3,5,9,10,11,13,20,23,24)
- LOCALLY LOW TO MODERATE (Areas 4,6,14,21,22)
- GENERALLY LOW (Areas 7,8,12,16,17,25,26)
- GENERALLY VERY LOW
- Boundary between areas of different radon potential; dashed where inferred

N

SOURCE:
RADON - POTENTIAL MAP OF OKLAHOMA
JAMES R. FLOOD, TOM B. THOMAS,
NEIL H. SUNESON, AND KENNETH V. LUZA
1990

ALL Consulting
engineering · environmental · planning · technology

RADON MAP

FINTUBE TBA
TULSA, OKLAHOMA

SCALE:	DATE:	FIGURE NO.
1:750 000	07/05/2011	Figure 6
APPROVED BY:	DRAWN BY:	PROJECT NO.
CBM	NDA	1303.PHI.00

8.0 HISTORICAL REVIEW

During the course of this Phase I ESA, various historical documentation and available resources were evaluated to determine a history of the previous uses of the subject property and surrounding area. In order to help identify the likelihood of past uses having potentially led to a recognized environmental condition in connection with subject site, the following documents were reviewed:

8.1. HISTORICAL AERIAL PHOTOGRAPHS

ALL obtained the 1967, 1973, 1980, 1984, 1995, 2005, 2006, and 2008 aerial photographs from EDR. The historical aerial photographs are provided in **Appendix E**.

1967 Historical Aerial Photograph:
The 1967 aerial photograph depicts the Site with the same main warehouse buildings that are present today. The northeast corner of the Site is shown to consist of residential properties. The southeastern corner of the Site contains several warehouse buildings. Several sets of tracks of the Texas and Pacific Railroad are adjacent to the west side of the Site. Three railroad lines, including the remnants of the Missouri, Kansas, and Texas Railroad (MK&T RR) (northwest-southeast), the St. Louis-San Francisco (southwest-northeast), and the Texas and Pacific (south-north) are shown intersecting near the southwest corner of the Site. Downtown Tulsa is depicted as a densely populated urban area with the major streets being visible. The areas west, north, and east of the Site appear to be mainly residential with several industrial properties in the vicinity. The areas south and southwest appear to be a mix of industrial and commercial properties.

1973 Historical Aerial Photograph:
The resolution of the 1973 aerial photograph is insufficient to discern any details of the Site or the surrounding properties. The interchange between Highway 75 (north-south) and Highway 244 (east-west) is located southeast of the Site. The Site is now bordered to the east by Highway 75 and to the south by Highway 244.

1980 Historical Aerial Photograph:
The resolution of the 1980 aerial photograph is insufficient to discern any details of the Site or the surrounding properties.

1984 Historical Aerial Photograph:
The 1984 aerial photograph shows that the construction of Highway 75 has been completed. A large commercial building has been built one block east and one block west of the Site. The residential areas north of the Site have been replaced by two unidentified industrial facilities. The residential areas in the northeast corner of the Site are no longer present. The residential areas located immediately west of the Site appear to have been removed.

1995 Historical Aerial Photograph:
The 1995 aerial photograph depicts the Greenwood Cultural Center, Vernon A.M.E Church, and The OSU-Tulsa Campus approximately 500 feet west of the Site. All other areas of the Site and the surrounding properties appear largely unchanged from the 1984 aerial photograph.

2005 Historical Aerial Photograph:
The 2005 aerial photograph shows that the buildings in the southeast corner of the Site have been removed. All other areas of the Site and the surrounding properties appear largely unchanged from the 1995 aerial photograph.

2006 Historical Aerial Photograph:
The 2006 aerial photograph depicts no significant changes at the Site or surrounding properties from the 2005 aerial photograph.

2008 Historical Aerial Photograph:
The 2008 aerial photograph depicts no significant changes at the Site or surrounding properties from the 2006 aerial photograph.

8.2. ABSTRACT DOCUMENTS

The abstract document for the subject site was not reasonably ascertainable during the course of the records review due to time restraints. The absence of the abstract document is not considered to be significant to the conclusions and recommendations of this report as information obtained through the site visit, property owner and adjoining property owner interviews, and historical documentation (topographic maps, aerial photographs, Sanborn Maps, and City directories) reviews is believed to have provided the same information as would be obtained in the abstract if it had been available.

8.3. HISTORICAL SANBORN MAPS

ALL obtained the 1905, 1907, 1911, 1915, 1939, 1962, and 1968 fire insurance maps (Sanborn Maps) from EDR for review. **Appendix F** contains a copy of the Sanborn Maps.

1905 Sanborn Map:
In the 1905 Sanborn Map, only the properties situated southwest of the Site are depicted. Southwest of the Site, two sets of tracks associated with the Missouri, Kansas, and Oklahoma (MK&O) Railroad Main Line are depicted running northwest-southeast. South of the Site, the Frisco Railroad Main Line is depicted traveling east to west. The properties depicted southwest of the Site include a grocery store, a residential property, and the Rea-Read Mill & Elevator Company, which contains an elevated water tank, cistern, water well and fire pump, and grain elevator.

1907 Sanborn Map:
The 1907 Sanborn Map only shows the properties situated southwest of the Site. Several retail stores, residential properties, and a restaurant are depicted.

1911 Sanborn Map:
The 1911 Sanborn Map only shows the properties located west and southwest of the Site. The map indicates two Negro schools and a grocery store are located approximately 400 feet west of the Site. The surrounding properties and structures to southwest consist of restaurants, residential properties, a skating rink, motion pictures, several cobblers, and the A.M.E Church. A 6" water pipe is shown running east-west through the middle of E. N. 1st St. (E. Archer St.).

1915 Sanborn Map:

In the 1915 Sanborn Map, the Site and adjoining properties to the north are not depicted. Residential development has continued west of the Site. The Missouri and Kansas Railroad is depicted traveling north-south approximately 200 feet west of the Site. The intersection of E. Archer St. and N. Greenwood Ave. (700 feet southwest of the Site) has undergone significant development and now includes many retail stores, a drug store, auto repair building, hand printing building, and a hotel. An oil and gas well supply building, and a small building labeled "oil house" have been constructed approximately 800 feet southwest of the Site. Two lumber yards are depicted approximately 800 feet south of the Site. The properties southeast of the Site mainly consist of residential properties, a church, retail stores, and a lumber yard. A 6" water pipe is depicted running north-south through the middle of N. Madison Ave. The Finlayson Tool Co. and a Machine Shop are situated approximately 700 feet southeast of the Site. These two businesses include offices, machine shops and warehouses, elevated water tanks, two brick furnaces, and a coal house. The Queen Bee Stove Co., and Oklahoma Natural Gas' machine shops and warehouses are located approximately 600 feet east of the Site.

1939 Sanborn Map:

In the 1939 Sanborn Map, the properties north of the Site are not depicted. The entire Site is labeled Bethlehem Steel Co. A concrete reservoir and a small pump house are shown along the northern edge of the Site. Buildings 1 and 4 at the Fintube Building Complex are depicted in their current locations with an east-west oriented crane running between them. Building 1 is labeled as a forge and contains a single brick furnace and Building 2 is a welding and fabricating shop and contains two brick furnaces. Residential properties are located in the entire northeast corner of the Site. A steel tank of unknown size and contents, a wash house, and three steel air tanks are located adjacent to the southeast corner of the welding and fabricating building. The eastern edge of the central portion of the Site consists of vacant lots. A 15,000-gallon fuel oil tank is located in the middle of the central portion of the Site. Railroad tracks are depicted running north-south on either side of the Fintube Building Complex. The Evans Building Complex is depicted as it currently stands, although Buildings 2 and 5 have not been constructed. The northern portion of Building 3 is a Foundry and the southern portion is a machine shop. Two cupolas are depicted along the western wall of the northern portion of Building 3. Building 1 is a warehouse and Building 4 is the paint spraying and assembly department. A pattern shop is depicted adjacent to the east side of the northern end of Building 3. The eastern side of the southern portion of the Site consists of a machine shop, a general storage area, a water tank and fuel oil tank of unknown size, a power house with engine oil and a fuel oil tank of unknown size, and a manufacturing office. A set of north-south railroad tracks travel between Buildings 1 and 3 and pass through Building 4. A second set of railroad tracks travels north-south along the eastern edge of the Site and stops before leaving the Site. A single office building is located in the far southwest corner of the Site. The adjacent property west of the northern portion of the Site consists of four north-south oriented railroad tracks, the Atchison-Topeka & Santa Fe Railroad Shops, and shanties. The areas west of the northern and central portions of the Site are mainly residential properties with a single restaurant. The Greenwood Community Center and Tulsa Department of Public Works, consisting of two gasoline tanks of unknown size, are located approximately 700 feet west of the southern portion of the Site. The Tulsa Street Department owns

several storage buildings and a steel fuel oil tank of unknown size; all are approximately 600 feet west of the southern portion of the Site. The Big Four Foundry Co. building is located approximately 400 feet west of the southern portion of the Site. The Big Four Foundry consists of a foundry building with two cupolas, a pattern shop and storage building to the north, and a fence and steel goods storage area to the south. Auto repair buildings are located 500 feet west, 500 feet southwest, and 750 feet southwest of the southern portion of the Site. Two garages, an undertaker, and a filling station with a single gasoline storage tank of unknown size are located approximately 500 feet southwest of the Site. Three oil well supply warehouses are located 700 feet southwest of the Site. A transfer and storage yard with a gasoline tank of unknown size is located on adjacent property south of the Site. Builders Supply Co., Tulsa Winch Manufacturing Co., and two coffee roasting warehouses are located approximately 600 feet south of the eastern portion of the Site. The Builders Supply Co. properties consist of a cement warehouse with three storage tanks that contain stone, a lime and cement warehouse, a separate cement warehouse, a mortar color building, a warehouse with an unknown quantity and volume of lime putty vats, and two lots marked "Old Iron Salvage." A private garage, beer and fish storage building, auto repair garage, and hotel are located on adjacent property east of the Tulsa Winch Mfg. Co. A steel spring facility, the Gasoline Pump Mfg. Co., and a filling station with three gasoline storage tanks of unknown size are located approximately 1200 feet southeast of the Site. Two tin shops, two auto repair buildings, an auto painting business, a used car sales business, and two filling stations with a total of five gasoline tanks of unknown size are located 950 feet southeast of the Site. A "Metal Liquid Spray Gun Facility" with a natural gas engine and generator is located 400 feet southeast of the Site. A pipeline equipment storage and repair building is located 400 feet west of the southern portion of the Site. The Oklahoma Natural Gas Co. properties located on adjacent property east of the Site consist of a truck storage and auto repair building, a machine shop, meter and fitting repair buildings, a chemistry lab, a parking garage, a shop and warehouse with a gasoline tank of unknown size, a valve warehouse, a trailer storage building, a pipe cleaning area, a blower house, an oil house, and an auto greasing building. A filling station with three gasoline storage tanks of unknown size and an auto repair garage are located 350 feet east of the southern portion of the Site. Oklahoma Natural Gas also owns twelve lots on adjacent property east of the central portion of the Site which contain several general storage warehouses, wire storage and ornamental iron works building, and a boiler shop. A filling station with two gasoline tanks of unknown size is located approximately 350 feet east of the central portion of the Site. A steam laundry building is located approximately 400 feet east of the northern portion of the Site. Two buildings labeled "Junk" are located approximately 300 feet east of the northern portion of the Site.

1962 Sanborn Map:

In the 1962 Sanborn Map, the properties north of the Site are not depicted. The concrete reservoir and the pump house formerly located at the northern end of the Site are no longer present. A storage building is located in the northwest corner of the Site. Building 4 at the Fintube Building Complex has now been constructed and is labeled "Fabricating." The 15,000-gallon fuel oil tank within the Site has been replaced by two small buildings and a dust collection system east of Building 3 of the Fintube Building Complex. A bath house, paint and oil storage building, and a compressor and storage building have been built on the east side of the central portion of the Site. Building 1 at the Evans Building Complex is now used as a welding shop, and Building 5 has now been constructed

and is being used as an assembly department. A junk warehouse is located on adjacent property west of the Evans Building Complex. A tin shop is located 400 feet west of the Site. An iron scrap yard is located on adjacent property west of the southern portion of the Site. A tin shop has replaced the auto repair building formerly located 500 feet west of the southern portion of the Site. A printing office is located 750 feet southwest of the Site. Tulsa Truck Repair has replaced the parking garage formerly located 500 feet southwest of the Site. The three oil well supply warehouses located approximately 800 feet southwest of the Site have been replaced by a liquor and screen warehouse, a motor freight station, and a private garage. A pipe warehouse and a tea warehouse are located 800 feet south of the western portion of the Site. A small truck repair building is located approximately 150 feet southwest of the Site. Approximately 700 feet south of the eastern portion of the Site, an aircraft parts warehouse has replaced the coffee warehouses, and a machine shop has been constructed. A brass foundry and welding business, two furniture warehouses, and a tin shop have been constructed approximately 700 feet southeast of the Site. An auto repair building and an auto spring repair building have been built approximately 700 feet southeast of the Site. An aluminum window warehouse, two furniture warehouses, and a restaurant have been built approximately 1,100 feet southeast of the Site. A steel warehouse and a paint storage building have been built approximately 700 feet southeast of the Site. The "Metal Liquid Spray Gun Facility" is no longer present southeast of the Site. The Oklahoma Natural Gas properties located adjacent to the southern portion of the Site are now owned by Marshall Supply & Equipment Co. (Power Tool Sales). The fill station that was approximately 500 feet east of the southern portion of the Site is no longer present. Three machine shops, a pump warehouse, and a building materials warehouse are located approximately 300 feet east of the central portion of the Site. An auto repair building is located approximately 500 feet east of the northern portion of the Site. A dry cleaning business is located approximately 500 feet east, and an upholstery business is located on adjacent property east of the northern portion of the Site.

1968 Sanborn Map:

In the 1968 Sanborn Map, the properties north of the Site are not depicted. The Bethlehem Steel Co. has been replaced by the Central States Steel Inc. The northern portion of Building 3 at the Evans Building Complex is used as a steel working room. A vacant building is now present east of the central portion of the Evans Building Complex. The compressor and storage room located east of the central portion of the Evans Building Complex has been converted to a baled paper storage building. The paint and oil storage building is now vacant. A small warehouse has been constructed east of the northern portion of the Evans Building Complex. The railroad shops located west of the northern portion of the Site are no longer present. The Big Four Foundry Properties located west of the southern portion of the Site are vacant. The truck repair shop, and the Transfer and Storage yard are no longer present southwest of the Site. The Tea Warehouse located 750 feet southeast of the Site has been replaced by an auto parts warehouse. All of the structures that were adjacent to the southeast corner of the Site are no longer present. The Builders Supply Co., Tulsa Winch Mfg. Co., auto repair shop, and machine shop previously located approximately 600 feet southeast of the Site are no longer present. All of the lots adjacent to the eastern side of the Site are now vacant.

8.4. TOPOGRAPHIC MAPS

Topographic Maps were obtained from Environmental Data Resources, Inc. for the years 1901, 1954,

1967, 1973, and 1982. **Appendix G** contains a copy of available Topographic Maps.

1901 Topographic Map:
The 1901 Topographic Map depicts the city of Tulsa in early stages of development. The street grid of downtown Tulsa appears to have been developed and several dozen buildings are depicted in the general vicinity of the Site. The Arkansas River is shown traveling north and south on the western edge of the photograph. The St. Louis-San Francisco railroad is depicted traveling west to east and connects Tulsa with Catoosa.

1954 Topographic Map:
In the 1954 map, the Site is visible, although no structures appear within its boundaries or on any adjacent properties. Structures depicted in the general vicinity of the Site include schools, churches, and playgrounds, but this map does not show other commercial or residential properties suspected to be present. The MK&T, Midland Valley, and St. Louis-San Francisco railroads are depicted intersecting each other southwest of the Site.

1967 Topographic Map (Photorevised from the 1954 Topographic Map):
The 1967 Topographic Map depicts no significant changes within the Site or surrounding properties from the 1954 map.

1973 Topographic Map (Photorevised from the 1954 Topographic Map):
The 1973 Topographic Map depicts the junction of I-244 and Highway 75 immediately southeast of the Site. This topographic map depicts no other significant changes within the Site or surrounding properties from the 1967 topographic map.

1982 Topographic Map (Photorevised from the 1954 Topographic Map):
The 1982 Topographic Map depicts no significant changes within the Site or surrounding properties from the 1973 map.

8.5. CITY DIRECTORIES

City Directories for the subject site were obtained from Environmental Data Resources, Inc. for the years 1909, 1916, 1921, 1926, 1931, 1936, 1941, 1946, 1951, 1956, 1961, 1966, 1971, 1976, 1981, 1985, 1991, 2000, and 2006.. **Appendix H** contains a copy of City Directories.

1909 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of residential properties.

1916 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Queen Bee Stove Co. at 312, Prairie Oil & Gas Co. Warehouse & Shops at 312, Oklahoma Natural Gas Corp. Warehouse at 312 Madison Ave.; and residential properties.

1921 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Chandler

Grocery at 1019 E. Easton; Lawrence Seals at 411, Lieberman Grocery and Jefferson Grocery at 525, Davis Filling Station at 626 N. Lansing Ave.; Queen Bee Stove Co. at 100, Oklahoma Natural Gas Corp. at 104, Prairie Oil & Gas Co. Warehouse & Shops at 105, Hinderliter Tool Co. at 140, Souders & Owens Grocers at 144, Tulsa Woven Wire Works at 210, Haynes Grocery at 244 Madison Ave.; Whitten & Loftis Cleaners at 101, Magnolia Petroleum Filling Station at 102 S. Madison Ave.; and residential properties.

1926 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: First Baptist Church at 902, Lowder Pattern & Model Works at 921, Gladden Barber at 1001 E. Archer; Iverson Tool Co. Warehouse at 120 and 122 N. Lansing Ave.; Western Radio Service Repairs at 101, Carmacks Café at 103, McSherry Garage at 109, Woven Wire & Ornamental Iron at 110, Oklahoma Natural Gas Sub Station at 115, Chisler & Schell Grocery at 150, Associated Grocers of Tulsa at 314, Viking Freight Co. at 315, Oklahoma Natural Gas Warehouse at 414 and 418, Reliable Transfer Storage Co. and Motor Freight Line at 615, Travelodge Corp. Auto Trailer Manufacturers at 615, Horwitz Pipe & Supply Co. at 615, Stiver Fill Station at 618 Madison Ave.; Calvary Baptist Church at 119, Harrington Dry Goods Co. at 200 S. Madison Ave.; and residential properties.

1931 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: Hodges Garage at 901, Madison Barber at 1001, United Pipe & Supply Co. at 1014 E. Archer; Hagin Filling Station at 1002 E. Haskell St.; Iverson Tool Co. Warehouse at 120, Peerless Supply Co. (Oil Well Supplies) at 122 N. Lansing Ave.; Madison Barber at 101, Francy's Restaurant at 103, Oklahoma Natural Gas Corp. at 104, Kroeger Auto Repair at 109, Woven Wire & Ornamental Iron at 110, Blacksmith at 111, Globe Grocery at 150, Moore Furniture Co. at 314, Oklahoma Natural Gas Warehouse at 414 and 418, Wailes Dove Hermiston Corp. Warehouse at 613, Oklahoma Natural Gas Corp. Warehouse at 615, Wailes Dove Hermiston Corp. Warehouse at 615, Prairie Pipeline Co. Garage at 617, and Keller Dempsey Co. Warehouse at 617, Meeter Restaurant at 618 Madison Ave.; Bayouth Grocery at 101, Magnolia Petroleum Filling Station at 102, Milliser Beauty Parlor at 107, Thrifty Grocers Assn. at 200 S. Madison Ave.; and residential properties.

1936 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: Hodges Garage at 901 E. Archer; Harper Sheet Metal Works at 1020 E. Easton; Mushrush Fill Station at 1002, Virgil Evans Auto Repair at 1018 E. Haskell St.; Podbielnaik Labs at 112, Iverson Tool Co. Warehouse at 120, Peerless Supply Co. (Oil Well Supplies) at 122 N. Lansing Ave.; Western Radio Service Repairs at 101, Francy's Restaurant at 103, Woven Wire & Ornamental Iron at 110, Chisler & Schell Grocery at 150, Vaughn Insect Spray Manufacturing at 314, Missouri Motor Distributing Corp. at 315, Oklahoma Natural Gas Warehouse at 414 and 418, Goodner VanDeventer Co. at 615, Kelly Dempsey & Co. Warehouse at 615, Stiver Fill Station at 618 Madison Ave.; Andrews Tire Co. at 101, Woods Filling Station at 102, Bevan Beauty Parlor at 107, Harrington Dry Goods Co. at 200 S. Madison Ave.; and residential properties.

1941 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: Iverson

Tool Co. Warehouse at 120 and 122 N. Lansing Ave.; Carmack's Café at 103, McSherry Garage at 109, Woven Wire & Ornamental Iron at 110, Oklahoma Natural Gas Sub Station at 115, Chisler & Schell Grocery at 150, Associated Grocers of Tulsa at 314, Viking Freight Co. at 315, Oklahoma Natural Gas Warehouse at 414 and 418, Reliable Transfer Storage Co. and Motor Freight Line at 615, Travelodge Corp. Auto Trailer Manufacturers at 615, Horwitz Pipe & Supply Co. at 615, Stiver Fill Station at 618 Madison Ave.; Calvary Baptist Church at 119 S. Madison Ave.; and residential properties.

1946 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: Smith Saw Filer at 914 E. Archer; Iverson Tool Co. Warehouse at 120 and 122, Wilson Truck Co. at 175 N. Lansing Ave.; Carmack's Café at 103, Groves Sand Blasting Co. at 109, Oklahoma Natural Gas Sub Station at 115, Chisler & Schell Grocery at 150, Tulsa Warehouse Co. at 314, Oklahoma Natural Gas Warehouse at 414 and 418, Travelodge Corp. Auto Trailer Manufacturers at 615, Horwitz Pipe & Supply Co. at 615 Madison Ave.; Gasoline Pump and Burner Manufacturer at 106 and 116, Calvary Baptist Church at 119 S. Madison Ave.; and residential properties.

1951 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: Dalton's Café at 854, First Baptist Church at 902 E. Archer; Bethlehem Supply Co. Foundry at 116, Ace Meter Co. at 117, Wilson Truck Co. at 175 N. Lansing Ave.; Carmack's Café and Grocery at 103, Willingham Garage at 109, Oklahoma Natural Gas Sub Station at 115, Scientific Instrument Manufacturer at 122, Chisler & Schell Grocery at 150, Mitchell Warehouse Co. at 314, Oklahoma Natural Gas Warehouse at 414 and 418, Breeding Motor Freight at 515, Travelodge Corp. Truck Body Repairs at 615, Mid State Pipe & Supply Co. at 615 Madison Ave.; M&D Café at 105, Gasoline Pump and Burner Manufacturer at 106 and 116 S. Madison Ave.; and residential properties.

1956 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: E&E Café at 854, Marshall Equipment Supply Co. at 921, Tulsa Trucking Co. at 1041 E. Archer; Consolidated Transfer & Storage Inc. at 117, TV Inc Tele Table at 175 N. Lansing Ave.; Carmack's Grocery at 103, Auxier Supply at 108 and 110, Sooner Garage at 109, Oklahoma Natural Gas Sub Station at 115, Scientific Instrument Manufacturer at 122, Chisler & Schell Grocery at 150, Hodges Warehouse Inc. at 314, Marshall Machinery at 414, Pageantry Decorators and Meade Dallas Construction at 515, Travelodge Corp. Truck Body Repairs at 615, Mid State Pipe & Supply Co. at 615, Empire Auto Rebuilders Auto & Truck Painters at 615, Champion Crane Carriers Inc. at 615, Harrisons Excavation Co. at 615 Madison Ave.; Butler Filling Station at 102, M&D Café at 105, Gasoline Pump and Burner Manufacturer at 106 and 116, Cooper Supply Co. Warehouse at 119 S. Madison Ave.; and residential properties.

1961 City Directory:

The Site was not listed in the research source. Other listed addresses in the area consist of: Marshall Supply and Equipment Co. at 920, Harrison Paint and Body Shop at 1032, Tulsa Trucking Co. at 1041 E. Archer; Conner Delivery Service at 117, Bash Machine Shop at 119, Air Kart Manufacturer

at 119, Lahmeyer Pattern Shop at 119, Worthington Corp. Machinery at 175 N. Lansing Ave.; Carmack's Liquor Store at 101, Carmack's Grocery at 103, Auxier Supply Co. at 108 and 110, Sooner Garage at 109, Oklahoma Natural Gas Sub Station at 115, Changepoint Co. Fountain Pen Manufacturer at 122, Tulsa Sheet Metal Works and Madison Machinery Co. at 414, Parsons Grocery at 524, Meade Dallas Construction at 515, Travelodge Corp. Truck Body Repairs at 615, Champion Carriers Truck Inc. at 615 Madison Ave.; The Owen Café at 105, Gasoline Pump and Burner Manufacturer at 106 and 116, Dickason Goodman Co. Warehouse at 107 and 109, Cooper Supply Co. Warehouse at 119 S. Madison Ave.; and residential properties.

1966 City Directory:
The Site was listed as Western Supply Co. (Heat Exchanger). Other listed addresses in the area consist of: Marshall Equipment Supply Co. at 921, Silkey Resale Used Clothing at 1023, Tulsa Trucking Co. at 1041 E. Archer; Gibson Insurance Agent at 1043 E. Easton; Pool Guy at 1015 E. Haskell St.; Central States Steel Inc. Warehouse (Air Cooled Exchangers Inc.) at 116, Conner Delivery Service at 117, Bash Machine Shop at 119, Air Kart Manufacturer at 119, Lahmeyer Pattern Shop at 119, Worthington Corp. Machinery at 175 N. Lansing Ave.; Carmack's Liquor Store at 101, Carmack's Market at 103, Sooner Garage at 109, Oklahoma Natural Gas Sub Station at 115, Changepoint Co. Fountain Pen Manufacturer at 122, Madison Machinery Co. at 414, Wheatley Oil Field Supply Industries at 508, Meade Dallas Construction at 515, Champion Carriers Truck Inc. at 615, Conrad Corp. Tube Manufacturers at 615 Madison Ave.; Gasoline Pump and Burner Manufacturer at 106, Dickason Goodman Co. Warehouse at 107, Cooper Supply Co. Warehouse at 119 S. Madison Ave.; and residential properties

1971 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Silkey Resale Used Clothing at 1023, Tulsa Trucking Co. at 1041, Marshall Supply & Equipment Co. at 1050 E. Archer; Carmack's Grocery at 103, Cooper Supply Co. Warehouse at 213, Frito Lay Warehouse at 217and 223, Almond Electric Storage at 315, 319, and 321, Sooner Garage at 109, Oklahoma Natural Gas Sub Station at 115, Madison Machinery Co. at 615 Madison Ave.; and residential properties.

1976 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Tempco Manufacturing at 1027, Marsuco Industrial Supplies at 1050 E. Archer; Carmack's Grocery at 103, Sooner Garage at 109, Madison Machinery Co. at 615 Madison Ave.; and residential properties.

1981 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Sooner Garage at 109, Madison Machinery Co. at 615 Madison Ave.; and residential properties.

1985 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Midtown Deli Convenience Food Store at 1007, S&S Vending Machines Co. at 1009, Wheatley Pump & Valve Inc. at 1050 E. Archer; Madison Machinery Co. at 615 N. Madison Ave.; and residential

properties.

1991 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of;:Midtown Deli Convenience Food Store at 1007, S&S Vending Machines Co. at 1009 E. Archer; and residential properties.

2000 City Directory:
The Site was not listed in the research source. Other listed addresses in the area consist of: Leroy's Body Shop at 1009, Nordam Group Foundries at 1050 E. Archer; Avon Order Houses at 1011 E. Easton St.; Madison Machinery Co. at 615 N. Madison Ave.; and residential properties.

2006 City Directory:
The Site was listed as Kentube Engineering Products. Other listed addresses in the area consist of: Canine Unlimited Dog Training at 118 N. Lansing Ave.; Madison Machinery Co. at 615 N. Madison Ave.; and residential properties.

8.6. PRIOR ENVIRONMENTAL SITE ASSESSMENTS

Mr. David Giacomo (City of Tulsa) provided a 2000 Phase I ESA that was performed on the Fintube Building Complex. The 2000 Phase I ESA included a summary of the 1994 Phase I ESA and Regulatory Compliance Audit (RCA) and Limited Phase II ESA that were also performed on the Fintube Building Complex. Mr. Dale Johnson (ODEQ) provided a partial copy of the 1994 Phase II ESA. Mr. Ray Meldrum provided a partial copy of the 1994 Phase I ESA.

1994 Phase I and Phase II ESA:

The 1994 Phase I concluded that a Phase II ESA was necessary at the Fintube Building Complex. The listed concerns included:

- Large sink-holes in the open yard area, with one containing water having an oily sheen;
- Leaked gasoline and diesel fuel at a removed above-ground fueling station;
- Leakage from four open drums; and
- Staining along the rail spur between the Evans Building Complex and the Fintube Building Complex.

A limited Phase II ESA was conducted that revealed the following concerns at the Site:

- Presence of 1,1,-dichloroethene, cis1,2dichloroethene, trichloroethene, and tetrachloroethene above regulatory limits in groundwater samples;
- Presence of metals such as cadmium and lead above regulatory limits in groundwater samples;
- Presence of total petroleum hydrocarbon (TPH)-diesel range organics (DRO) above regulatory limits in a soil sample.

Based on the recommendations of the 1994 Limited Phase II ESA, Fabsco (the owner of the property

at the time of the 1994 assessments) excavated stained soil, cleaned the hydro-test water sump and paint booth, removed a storage shed, modified floor drains, and removed two ASTs of unknown size that were used to store fuel. After these remedial actions had taken place, the ODEQ issued a letter stating that no additional remedial work was required at the Fintube Building Complex.

2000 Phase I ESA:

The following 2000 Phase I ESA revealed the following findings:

- Ten flooring samples were determined to contain between 3 and 8 percent chrysotile asbestos.
- An LBP test revealed that three samples of peeling paint contained LBP.
- A fluorescent light ballast that had overheated and leaked oil was observed in the Locker Room.
- A container of battery acid (less than one (1) quart) was observed to have leaked a small amount on the concrete wall it was located on.
- A large pit, of unknown size, that was used to collect water for hydro-testing was observed in the southwest corner of the Fintube Building Complex. This pit contained approximately one inch of hydrocarbon containing fluid that appeared to be hydraulic fluid.

In a letter from EnecoTech, Inc. to Fintube Technologies it is stated that the flaking LBP was removed from steel beams on the west side of the building, 1,060 square feet of asbestos-containing floor tile was removed, and approximately 38 fluorescent light ballasts were removed from the Fintube Building Complex.

2009 Phase I ESA:

The prior Phase I ESA conducted by ALL in 2009 identified the following potential environmental concerns at the Site (ALL, 2009):

- Stained wooden bricks within the Evans Building Complex.
- Historic railroad operations throughout the Site.
- Staining in the vicinity of open pits, sumps, and floor drains.
- Presence of five 55-gallon drums of xylene and other unknown contents
- Piles of potentially metal impacted fill material
- Furnace refractory material
- A lead-acid battery in a drainage ditch
- Leaking transformer and electric motors in the Evans Building Complex
- Hazardous materials in a dumpster
- Former usage of the Site for Bethlehem Steel Works, Bankoff Scrap Metals, and Storey Wrecker Storage Lot, and Big Four Foundry
- Former fuel storage tanks

2010 Phase II ESA:

A Phase II ESA was conducted on the Site by ALL in 2010 (ALL, 2010) to determine if the potential environmental concerns identified in the 2009 Phase I ESA had led to adverse impacts to the Site. The Phase II field work consisted of drilling ten (10) soil borings, sampling surface and subsurface

soils, sampling groundwater from the temporary wells, well abandonment, temporary storage and disposal of investigative-derived waste, inspection of suspect LBP, and inspection and sampling of suspect ACM and Other Regulated Material (ORM). The following items are the activities and findings from the 2010 Phase II field work:

- A total of ninety-seven (97) surface soil samples were collected from soil borings and field locations throughout the Site. Arsenic exceeded its regional screening level (RSL) of 1.6 mg/kg in all but three (78 of 81) normal surface soil samples tested for metals. Twelve (12) surface soil samples exceeded RSLs for semi-volatile organic compounds (SVOCs) in one or more parameters.. No volatile organic compound (VOC) parameters exceeded RSLs. No herbicides exceeded RSLs. No samples exceeded TPH gasoline-range organic (GRO) (>C6-C12) action limits of 500 mg/kg set by ODEQ. Nine (9) of the samples exceeded TPH DRO (>C12-C28) action limits of 2,500 mg/kg set by ODEQ. Seven (7) samples exceeded ODEQ's action limits of 5,000 mg/kg for TPH Lube Oil (>C28-C35). Fifteen (15) samples exceeded the ODEQ Tier 1 generic TPH (>C6-C35) action level. Thirteen (13) surface soil samples exceeded RSLs for PCBs in one or more parameters.
- A total of thirteen (13) subsurface soil samples were collected from varying depths from the ten (10) soil borings. One subsurface soil sample exceeded its RSL for three SVOC parameters. One sample exceeded its RSL for PCBs. Arsenic exceeded its RSL in all subsurface soil samples.
- A total of thirteen (13) groundwater samples were taken from the ten (10) soil borings. Two samples exceeded their screening level for chloroform. One sample exceeded its screening level for both 1,2,4-Trichlorobenzene and naphthalene.
- A total of twenty-one (21) samples were analyzed for ACM from the sixteen (16) homogeneous areas within Fintube Building Complex and nine (9) samples were analyzed from the seven (7) homogeneous areas within Evans Building Complex. The laboratory analysis determined that approximately 10 linear feet and 10 square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of Fintube main building and approximately 34 linear feet of asbestos containing thermal system pipe insulation located in main warehouse of Evans facility are considered to be Regulated Asbestos Containing Materials (RACM).
- A total of 73 samples from the Fintube Building Complex and 71 samples from the Evans Building Complex were analyzed for LBP. The results of the screening and lab analysis indicated that LBP was present within both buildings above the permissible level of 1.0 mg/cm^2, or 5,000 parts per million in several areas.
- An ORM inspection revealed the presence of fluorescent lights and ballasts, and mercury switches within the Site.

8.7. ADDITIONAL HISTORICAL RESOURCES

None

9.0 INTERVIEWS

Interviews were conducted with landowner representatives, city officials, and adjoining property owners to obtain information indicating if there are any recognized environmental conditions in relation to the Site.

9.1.1. CURRENT LANDOWNER'S REPRESENTATIVE

Mr. Nathan Alleman (ALL) interviewed Mr. O.C. Walker (Executive Director of the Tulsa Development Authority) on July 20, 2009, regarding the Site. Due to his short tenure at the position and unfamiliarity with the Site, Mr. Walker recommended that Mr. David Giacomo (City of Tulsa) be interviewed to answer questions relating to the past uses and environmental history of the Site.

Mr. Alleman interviewed Mr. David Giacomo (Director-Tulsa Parking Authority) on July 20, 2009. Mr. Giacomo stated that the wood blocks at the Evans Building have been contaminated with machining oil. He said that a spill of PCB oil occurred on the platform on the west side of the Evans Building when the transformers were vandalized. Mr. Giacomo provided the 2000 Phase I ESA on the Fintube Building Complex along with a letter from EnecoTech to Fintube Technologies describing the actions taken to address the recommendations made in the Phase I. Mr. Neiman conducted a subsequent interview with Mr. Giacomo on June 30, 2011, as a part of the 2011 Phase I ESA. Mr. Giacomo stated that he was unaware of any additional environmental concerns apart from those mentioned during the 2009 interview.

As part of the Update, Mr. Stuart Neiman interviewed Mr. Walker again on June 30, 2011, regarding any activities that may have taken place on the Site that could affect either its legal standing , i.e. environmental liens, proposed engineered controls, institutional controls, etc. Mr. Walker stated that he was unaware of any activities and recommended interview with Mr. Giacomo again.

Mr. Neiman interviewed Mr. Giacomo of the Tulsa Parking Authority, Real Estate Management Department on June 30, 2011, who stated that he was unaware of any changes to either the legal status or site remediation efforts, save the Phase II ESA completed in 2010.

Mr. Neiman also interviewed Mr. Ray Meldrum of the Tulsa Development Authority and the site owner's representative on July 1, 2011. Mr. Meldrum was unaware of any additional environmental concerns or issues at the Site since the 2009 Phase I ESA report preparation.

9.1.2. STATE AND LOCAL GOVERNMENT OFFICIALS

Mr. Alleman interviewed Mr. Ron Fegaly, Assistant Fire Marshall with the Tulsa Fire Department, on July 21, 2009. Mr. Fegaly stated that the Tulsa Fire Department had responded to several fires at the paper recycling plant that was previously located within the Site, although he is unaware of any impact that these fires may have had on the environmental condition of the Site. Mr. Neiman was unsuccessful in contacting a representative of the Tulsa Fire Department after making three attempts on June 30 and July 1 and 5, 2011.

Mr. Neiman interviewed Mr. Dale Johnson (ODEQ, Voluntary Cleanup Program (VCP)) on July 1,

2011, as a part of the 2011 Phase I ESA. Mr. Johnson stated that he was unaware of any environmental concerns at the Site. Mr. Johnson did mention that they did receive the 1994 Phase II ESA report on January 6, 1995, and returned the report to the FABSCO consultant on January 25, 1995, after their review without comment. Mr. Johnson stated that there was no further information regarding any site activities found in ODEQ files.

Mr. Neiman interviewed Ms. Adrienne Russ (TIA) on June 30, 2011, as a part of the 2011 Phase I ESA. Ms. Russ stated that she was unaware of any environmental concerns at the Site. Ms. Russ has been with the Tulsa Industrial Authority for eight (8) years and is familiar with the Site since 2009. She was aware of the Phase II ESA and had read the report, but could not add any further information.

9.1.3. ADDITIONAL INTERVIEWS

Mr. McComas interviewed former property owner representative Mr. Rusty Thrash (Region 2 Vice President, Evans Enterprises) on August 13, 2009. Mr. Thrash stated that Evans Enterprises purchased the property from Mr. Robert Traband on August 26, 1991, and subsequently sold it to the Tulsa Development Authority on April 3, 2003. He noted that Evans Enterprises used the Evans Building Complex as a warehouse to store large electric motors and the Offices inside the complex were used as office space and for small engine repairs. Mr. Thrash stated that the cleanup of PCB oils was necessary at the time of purchase from Mr. Traband due to the leaking of PCB oil from vandalized transformers within the Site. Mr. Thrash provided Mr. McComas with copies of files pertaining to the Site including: warranty deeds, hazardous waste manifests, and guidance from the EPA on appropriate cleanup levels. The information included in the files that pertains to the cleanup of PCB contamination at the Site is included in **Section 14**. Mr. Neiman conducted a subsequent interview with Mr. Thrash on June 30, 2011, as a part of the 2011 Phase I ESA. Mr. Thrash stated that he was unaware of any additional environmental concerns apart from those mentioned during the 2009 interview.

Mr. Alleman interviewed adjacent property owner Mr. Sid Lee, (President, Lee Supply Co.) on August 18, 2009. The Lee Supply Co. facility located on adjacent property north of the Site stores and sells metal piping. Mr. Lee stated that he his company has been located north of the Site since 1988, and he has lived in the Tulsa area since the 1925. Mr. Lee was not aware of any environmental concerns at the Site. Mr. Neiman conducted a subsequent interview with Mr. Lee on July 5, 2011, as a part of the 2011 Phase I ESA. Mr. Lee stated that he was unaware of any additional environmental concerns apart from those mentioned during the 2009 interview.

9.2. PROPERTY USAGE

According to the Sanborn Maps for the Site, the Evans Building Complex was formerly a steel manufacturing facility that contained a foundry on the northern end of Building 3. The vacant lot located east of the Evans Building Complex was formerly used as a paper recycling facility. The Fintube Building Complex was formerly used as a metal manufacturing facility and a producer of heat exchangers that consisted of a concrete reservoir, a forge, and welding and fabrication shops. The vacant lot east of the Fintube Building Complex was formerly a residential area.

The EDR City Directory revealed that the following businesses were located within the Site: Iverson Tool Co. (1926-1946), Peerless Supply Co. (1931-1936), Podbielnaik Labs (1936), Bethlehem Supply Co. Foundry (1951), Ace Meter Co. (1951), Wilson Truck Co. (1951), Consolidated Transfer & Storage (1956), TC Inc. Tele Table (1956), Connor Delivery Service (1961), Bash Machine Shop (1961-1966), Air Kart Manufacturer (1961-1966), Lahmeyer Pattern Shop (1961-1966), Worthington Corp. Machinery (1961-1966), Central States Steel Inc. (1966), Kentube Engineering Products (2006), and Canine Unlimited Dog Training (2006).

An interview with Mr. Rusty Thrash of Evans Enterprises revealed that the Evans Building Complex was purchased by Evans Enterprises from Mr. Robert Traband (President, University Park Properties, Inc.) on August 26, 1991.

10.0 HISTORICAL RESOURCES DATA GAPS

Historical Resources Data Gaps do not exist for the Site.

11.0 ACTIVITY AND USE LIMITATIONS

According to a representative of the Site, Mr. David Giacomo, there are no reported deed restrictions, restricted covenants, easements, zoning, or institutional and/or engineering controls, such as environmental liens that have been filed or recorded under federal, tribal, state, or local law.

According to the regulatory records check supplied by EDR, there are no engineering or institution controls for the subject site.

12.0 REGULATORY RECORDS REVIEW

Based upon our review and interpretation of records acquired from EDR, existing evidence was found concerning the Site, which could cause environmental degradation to the Site. The following information was reviewed to determine potential environmental degradation:

1) EPA Comprehensive Environmental Response, Compensation and Liability Act Information System (CERCLIS)
2) EPA Resource Conservation and Recovery Information System (RCRIS)
3) Oklahoma Registered Underground Storage Tank/Leaking Underground Storage Tank (UST/LUST)
4) EPA Facility Index System (FINDS)
5) EPA Emergency Response Notification System (ERNS)
6) State of Oklahoma Permitted Solid Waste Disposal and Processing Facilities
7) Local Government and tribal records.

The EPA, ODEQ, and OCC learn of these sites in various ways such as notification by the owner, citizen complaints, state and local government identification and as a result of other EPA investigations. These records are updated in accordance to ASTM E 1527-05, unless otherwise noted. A copy of relevant regulatory records can be found in **Appendix I**.

Comprehensive Environmental Response, Compensation, and Liability Act – CERCLIS (0.5 mile radius)
According to EDR information, the Site is not listed as being in the CERCLIS database. There are no properties within a 0.5 mile radius found in the CERCLIS database.

Comprehensive Environmental Response, Compensation, and Liability Act – No Further Remedial Action Planned – CERCLIS-NFRAP (0.5 mile radius)
According to EDR information, the subject site is not listed as a CERCLIS-NFRAP facility. There are two CERCLIS-NFRAP facilities within a 0.5 mile radius of the Site.

- Treban PCB Site, 116 North Lansing, (On Site)
  The Treban PCB release is located within Site and is described as being an industrial warehouse area including an abandoned warehouse and rail spur. This property was initially discovered February 2, 1990, and the status was listed as NFRAP after the preliminary assessment and site inspection were completed March 11, 1991.
- Electro Platers – Injection Wells, 624 East Archer, (0.105 miles WSW)
  Electro-Platers is located down-gradient from the Site. A preliminary assessment was opened for this property on April 1, 1980, and was reported as completed April 1, 1980. Although a start date for the discovery of this property is not reported, the date completed is listed as May 1, 1980.

CERCLA Lien Information – LIENS 2 (0.5 mile radius)
According to EDR information, the Site is not listed as being in the LIENS 2 database. There are no properties within a 0.5 mile radius found in the LIENS 2 database.

Resource Conservation and Recovery Act-Corrective Action - RCRA-CORRACTS (1 mile radius)
According to EDR information, the subject site is not listed as a RCRA-CORRACTS facility. There are no facilities located within a one-mile radius of the Site that are registered in the RCRA-CORRACTS database.

Resource Conservation and Recovery Act-Treatment, Storage, Disposal Facility - RCRA-TSDF (1 mile radius)
According to EDR information, the subject site is not listed as a RCRA-TSD facility. There are no facilities located within a 1 mile radius of the Site that are registered with the RCRA-TSD.

Resource Conservation and Recovery Act-Large Quantity Generator - RCRA-LQG (0.25 mile radius)
According to EDR information, the Site is not listed as a RCRA-LQG facility. There are no RCRA-LQG facilities within a 0.25 mile radius of the Site.

Resource Conservation and Recovery Act- Small Quantity Generators – RCRA-SQG (0.25 mile radius)
According to EDR information, the subject site is not listed as a RCRA-SQG facility. There are no RCRA-SQG facilities within a 0.25 mile radius of the Site.

Resource Conservation and Recovery Act-Conditionally Exempt Small Quantity Generators – RCRA-CESQG (0.25 mile radius)
While the Site is not listed as a RCRA-CESQG, there are four RCRA-CESQG facilities located within a 0.25 mile radius of the Site.

- Aircraft Cylinders of America, 1006 E. Independence St. (0.077 miles E)
  Aircraft Cylinders of America is listed as having generated corrosive hazardous wastes and chromium. A violation was documented by the state on September 27, 1989 and compliance was achieved December 19, 1989. Subsequent compliance evaluations were conducted on September 24 and December 23, 1992. No other violations have been reported. This facility is located down-gradient from the Site.
- Madison Machinery Co., 65 N. Madison St. (0.076 miles E)
  This facility is listed as having generated the following types of hazardous wastes: ignitable wastes, corrosive wastes, halogenated solvents, and non-halogenated solvents. No violations were found for this facility.
- Nordam Transparency Division Co., 1050 E. Archer St. (0.125 miles E)
  This facility is listed as having generated formaldehyde and methyl methacrylate. No violations were found for this facility.

- Centerline Main Building, 1007 E. Admiral Blvd. (0.193 miles SE)
  This facility is listed as having generated ignitable wastes and halogenated solvents. Fourteen general violations were documented between April 24 and May 24, 1993. Two of the violations achieved compliance on October 13, 1993, and the other twelve violations achieved compliance on November 30, 1993. This facility is down-gradient from the Site.

Due to either distance from the Site or lack of reported violations at the properties, these locations are considered to pose minimal threat for adverse impact to the Site.

Resource Conservation and Recovery Act-Non Generators – RCRA-NonGen (0.25 mile radius)
According to EDR information, there are two RCRA-NonGen facility listed as being within the Site. There are four RCRA-NonGen facilities located within a 0.25 mile radius of the Site.

- Therma Tech Inc., 186 N. Lansing (On Site)
  The types of hazardous waste previously generated at this facility were not listed. No violations were reported for this facility.
- Evans Enterprises, 821 East Archer, (On Site)
  The types of hazardous waste previously generated at this facility were not listed. No violations were reported for this facility.
- First Image Management Co., 824 East Admiral Boulevard, (0.131 miles SSE)
  This facility is listed as having previously generated chromium and silver. No violations were reported for this facility.
- Printed Products Inc., 1145 E. Easton (0.239 miles E)
  The types of hazardous waste previously generated at this facility were not listed. No violations were reported for this facility.

Due to a lack of reported violations, these facilities are considered to pose minimal threat for adverse impact to the Site.

Engineering Controls Sites List- US INST Control (1 mile radius)
According to EDR information, the Site is not listed in the US INST Control database. There are no properties listed in the US INST Control database within 1 mile of the Site.

Institutional Controls Sites List- US INST Control (1 mile radius)
According to EDR information, the Site is not listed in the UST INST Control database. There are no properties listed in the US INST Control database within 1 mile of the Site.

Emergency Response Notification System - ERNS (0.5 mile radius)
According to EDR information, the subject site is not listed as an ERNS facility. There are no facilities within 0.5 miles of the Site listed in the ERNS facilities list.

Hazardous Materials Information Reporting System - HMIRS (0.125 mile radius)
According to EDR information, the subject site is not listed in the HMIRS database. There are no facilities within 0.125 miles of the Site listed in the HMIRS database.

Incident and Accident Data – DOT OPS (0.5 mile radius)
According to EDR information, the subject site is not listed in the DOT OPS database. There are no facilities within 0.5 miles of the Site listed in the DOT OPS database.

Clandestine Drug Labs - CDL (0.5 mile radius)
According to EDR information, the subject site is not listed in the CDL database. There are no facilities within 0.5 miles of the Site listed in the CDL database.

US Brownfields (0.5 mile radius)
According to the EDR information, there are no US Brownfields listings within the Site. There are two US Brownfields listings within a 0.5 mile radius of the Site.

- 2 North Elgin Avenue, 2 North Elgin Avenue (0.284 miles SW)
  A Phase I ESA was conducted at this down-gradient location on an unknown date.
- Site B-N. Peoria (Lowell), 1006 N. Quaker Ave. (0.397 miles ENE)
  The action taken on this facility was the completion of a Phase I ESA that was completed on June 30, 2002.
- Oklahoma Steel Castings, 1200 N. Peoria St. (0.456 miles NE)
  The cleanup of this down-gradient steel casting plant began December 31, 2001, and is listed as being completed December 31, 2001.

Due to their distance from the Site and lack of reported violations, these locations are considered to pose minimal threat for adverse impact to the Site. The 2 North Elgin Avenue US Brownfields listing was not identified in the original Phase I ESA conducted for the Site. This listing is located down-gradient from the Site and does not a pose a threat for adverse environmental impact to the Site.

Department of Defense Sites - DOD (1.5 mile radius)
According to EDR information, the subject site is not listed in the DOD database. There are no facilities within 1.5 miles of the Site listed in the DOD database.

Formerly Used Defense Sites - FUDS (1.5 mile radius)
According to EDR information, the subject site is not listed in the FUDS database. There are no facilities within 1.5 miles of the Site listed in the FUDS database.

Land Use Control Information System - LUCIS (1 mile radius)
According to EDR information, the subject site is not listed in the LUCIS database. There are no facilities within 1 mile of the Site listed in the LUCIS database.

Superfund (CERCLA) Consent Decrees - CONSENT (1.5 mile radius)
According to EDR information, the subject site is not listed in the CONSENT database. There are no facilities within 1.5 miles of the Site listed in the CONSENT database.

Record of Decision - ROD (1.5 mile radius)
According to EDR information, the subject site is not listed in the ROD database. There are no facilities within 1.5 miles of the Site listed in the ROD database.

Uranium Mill Tailings Sites - UMTRA (1 mile radius)
According to EDR information, the subject site is not listed in the UMTRA database. There are no facilities within 1 mile of the Site listed in the UMTRA database.

Open Dump Inventory - ODI (1 mile radius)
According to EDR information, the subject site is not listed in the ODI database. There are no facilities within 1 mile of the Site listed in the ODI database.

Torres Martinez Reservation Illegal Dump Site Locations – DEBRIS REGION 9 (1 mile radius)
According to EDR information, the subject site is not listed in the DEBRIS REGION 9 database. There are no facilities within 1 mile of the Site listed in the DEBRIS REGION 9 database.

Mines Master Index File - MINES (0.75 mile radius)
According to EDR information, the subject site is not listed in the MINES database. There are no facilities within 0.75 miles of the Site listed in the MINES database.

Toxic Chemical Release Inventory System - TRIS (0.125 mile radius)
According to EDR information, the subject site is not listed in the TRIS database. There are no facilities within 0.125 miles of the Site listed in the TRIS database.

Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA)/ TSCA Tracking System – FTTS (0.5 mile radius)
According to EDR information, the subject site is not listed in the FTTS database. There are no facilities within 0.5 miles of the Site listed in the FTTS database.

FIFRA/TSCA Tracking System Administrative Case Listing – HIST FTTS (0.5 mile radius)
According to EDR information, the subject site is not listed in the HIST FTTS database. There are no facilities within 0.5 miles of the Site listed in the HIST FTTS database.

Section 7 Tracking System - SSTS (0.5 mile radius)
According to EDR information, the subject site is not listed in the SSTS database. There are no facilities within 0.5 miles of the Site listed in the SSTS database.

Integrated Compliance Information System – ICIS (0.125 mile radius)
According to EDR information, the subject site is not listed in the ICIS database. There are no ICIS facilities within 0.125 miles of the Site listed in the ICIS database.

PCB Activity Database System - PADS (0.5 mile radius)
According to EDR information, the subject site is not listed in the PADS database. There are no facilities within 0.5 miles of the Site listed in the PADS database.

Material Licensing Tracking System - MLTS (0.5 mile radius)
According to EDR information, the subject site is not listed in the MLTS database. There are no facilities within 0.5 miles of the Site listed in the MLTS database.

Radiation Information Database - RADINFO (0.5 mile radius)
According to EDR information, the subject site is not listed in the RADINFO database. There are no facilities within 0.5 miles of the Site listed in the RADINFO database.

FINDS- Facility Indexed System (0.125 mile radius)
According to the EDR information, there are three FINDS listings within the Site. There are no other FINDS listings within a 0.125 mile radius of the Site.

- Kentube Engineered Products, 186 N. Lansing (On Site)
  The EDR Report indicates that Kentube Engineered Products is listed within the TRIS database.
- Therma Tech Inc., 186 N. Lansing (On Site)
  Therma Tech Inc. is listed as a RCRA Non-Gen facility. The types of hazardous waste previously generated at this facility were not listed. No violations were reported for this facility.
- Evans Enterprises, 821 E. Archer (On Site)
  Evans Enterprises is listed as a RCRA Non-Gen facility. The types of hazardous waste previously generated at this facility were not listed. No violations were reported for this facility.

The information in the EDR Report regarding the above facilities' listing in the FINDS database does not give details as to the activities at the facilities.

RCRA Administrative Action Tracking System - RAATS (0.5 mile radius)
According to EDR information, the subject site is not listed in the RAATS database. There are no facilities within 0.5 miles of the Site listed in the RAATS database.

State Coalition for Remediation of Drycleaners Listing - SCRD DRYCLEANERS (0.5 mile radius)
According to EDR information, the subject site is not listed in the SCRD DRYCLEANERS database. There are no facilities within 0.5 miles of the Site listed in the SCRD DRYCLEANERS database.

The Land Report – SHWS (1.5 mile radius)
According to EDR information, the subject site is not listed in the SHWS database. There are no facilities within 1.5 miles of the Site listed in the SHWS database.

Permitted Solid Waste Disposal & Processing Facilities – SWF/LF (1 mile radius)
According to EDR information, the subject site is not listed in the SWF/LF database. There are no facilities within 1 mile of the Site listed in the SWF/LF database.

Solid Waste/Recycling Facilities – SWRCY (0.5 mile radius)
According to EDR information, the subject Site is not listed as a SWRCY facility. There are nine SWRCY locations registered within a 0.5 mile radius of the Site.

- Quick Service Steel Co., 1155 N. Peoria (0.486 miles NE)

Due to its down-gradient orientation to the Site, this facility is not considered to pose an threat of environmental impact to the Site.

Leaking Underground Storage Tanks – LUSTs (0.5 mile radius)
According to EDR information, the subject Site is not listed as a LUST facility. There are nine LUST locations registered within a 0.5 mile radius of the Site.

- Madison Machinery, 65 North Madison, (0.076 miles E)
  Madison Machinery is up-gradient from the Site. A case of suspicion of release was opened on August 21, 2007, and subsequently closed on June 4, 2008.
- Printed Products Inc. Bldg. #3, 1144 E. Haskell (0.238 miles E)
  This facility is down gradient from the Site. On May 6, 1999 a case of confirmed release was opened and was subsequently closed on October 27, 1994.
- Sail & Sun, 587 East 1st Street, (0.208 miles SSW)
  Sail & Sun is down-gradient from the Site. On February 17, 1989, a case of confirmed release was opened and subsequently closed on June 30, 1989.
- B&B Lines, Inc., 317 S. Detroit (0.308 miles SSW)
  B&B Lines, Inc. is up-gradient from the Site. On November 3, 1995, a case of confirmed release was opened and was subsequently closed on January 24, 1996.
- Fuelman #1952, 319 East Archer, (0.329 miles WSW)
  Fuelman #1952 is located down-gradient from the Site. A case of confirmed release was opened July 11, 1990, and subsequently closed March 31, 2000. A second case of confirmed release was opened January 28, 2002, and subsequently closed August 28, 2002.
- 4th Street Auto Service, 1004 East 4th Street, (0.404 miles SSE).
  4TH Street Auto Service is down-gradient from the Site. A case of confirmed release was opened February 21, 1990, and subsequently closed June 28, 2001.
- Pacesetter Coachlines, 414 S. Owasso (0.462 miles SSE)
  Pacesetter Coachlines is located down-gradient from the Site. A case of confirmed release was opened on September 11, 1992, and subsequently closed on January 6, 1995.
- Greyhound Lines, Inc., 317 South Detroit, (0.465 miles SSW)
  Greyhound Lines, Inc. is up-gradient from the Site. A case of confirmed release was opened on August 12, 1987, and subsequently closed on August 12, 1987. A second case of confirmed release was opened September 20, 1990, and closed November 30, 1990.
- Riverside Chevrolet, 414 South Elgin, (0.466 miles S)
  Riverside Chevrolet is up-gradient from the Site. A case of confirmed release was opened August 7, 2006, and was followed by a case of suspicion of release opened on September 9, 2006. The case of suspicion of release was closed on November 22, 2006, with a case of

confirmed release opened on the same date, November 22, 2006. This case was closed on October 31, 2007.

The closed status indicates that either the LUST locations were found to have minimal contamination below any regulatory action threshold, or that the location was cleaned up to levels below any regulatory threshold. The facilities listed under a closed status present minimal threat for impact to the Site.

Underground Storage Tanks – USTs (0.25 mile radius)

According to records acquired from EDR the Site does not contain a UST listing. There are nine UST listings within a 0.25 mile radius of the Site.

- Madison Machinery, 65 North Madison, (0.076 miles E)
  Madison Machinery has one permanently out of use gasoline UST of unknown size.
- DTH Cooking & C Store, 1007 E. Archer (0.079 miles E)
  DTH Cooking and C Store has two temporarily out of use 10,000-gallon gasoline USTs. Both USTs were installed January 17, 1986.
- MCC Center Line, 1007 E. Admiral Blvd. (0.193 miles SE)
  This facility has one 1,000-gallon gasoline UST. This UST was installed on April 11, 1982 and is permanently out of use.
- Harel and Wilma Bennett, 1111 E. Archer (0.197 miles E)
  This facility has one diesel UST and one used oil UST of unknown size. These USTs are listed as being permanently out of use and the install date is not listed.
- U-Haul, 504 East Archer, (0.195 miles WSW)
  U-Haul has one, private, nonretail, permanently out of use, UST registered at this location. This UST is asphalt coated, has unknown piping, was installed April 14, 1977, and contained 10,000 gallons of gasoline.
- Printed Products Inc.-Bldg. 3, 1144 E. Haskell St. (0.238 miles E)
  Printed Products Inc. has one 1,000-gallon gasoline UST and two 550-gallon USTs with unknown contents. All three USTs were installed on August 1, 1979 and are listed as being permanently out of use.
- Sail & Sun, 587 East 1st Street, (0.208 miles SSW)
  Sail & Sun has permanently out of use UST. Date of installation, tank type, tank material description, piping material description, tank capacity, and product/substance description are not reported.
- Taylor's Downtown CITGO, 723 East 2nd Street, (0.229 miles SSE)
  At this location there are a total of five USTs currently in use, all of which are constructed of cathodically protected steel. Four USTs contain either gasoline or diesel fuel, have steel piping, while the fifth UST used for used oil storage has no piping. All five USTs were installed May 2, 1976. Two USTs are used for gasoline and have 8,000-gallon and 4,000-gallon capacities. Two USTS are used for diesel and have capacities of 8,000 gallons and 4,000 gallons, respectively. The fifth UST, used for used oil storage, has a 500-gallon

capacity.

- Independent Material Co., 34 N. Owasso Ave. (0.244 miles ESE)
  This facility has one 500-gallon gasoline UST. The UST was installed on June 20, 1956 and is permanently out of use.

These UST locations are not considered to present a material threat for adverse environmental impact to the Site as they are all down-gradient from the Site and are not listed as active LUST cases, with the exception of the three LUST listings (Madison Machinery, Printed Products Inc., and Sail & Sun) which have been described previously in this report. Additionally, information gathered through records reviews, interviews with persons knowledgeable about the Site and its history, and Site observations did not indicate any releases or potential releases that would be considered above de minimis conditions.

Historic Underground Storage Tanks – HIST USTs (0.25 mile radius)
According to records acquired from EDR the Site does not contain a UST listing. There are eight UST listings within a 0.25 mile radius of the Site.

- DTH Cooking & C Store, 1007 E. Archer (0.079 miles E)
- Centerline Main Building, 1007 E. Admiral (0.193 miles SE)
- Harel and Wilma Bennett, 1111 E. Archer (0.197 miles E)
- U-Haul, 504 East Archer, (0.195 miles WSW)
- Printed Products Inc.-Bldg. 3, 1144 E. Haskell St. (0.238 miles E)
- Sail & Sun, 587 East 1st Street, (0.208 miles SSW)
- Taylor's Downtown CITGO, 723 East 2nd Street, (0.229 miles SSE)
- Independent Material Co., 34 N. Owasso Ave. (0.244 miles ESE)

These UST locations are not considered to present a material threat for adverse environmental impact to the Site as they are all located down-gradient from the Site and are not listed as active LUST cases, with the exception of the three LUST listings (Madison Machinery, Printed Products Inc., and Sail & Sun) which have been described previously in this report. Additionally, information gathered through records reviews, interviews with persons knowledgeable about the Site and its history, and Site observations did not indicate any releases or potential releases that would be considered above de minimis conditions.

Leaking Aboveground Storage Tanks List – LAST (1 mile radius)
According to EDR information, the subject site is not listed in the LAST database. There are no facilities within 1 mile of the Site listed in the LAST database.

Aboveground Storage Tanks List –AST (0.25 mile radius)
According to EDR information, the subject site is not listed in the AST database. There are no facilities within 0.25 miles of the Site listed in the AST database.

Institutional Controls Sites- INST Control (1 mile radius)
According to EDR information, the Site is not listed in the INST Control database. There are two properties listed in the INST Control database within 1 mile of the Site.

- Southern Specialties Corp., 1232 E. 2nd St. (0.364 miles SE)
- Oklahoma Steel Castings, 1200 N. Peoria (0.453 miles NE)

The Oklahoma Steel Castings facility was identified in the EDR Report for the 2009 Phase I, but was not included in the EDR Report for this Phase I Report. Due to their distance and topographically down-gradient orientation to the Site, these locations are considered to pose minimal threat for adverse impact to the Site.

Voluntary Cleanup Site Inventory – VCP (0.5 mile radius)
According to EDR information and the Oklahoma Department of Environmental Quality, the Site is not listed in the VCP database. There are three properties listed in the VCP database within 0.5 mile of the Site.

- FABSCO, Inc., 186 North Lansing (On-site)
- PPI Properties/George Owens, 1144 E. Haskell St. (0.238 miles E)
- Southern Specialties Corp., 1232 E. 2nd St. (0.362 miles SE)
- Oklahoma Steel Castings, 1200 N. Peoria (0.453 miles NE)

The FABSCO, Inc. facility was identified in the EDR Report as being located on-site, but was not identified in the EDR Report of the 2009 Phase I ESA. FABSCO was owned by Harsco, Inc. in 1995 when they occupied the on-site Fintube Building Complex. Although a Phase I (1991) and Phase II (1994) were completed for FABSCO to address potential and recognized site conditions, ODEQ does not have a record of the Site entering into the Voluntary Cleanup Program. ODEQ did review the Phase II ESA in January 1995, but returned the report two weeks later without comment or letter response (interview Mr. Dale Johnson, ODEQ, June 30, 2011).

The Oklahoma Steel Castings facility was identified in the EDR Report for the 2009 Phase I, but was not included in the EDR Report for this Phase I Report.

Due to their distance and topographically down-gradient orientation to the Site, the PPI Specialties, Southern Specialties Corp., and Oklahoma Steel Casting facilities are considered to pose minimal threat for adverse impact to the Site.

Drycleaners (0.75 mile)
According to EDR information, the Site is not listed in the Drycleaners database. There are no properties listed in the Drycleaners database within 0.75 miles of the Site.

Brownfields (0.5 mile radius)
According to the EDR information, the Site is not listed in the Brownfields database. There is one

properties listed in the Brownfields database within a 0.5 mile radius of the Site.

- Oklahoma Steel Castings, 1200 N. Peoria (0.453 miles NE)
  A fuel UST was damaged during demolition of the building. Cleanup of the spill began on January 1, 2003 and has been completed. This facility is located down-gradient from the Site.

The Oklahoma Steel Castings facility was identified in the EDR Report for the 2009 Phase I, but was not included in the EDR Report for this Phase I Report. Due to the facility's completed remediation and its down-gradient orientation to the Site, this location is considered to pose minimal threat for adverse impact to the Site.

Permitted AIRS Facility Listing – AIRS (0.5 mile radius)
According to EDR information, the subject site is not listed in the AIRS database. There are no facilities within 0.5 miles of the Site listed in the AIRS database.

Tier 2 (1 mile radius)
According to the EDR information, the Site is not listed in the Tier 2 database. There are no properties listed in the Tier 2 database within 1 mile of the Site.

Oklahoma Complaint System Database –OK COMPLAINT (1 mile radius)
According to EDR information, the subject site is not listed in the OK COMPLAINT database. There are no facilities within 1 mile of the Site listed in the OK COMPLAINT database.

Indian Reservation (1.5 mile radius)
According to the EDR information, the Site is listed in the Indian Reservation database. There is one property listed in the Indian Reservation database within 1.5 miles of the Site.

- Osage Indian Reservation, (0.889 miles W)

Report on the Status of Open Dumps on Indian Lands – INDIAN ODI (1 mile radius)
According to EDR information, the subject site is not listed in the INDIAN ODI database. There are no facilities within 1 mile of the Site listed in the INDIAN ODI database.

Leaking Underground Storage Tanks on Indian Lands – INDIAN LUST (1 mile radius)
According to EDR information, the subject site is not listed in the INDIAN LUST database. There are no facilities within 1 mile of the Site listed in the INDIAN LUST database.

Underground Storage Tanks on Indian Lands – INDIAN UST (0.75 mile radius)
According to EDR information, the subject site is not listed in the INDIAN UST database. There are no facilities within0.75 miles of the Site listed in the INDIAN UST database.

Voluntary Cleanup Priority Listing – INDIAN VCP (1 mile radius)
According to EDR information, the subject site is not listed in the INDIAN VCP database. There are no facilities within 1 mile of the Site listed in the INDIAN VCP database.

Manufactured Gas Plants (1.5 mile radius)
According to EDR information, the subject site is not listed in the Manufactured Gas Plants database. There are no facilities within 1.5 miles of the Site listed in the Manufactured Gas Plants database.

12.1. NPL SITES

The EPA has established a National Priorities List (NPL) of contaminated sites ranked most hazardous by the Hazard Ranking System for the expenditure of cleanup funds. The NPL includes abandoned and uncontrolled hazardous waste sites, which EPA updates periodically.

National Priorities List – NPL (1.5 mile radius)
According to EDR information, the Site is not listed as being in the NPL database. There are no properties within a 1.5 mile radius found in the NPL database.

Proposed National Priorities List Sites – Proposed NPL (1.5 mile radius)
According to EDR information, the Site is not listed as being in the Proposed NPL database. There are no properties within a 1.5 mile radius found in the Proposed NPL database.

National Priorities List Deletions– Delisted NPL (1.5 mile radius)
According to EDR information, the Site is not listed as being in the Delisted NPL database. There are no properties within a 1.5 mile radius found in the Delisted NPL database.

Federal Superfund Liens – NPL LIENS (0.5 mile radius)
According to EDR information, the Site is not listed as being in the NPL LIENS database. There are no properties within a 0.5 mile radius found in the NPL LIENS database.

12.2. LANDFILLS

According to EDR information, there are no permitted solid waste disposal facilities located within 0.50 miles of the Site.

A complete list of relevant Regulatory Records (including the EDR) is provided in **Appendix I**.

13.0 ADDITIONAL SERVICES

Additional services were not requested as part of the Scope-of-Work for this Phase I ESA.

14.0 FINDINGS AND CONCLUSIONS

ALL Consulting has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-05 on the Fintube TBA Site, bounded on the west by a railroad easement; on the east by N. Lansing Ave. and Highway 75; on the north by Lee Supply Co.; and on the south by E. Archer St. and Highway 244 in the City of Tulsa, Tulsa County, Oklahoma. Any exceptions to or deletions from this practice are described in Section 4.3 of this report. Please review the following findings of the inspection.

A) Several areas within the Site contained chemicals such as motor oil, lubricant, paint, herbicides, and pesticides (see **Appendix D**, Photographs 9, 10, 12-15, 17, 22, 24, 25, 28, 31-35, 37-42, 45, 51, and 55). The Offices at the Evans Building Complex contain three (3) 1-gallon containers of evaporator/condenser cleaner, nine (9) 1-gallon bottles of acid-type condenser cleaner, two (2) 1-gallon containers of refrigeration oil, nine (9) 8-ounce bottles of ice machine cleaner, two (2) 11-ounce containers of CFC Freeze, approximately fifty (50) 1-gallon paint cans, one (1) 5-gallon bucket of seam sealer, four (4) 1-gallon cans of solvent, three (3) 1-gallon containers of Goof Off, two (2) 1-gallon containers of water seal, two (2) 5-gallon buckets of water seal, one (1) 5-gallon bucket of paint, two (2) cases of herbicides, and seven (7) cases of motor oil (see **Appendix D**, Photographs 9, 12-14). The Maintenance Shop within the Evans Building Complex contained carburetor cleaner, fuel conditioner, motor oil, and brake fluid (see **Appendix D**, Photographs 16-17). An approximately 20"x5" stain was observed on the floor underneath the chemicals being stored at the Maintenance Shop. The Supply Room at the Evans Building Complex contained several spray paint cans and approximately fifteen (15) quarts of motor oil (see **Appendix D**, Photographs 22, 24, and 25).

B) Numerous 55-gallon drums without secondary containment were observed throughout the Evans Building and Fintube Building Complexes. A full 55-gallon drum, labeled "Shepler's Premium Release", was observed in the southeast portion of Building 4 at the Evans Building Complex (see **Appendix D**, Photograph 35). Five full 55-gallon drums, one of Shep Cure and four of "P" Prime, were located in the south portion of Building 3 of the Evans Building Complex (see **Appendix D**, Photographs 39 and 40). Minor staining was observed in relation to these drums. Four full 55-gallon drums, one of Spec Strip and three of Chem Trete 40 VOC, were observed on the northeast exterior of Building 4 of the Evans Building Complex (see **Appendix D**, Photograph 55). No staining was noted in relation to these drums. Fifteen full or partially full 55-gallon drums were observed on the southeast exterior of Building 5 of the Fintube Building Complex, with handwritten labels indicating waste oil, burn diesel, and mineral spirits (see **Appendix D**, Photograph 87). A small 3'x3' stain was observed near these drums, which is up-gradient to an open sump (see **Appendix D**, Photograph 88). Seventeen empty 55-gallon drums were observed stored along the west fence line on the south exterior portion of the Evans Building Complex (see **Appendix D**, Photograph 54). No staining was observed in relation to these drums.

C) Five 275-gallon totes of Pave Cure were observed, two partially full within and three empty on the south exterior of Building 3 of the Fintube building complex. None of the totes were within a secondary containment system. No evidence of leakage or spills was observed related

to these totes.

D) Two (2) liquid applicators were observed within the Evans Building Complex during the site visit (see **Appendix D**, Photographs 15, 43, and 44). An empty 250-gallon herbicide sprayer was observed in both the Maintenance Shop and the west portion of Building 4. A second liquid applicator with a 250-gallon tank was observed also in the Evans Building Complex in the west-central area of Building 3 attached to a concrete cutter machine. The liquid is sprayed as a coolant for the diamond cutter and a lubricant to remove concrete pieces during the cutting process. No leakage or release of tank contents from either the herbicide sprayer or the concrete cutter beneath their respective tanks was observed.

E) Staining due to motor oil leaks and other unknown substances was observed throughout the interiors of both the Evans Building Complex and the Fintube Building Complex. Due to the impervious nature of the concrete flooring, staining on solid portions of the concrete floor presents a low potential for impact to the Site (see **Appendix D**, Photographs 19, 21, 25, 36, and 39). However, portions of the Site contained stains that were on or near cracks in the concrete floor, trenches, or sumps, which could potentially allow the leaked substance to impact soils or groundwater at the Site (see **Appendix D**, Photograph 33).

Stains were also observed on the west end of Building 4 and 5 near several large electric motors (see **Appendix D**, Photograph 36). During the 2009 Phase I ESA, a large transformer was located in the vicinity of the 4'x5' stain in the western end of Building 5. This transformer was not observed during the 2011 site visit. Based on the historic use of PCB oil in transformers, the staining located underneath the former pad-mounted transformer is potentially PCB oil. Several floor drains were also observed in the vicinity of the western portions of Buildings 4 and 5.

F) Throughout the interior and exterior of the Evans Building Complex and the Fintube Building Complex, multiple open trenches, pits, sumps, and floor drains were observed (see **Appendix D**, Photographs 33, 79, 89 and 90). The extent of staining throughout the Site suggests that leaking fluids may have potentially drained into these openings throughout the historic use of the Site. Review of the Phase I ESA conducted on the Fintube Building Complex in 2000 revealed the former presence of a large pit, of unknown size, that was used to collect water for hydro-testing in the southwest corner of the Fintube Building Complex. At the time of the previous assessment, this pit contained approximately one inch of hydrocarbon-containing fluid that appeared to be hydraulic fluid. The location of the former hydro-test pit was not identified during the site visit. Additionally, the 2000 Phase I ESA identified two (2) east-west oriented floor drains within the southern portion of the Fintube Building Complex, two (2) large north-south oriented floor drains within the mid-northern portion of the Fintube Building Complex, and one (1) large north-south oriented stormwater drain located immediately east of the central portion of the Fintube Building Complex. These drains identified in the 2000 Phase I ESA were not observed during the 2009 or 2011 site visits. These former and current floor level openings represent a potential open pathway to surface soils, subsurface soils, and groundwater.

G) Throughout Building 3 at the Evans Building Complex, wooden bricks being used as floor covering were observed to be saturated with a hydrocarbon substance and exhibited a hydrocarbon odor. The presence of hydrocarbons on the porous flooring has potentially resulted in hydrocarbon impact to surface and subsurface soils of the Site.

H) During the site visit, one (1) red 55-gallon drum was observed in Building 3 at the Evans Building Complex. The drum was partially filled and appeared to be in good condition. The label of "Red Diesel" is hand written on the drums. No staining that could be attributed to leakage from the drums was observed in the area.

I) Two (2) piles of railroad ties, approximately 5'x5' and 8'x5' were observed within the northern portion of Building 3 at the Evans Building Complex . Railroad ties are commonly treated with polycyclic aromatic hydrocarbons (PAHs), which are known to be carcinogenic.

J) Peeling paint was observed within the interior of the Fintube Building Complex and Evans Building Complex. A 2010 LBP inspection was conducted as a part of a previous Phase II ESA (ALL, 2010). Results of LBP sampling indicated the presence of LBP above the permissible level of 1.0 mg/cm^2 in both the Evans Building and Fintube Building Complexes.

K) Suspect ACM was observed within the interior of the Fintube Building Complex and Evans Building Complex in the form of wall and pipe insulation. An ACM inspection was conducted as part of a Phase II ESA (ALL, 2010). The Phase II ESA report provides a listing of locations where ACM concentrations have been defined. Asbestos sampling was not conducted as a part of this Phase I ESA.

L) An approximately 500-gallon diesel AST was located 100 feet south of Building 5 at the Evans Building Complex (see **Appendix D**, Photograph 51). It is unknown how much diesel is currently contained within the AST. Secondary containment is prefabricated for the AST and no stains or signs of leaking were observed in the area.

M) Observations made at the time of the Site visit along with information obtained from the Sanborn Maps revealed that railroad spurs are located along the east and west sides of the Evans Building Complex and the Fintube Building Complex (see **Appendix D**, Photographs 60, 64, and 65). Several sets of railroad tracks are located on adjacent property west of the Site as well. Historic usage of the Site and adjacent property for railroad transportation has likely resulted in hydrocarbon and/or metals impact to surface and subsurface soils. Additionally, the customary practice of using a spray car to apply herbicides to rail lines and crossings may have led to surface and subsurface impact due to these chemicals.

N) A furnace and an empty approximately 5,000-gallon AST was observed west of Building 4 at the Fintube Building Complex (see **Appendix D**, Photograph 91).

O) The shell of a PMT located south of Building 3 at the Fintube Building Complex was observed lying on top of a concrete pad (see **Appendix D**, Photograph 84). An approximately 10'x15' stain was observed about two (2) feet south of the transformer and appeared to have travelled

approximately thirty (30) feet to the west along a row of soil between two concrete pads (see **Appendix D**, Photograph 85). While the 2000 Phase I ESA stated that each of the four transformers had a "non-PCB" sticker, the Phase II ESA conducted by ALL identified this as being a source of PCB contamination (ALL, 2010).

P) Fluorescent lights were observed in the Offices and Maintenance Shop at the Evans Building Complex, and within the Locker Room and Break Room at the Fintube Building Complex (see **Appendix D**, Photograph 11). Sodium vapor lights were noted in Fintube Building 4. The fluorescent light and sodium vapor light bulbs are known to contain mercury vapors inside their tube and their ballasts have the potential to contain PCB liquids as a dielectric. During the 2000 Phase I ESA at the Fintube Building Complex, a fluorescent light ballast was observed to have overheated and leaked oil on the floor within the Locker Room. Based on recommendations made during the 2000 Phase I ESA, approximately 38 fluorescent light ballasts were replaced at the Fintube Building Complex. A mercury thermostat switch was observed in both the Locker Room and Break Room at the Fintube Building Complex (see **Appendix D**, Photograph 81). Fluorescent lights and ballasts, and mercury switches are classified as universal wastes for disposal purposes. The presence of these materials poses a threat for environmental impact to the Site.

Q) Review of the Sanborn maps for the Site revealed the past presence of an approximately 100'x100'concrete reservoir located approximately 30 feet north of Building 1 at the Fintube Building Complex. It is unknown what the reservoir may have previously contained, or if the reservoir is still present within the Site. No indications of its presence were observed in the 2009 or 2011 inspections. If the reservoir was used to contain hazardous materials, the soils at the Site could have potentially been impacted during its use or in the process of burial or excavation of the reservoir.

R) A single PMT was observed with a "non-PCB" sticker located east of the Fintube Building Complex (see **Appendix D**, Photographs 56 and 57). Three "non-PCB" PMTs were observed within the Site, east of the Evans Building Complex (see **Appendix D**, Photographs 29 and 30). All of the PMTs appeared to be in good condition, and no soil staining was observed underneath them.

S) As mentioned in the 2000 Phase I ESA, a Limited Phase II ESA conducted in 1994 revealed the presence of 1,1-dichloroethene, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene, cadmium, and lead above regulatory limits in groundwater near the Fintube Building Complex. Additionally, TPH- DRO were discovered above regulatory limits in the soil at the Site. Based on the recommendations of the 1994 Limited Phase II ESA, Fabsco (the owner of the property at the time of the 1994 assessments) had their consultant supply the Phase II report to ODEQ for review under the VCP. ODEQ reported that they did receive the 1994 Phase II ESA report on January 6, 1995 and returned the report to the consultant on January 25, 1995 after their review without comment. No further information regarding any site activities is found in ODEQ files (D. Johnson interview, 2011).

T) A search of regulatory records documentation and interviews with persons familiar with the

Site has revealed that the Traband PCB Site (EPA ID: OKD987069449) was historically located at the Evans Building Complex. According to the EDR database report, the contamination was discovered on February 2, 1990. After cleanup was complete, the status of the Traband PCB Site was listed as NFRAP on March 11, 1991.

U) Historic resources revealed that Bethlehem Steel Co. occupied the Evans and Fintube Building Complexes from approximately 1939 through 1962. The Bethlehem Steel Co. operated a foundry within the north end of Building 3 at the Evans Building Complex and a forge at the north end of Building 4 at the Fintube Building Complex, both of which consisted of earthen floors. The use of the Site for foundry and forging operations has potentially resulted in hydrocarbons and/or metals impact to surface soils in the area.

V) Bankoff Scrap Metals previously operated within the Site. The historical presence of a scrap metal business presents the potential for metals impacts to the soil within the Site.

W) Storey Wrecker Service previously used the Site as a storage lot for vehicles. The historic presence of wrecked vehicles suggests the potential for soil impacts due to the potential for releases from leaking engine oil, gasoline, and other automobile fluids.

X) Review of the 1939 Sanborn Map depicts the former presence of the following gasoline and fuel oil storage tanks located up-gradient to or within the Site:

- A former Filling Station is depicted off-Site, approximately 750 feet east of the southern end of Building 3 at the Fintube Building Complex and contained one gasoline tank of unknown size.
- A former Filling Station is depicted off-Site, approximately 700 feet east of the southern end of Building 3 at the Fintube Building Complex and contained three gasoline tanks of unknown size.
- A former gasoline tank of unknown size is depicted off-site, approximately 700 feet southeast of the Building 4 at the Evans Building Complex.
- A former gasoline tank of unknown size is depicted on adjacent property approximately 100 feet of the Southwest corner of the Site.
- A former 15,000-gallon fuel oil tank is depicted was located on-Site, approximately 20 feet south of the east edge of Building 4 at the Fintube Building Complex.
- A former fuel oil tank of unknown size is depicted on-Site, approximately 100 feet east of the central portion of Building 3 at the Evans Building Complex.
- A former oil tank of unknown size is depicted on-site, approximately 100 feet east of the southern portion of Building 3 at the Evans Building Complex.

Although no visual or documented evidence of contamination due to these tanks has been discovered, the lack of environmental regulations and controls in place during the existence of these tanks makes the potential for unreported spills an environmental concern to the Site.

Y) Review of the 1939 and 1962 Sanborn Maps revealed the former presence of the Big Four Foundry located 400 feet west of the southwest portion of the Site. The Big Four Foundry was

a manufacturer of iron castings. Due to the potential for airborne deposition of metals onto the soil of the Site, this property is considered an environmental concern to the Site.

Z) A Phase I ESA was conducted for the Site in 2009 (ALL, 2009) and identified the following possible environmental concerns at the Site: presence of stained wooden bricks; historic railroad operations; staining in the vicinity of open pits, sumps, and floor drains; presence of five (5) 55-gallon drums of xylene and other unidentified materials; piles of potentially metal impacted fill material; furnace refractory material; lead-acid battery in a drainage ditch; leaking transformer and electric motors; presence of hazardous materials in a dumpster; former usage of the Site for Bethlehem Steel Works, Bankoff Scrap Metals, and Storey Wrecker Storage Lot, and Big Four Foundry; and the former presence of fuel storage tanks throughout the Site. Most of these are also discussed above.

AA) A Phase II ESA was conducted for the Site in 2010 to determine if the potential environmental concerns identified in the 2009 Phase I ESA had adversely impacted the Site.

- SVOCs exceeded their screening levels in twelve (12) surface soil samples and three (3) subsurface soil samples. Arsenic exceeded its screening level in seventy-eight (78) surface soil samples and thirteen (13) subsurface soil samples. DROs exceeded their screening levels in nine (9) surface soil samples. Lube oil range organics exceeded their screening levels in seven (7) surface soil samples. PCBs exceeded their screening levels in one (1) surface soil sample and one (1) subsurface soil sample. VOCs exceeded their screening levels in three (3) groundwater samples.

- Results of ACM sampling indicate the presence of approximately ten (10) linear feet and ten (10) square feet of asbestos containing thermal system pipe fittings and floor debris located in locker room area of Fintube main building and approximately thirty four (34) linear feet of asbestos containing thermal system pipe insulation located in the main warehouse of Evans Building Complex are considered to be RACM.

- Results of LBP sampling indicated the presence of LBP above the permissible level of 1.0 mg/cm^2 in both the Evans Building Complex and Fintube Building Complex.

- An ORM inspection revealed the presence of fluorescent lights and ballasts in both the Evans Building Complex and Fintube Building Complex, and mercury switches in the Fintube Building complex.

RECOMMENDATIONS:

The Phase II ESA investigation conducted by ALL in 2010 (ALL, 2010) generated environmental soil and groundwater data that confirmed localized areas of concentrations of both metals and chemical that exceed their respective definition of adverse impact at both the Evans Building Complex and the Fintube Building Complexes. Although metals and chemical impacts to soils and groundwater were detected, surface soil sampling was based on a grid pattern and only discrete sampling points were defined within that grid. The borehole placement for subsurface soils and groundwater sampling was determined by historic and observed concerns identified in the prior

Phase I ESA (ALL, 2009). Some of those concerns have been removed from this report based on the findings of the Phase II ESA, and others because the source of concern is no longer present. Prior to any future development within the Site, it is recommended that confirmation sampling should be performed to validate the original detected exceedances and to identify the vertical and horizontal extent of contamination within the proposed area(s) of development. This will allow risk-based management for future on-site development.

Based on information obtained during the site visit conducted on June 24, 2011 (Friday), as well as information obtained through historical records review and interviews, this assessment has identified eight (8) Recognized Environmental Conditions, one (1) Historical Recognized Environmental Conditions, two (2) Business Environmental Risks, and five (5) Other Environmental Findings. The environmental findings within each category are summarized below.

Recognized Environmental Conditions (RECs)

1. ***Stained Wooden Bricks.*** The presence of hydrocarbons on the porous wood brick flooring has potentially resulted in hydrocarbon impact to surface and subsurface soils of the Site. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that the wooden bricks be removed from the Site to prevent further hydrocarbon impacts related to their continued presence and that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

2. ***Railroad Operations.*** Historic usage of the Site and adjacent property for railroad transportation has potentially resulted in hydrocarbon impact to surface. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

3. ***Staining in Proximity to Open Trenches, Pits, Sumps, and Floor Drains.*** Due to the staining observed during the site visit and past usage of the site including the handling of metals and hydrocarbons, these potentially open pathways to soil and groundwater present an environmental threat to the Site. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

4. ***Piles of Fill Material.*** Due to the potential for leaching of metals to surface and subsurface soils, the piles of fill material along the western border of the Evens Building Complex are considered a threat to Site. It is recommended that the fill material be removed from the Site. Sampling may be required for proper characterization and disposal during the removal of these materials.

5. ***Leaking Transformer (Removed) and Electric Motors.*** The former presence of a leaking transformer and continued presence of electric motors in the vicinity of floor drains have resulted in PCB and hydrocarbon impacts to surface soils at the Site. It is recommended that the remaining electric motors and related equipment be removed from the Site and the spilled fluids be remediated with confirmatory sampling conducted following the remedial effort.

6. ***Bethlehem Steel Works.*** Past usage of the Site for foundry and forging operations has potentially resulted in hydrocarbons and/or metals impact to surface soils at the Site. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

7. ***Storey Wrecker Storage Lot.*** The past presence of wrecked vehicles within the Site suggests the potential for impacts due to leaking engine oil, gasoline, and other automobile fluids. Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of hydrocarbons in surface soils collected from these areas that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

8. ***Vandalized PMT.*** Sampling during the Phase II ESA conducted by ALL in 2010 noted the presence of polychlorinated biphenyls (PCB) in surface soils collected from this area that exceeded regulatory screening levels. It is recommended that further evaluation be conducted in coordination with ODEQ to determine actions necessary to manage the risks associated with the impacted soils.

Historical Recognized Environmental Conditions (HRECs)

1. ***Traband PCB Site.*** The past PCB spill west of Building 1 at the Evans Building Complex resulted in PCB contamination to the Site. After remediation of the contamination, the PCB levels at the Site were below applicable standards and the EPA determined that no further remedial actions were necessary at the Site; therefore, no additional assessment was recommended in relation to the former PCB Spill.

Business Environmental Risks (BERs)

1. ***LBP.*** A LBP inspection conducted as part of the 2010 Phase II ESA confirmed that LBP is present within the Fintube Building Complex and Evans Building Complex within the Site.

2. ***ACM.*** An ACM inspection conducted as part of the 2010 Phase II ESA confirmed that ACM is present within the interior of the Fintube Building Complex and Evans Building Complex in the form of wall and pipe insulation.

Other Environmental Findings

1. ***Heavy Equipment and Vehicle Storage.*** The presence of heavy equipment and trucks being parked within the Site has potentially impacted the Site due to oil leaks. It is recommended that the equipment and trucks be removed from the Site, and any identified areas of stained

soil be remediated.

2. ***Empty 55-Gallon Drums.*** Due to the lack of secondary containment, the empty 55-gallon drums located throughout the Site are considered an environmental threat. It is recommended that the drums be removed from the Site and that any related spilled substances be remediated

3. ***Fluorescent Lights and Mercury Switches.*** The presence of mercury in the switch and fluorescent light bulbs and the potential presence of PCB oil in light ballasts pose a potential threat for environmental impact to the Site. It is recommended that any PCB oil containing ballasts be removed from the Site. Additionally, any damaged fluorescent light bulbs or mercury switches should be removed from the Site.

4. ***Chemical Storage Areas.*** The presence of stains associated with chemical storage in the Maintenance Shop presents an environmental threat to the Site if managed improperly. It is recommended that chemicals be placed on impervious surfaces, or within a secondary containment system to minimize spills or overflows.

5. ***Railroad Ties.*** Since railroad ties are commonly treated with PAHs, the presence of railroad ties poses a threat of environmental impact to the Site. It is recommended that the railroad ties be placed on impermeable materials within Building 4 of the Evans Building Complex.

15.0 REFERENCED MATERIALS

"All Appropriate Inquiry" Final Rule, 40 CFR Part 312, Chapter 1 EPA, Subchapter J-Superfund, Emergency Planning, and Community Right-to-Know Programs, 40 CFR Parts 300-399

ALL Consulting (ALL). 2009. Final Phase I Environmental Site Assessment, Fintube TBA, Tulsa, Oklahoma, Dated September, 2009.

ALL Consulting (ALL). 2010. Final Report, Phase II Environmental Site Assessment, Fintube TBA, Tulsa, Oklahoma, Dated April, 2010.

ASTM E 1527-05: Standard Practice for Phase I Environmental Site Assessments.

Dames & Moore. 1994. Limited Phase II Environmental Site Assessment, Fabsco, Inc. Plant, 186 North Lansing, Tulsa, Oklahoma, Volume 1 of 2, Dated December 22, 1994.

EnecoTech. 2000. Phase I Environmental Site Assessment Proposed Fintube Manufacturing Building, 186 N. Lansing Avenue, Tulsa, Oklahoma, Dated June 28, 2000

EDR Radius Map Report with GeoCheck. Environmental Data Resources, Inc. Dated June 23, 2011.

EDR City Directory Abstract. Environmental Data Resources, Inc. Dated June 24, 2011.

EDR Aerial Photo Decade Package. Environmental Data Resources, Inc. Dated June 24, 2011.

EDR Certified Sanborn Map Report. Environmental Data Resources, Inc. Dated June 24, 2011.

EPA. Engineering Bulletin: Solvent Extraction. EPA/540/S-94/503. http://nepis.epa.gov. April 1994. Accessed On: August 19, 2009.

EPA. Superfund Information Systems. Treban PCB Site. http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0604073. Accessed on August 19, 2009.

Geologic Map of Oklahoma. USGS and Hugh D. Miser. Dated 1954.

Mintech. 1994. Letter: Report for Update Environmental Property Assessment of Property Located at 150 N. Lansing Avenue, Tulsa, Oklahoma, Dated October 25, 1994.

Radon Potential Map of Oklahoma (GM-32). Oklahoma Geologic Survey. Dated 1972.

Shepler's Performance Products. Shep Premium Release MSDS. http://www.cmc.com/PublicDocs/CRP/MSDS/Form-Release/Shep-Premium-Release_MSDS.pdf. Accessed On: August 13, 2009.

Small Business Liability Relief & Revitalization Act (Federal Brownfields Law) 40 CFR Part 312.

Soil Survey Supplement of Tulsa County Oklahoma. Natural Resource Conservation Service and U.S. Department of Agriculture. April 1979.

USGS 7.5-Minute Topographic Map – Tulsa Quadrangle. Dated 1982.