File Review and Summary of Site Conditions

Former St. Louis Ordnance Plant

St. Louis, Missouri

December 20, 2010

Terracon Project No. 15107048

Prepared for:

General Services Administration
Kansas City, Missouri

Prepared by:

Terracon Consultants, Inc.
St. Louis, Missouri

Terracon

December 20, 2010

General Service Administration
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Attn: Mr. Dave Hartshorn
P: [816] 823 2227
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Re: File Review and Summary of Site Conditions
Former St. Louis Ordnance Plant
4300 Goodfellow Boulevard
St. Louis, Missouri
Project No. 15107048

Dear Mr. Hartshorn:

Terracon Consultants, Inc. (Terracon) is pleased to submit the enclosed File Review and Summary of Site Conditions for the above-referenced site. The review was performed in accordance with our proposal dated June 3, 2010, which was authorized by General Services Administration Purchase Order No. GS-P-06-10-GX-5140 dated June 16, 2010.

Terracon appreciates this opportunity to provide environmental engineering services to the General Services Administration. Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
Terracon Consultants, Inc.

(b) (6)

for: Bryan Gatlin
Project Manager

(b) (6)

Brian Porter, PE
Department Manager

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FORMER ST. LOUIS ORDNANCE PLANT
4300 GOODFELLOW BOULEVARD
ST LOUIS, MISSOURI

Project No. 15107048
December 20, 2010

1.0 INTRODUCTION

Terracon is pleased to submit this File Review and Summary of Site Conditions for the General Services Administration's (GSA's) facility located at 4300 Goodfellow Boulevard in St. Louis, Missouri. The review was performed in accordance with our proposal dated June 3, 2010, which was authorized by GSA Purchase Order No. GS-P-06-10-GX-5140 dated June 16, 2010.

1.1 Site Description and Documents Reviewed

The site is a portion of the former St. Louis Ordnance Plant (SLOP) located near the western boundary of the City of St. Louis at 3400 North Goodfellow Boulevard. The site consists of approximately 64 acres, and is developed with 24 buildings (some with basement and sub-basement levels), tunnels for utilities, and a combined storm water and sanitary sewer collection system. Some of the buildings are unoccupied; the ones with tenants are primarily used for office and warehouse space. Exhibit 1 in Appendix A depicts the site's location on a United States Geological Survey (USGS) topographic map. Exhibit 2 in Appendix A is a site layout.

The file review included the following documents provided by the GSA.

- *Preliminary Assessment/Site Inspection Report, Former St. Louis Ordnance Plant, St. Louis, Missouri, Draft Submittal*, TapanAm Associates, Inc., June 2001.
- *Phase I Environmental Site Assessment, Federal Center, 4300 Goodfellow Boulevard, St. Louis, MO 63120,* prepared by Marc Enviro Services, LLC, dated January 24, 2002.
- *SVOC, PCB and Metals Analysis of Railroad Track Subgrade Soils Adjacent to Building 104 at St. Louis Ordnance Plant (SLOP)*, Letter to GSA, SCS Engineers, January 8, 2004.
- *Building 103F – Lead Dust Investigation*, prepared by Occu-Tec, dated June 11, 2008.
- *Combined Preliminary Assessment/Site Inspection Report*, SCS Engineers, August 2008.

- *Addendum 1 to Preliminary Site Assessment/Site Inspection Report, Interim Lead Wipe Sampling and Assessment Report, Buildings 102, 103E, 103F, 104 & 104F, Saint Louis Federal Center, 4300 Goodfellow Boulevard, Saint Louis, Missouri*, SCS Engineers, August 2008.

- *Goodfellow Federal Center Lead Air and Dust Wipe Investigation*, Letter to GSA, OCCU-TEC, February 16, 2009.

- *Surface Lead Assessment Follow Up For Selected Areas At, The Federal Center, 4300 Goodfellow, St. Louis, Mo* (sic), John McCall, GSA Heartland Region, March 11 and 12, 2009.

- *Goodfellow Contamination Issues Summary*, 2008.xlsc (Microsoft® Excel Spreadsheet).

In addition, Terracon reviewed the following public document.

- *A Look Back - St. Louis factory loaded America's weapons during World War II*, St. Lois Post Dispatch, June 27, 2010.

1.2 Objective

The objective of the file review as to summarize in one document past environmental work at the facility and the major environmental issues that remain. Specifically, the GSA desired a document that summarizes the residual contamination issues at the facility and specifically includes the following elements.

- A narrative describing the facility's history and previous investigations.

- A summary table of activities/notifications required for specific areas related to different scenarios. For example, if a certain area has residual lead contamination in soil, what specific steps should be taken before the area can be used for a child-care facility. Specific land use scenarios/populations requested by the GSA include child-care facilities, general office/warehouse, and construction activities.

- Specific to construction activities, a discussion of unique handling and/or disposal considerations for excess soil and/or groundwater generated.

- State notification requirements, if any.

- Recommendations and/or considerations pertaining to evaluation of the facility as if enrolled in Missouri's Brownfields/Voluntary Cleanup Program (B/VCP).

2.0 SITE HISTORY

Based on a review of the documents listed in Section 1.1, the site operated as residential or farmstead (dairy farm) between 1912 and 1925. A "Community Garden" was identified on the site between 1936 and 1940. In 1940, the City of St. Louis dedicated a city park, Hickey Park, on Goodfellow Boulevard. Hickey Park was dedicated to David Hickey, the first St. Louisan killed in World War 1. Hickey Park would ultimately be developed as part of the St. Louis Ordnance Plant.

Groundbreaking for the St. Louis Ordnance Plant occurred in January 1941 and production reportedly began nine days after Pearl Harbor (December 7, 1941). The ordnance plant was reportedly the largest small-arms ammunition installation in the world and produced small arms ammunition (.30 caliber and .50 caliber) and components for 105mm artillery shells.

At full capacity, the plant employed between 35,000 and 42,000 people on 291 acres containing approximately 300 buildings and bunkers. Production peaked at 250 million cartridges per month in summer 1943. By the time the factory ceased production in September 1945, 6.7 billion cartridges had been manufactured. The plant produced approximately 19 million howitzer shells from 1950 to 1954 for the Korean War. In 1967, the plant produced approximately 4.5 million howitzer shells for the Vietnam War.

The historical buildings/activities are summarized below:

- Buildings 102, 103, 104, and 105 – brass cartridge annealing and shaping, powder and primer packaging, lead core insertion, and sorting, packaging, and shipping

- Buildings 102F, 102H, 103F, 103H, 104G, 104J, 105G – powder canning and storage inside blast proof bunkers

- Buildings 102G, 103G, 104H, and 105H – powder canning and storage south of the production buildings

- Buildings 102D, 103D, 104E, and 105E – powder packing

- Buildings 102E, 103E, 104F, and 105F – primer packing

- Buildings 102J, 102K, 103J, 103K, 104M, 104N, 105M, and 105N – storage of oils and lacquer. Oil and lacquer was transferred from storage areas through mechanical piping into the main production buildings. The oil was believed to have been utilized during shaping and trimming and lacquer was utilized as a waterproofing agent

Current Building 103F was historically referred to as Building 112 and was used to shape and form lead cores. Lead was melted in the building through at least February 1957. Building 103F is currently used as a cafeteria.

The Department of Defense (DOD) converted the site in the 1960s and 1970s to a Federal Office complex under the management of the GSA. The four primary munitions manufacturing buildings (102, 103, 104, and 105) were decommissioned and converted into office and warehouse space. The powder bunkers were removed during a redevelopment project in 1980.

3.0 SUMMARY OF HISTORICAL REPORTS

The following sections summarize the information contained in the reports reviewed.

3.1 June 2001 Preliminary Assessment/Site Inspection Report

This report was conducted on the "Hanley Area" which is located on the west side of Goodfellow Boulevard and not part of the current Federal Building complex.

3.2 January 2002 Phase I Environmental Site Assessment

The Phase I Environmental Site Assessment (ESA) was conducted for the current 63.77-acre GSA facility containing 24 buildings. Marc Enviro Services (MES) reviewed historical documents in the Missouri History Museum, which indicated that the facility was once the largest employer in St. Louis with over 42,000 people. The manufacturing activities consumed 6 million gallons of water, 88 tons of coal, 4,400 gallons of lubricating oil, and 60 carloads of brass every 24 hours. MES indicated that three underground storage tanks (USTs) with capacities of 550 gallons, 8,000 gallons, and 10,000 gallons, were formerly located on the site, but had been removed. MES did not identify the three former USTs as recognized environmental conditions (RECs).[1]

[1] *Recognized Environmental Conditions are defined by ASTM E 1527-05 (the standard for conducting Phase I ESAs) as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions of compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to the public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."*

MES indicated that, as of the Phase I ESA report date, the site operated one 20,000-gallon diesel UST, one 600-gallon overflow protection tank (located north of Building 103 for an emergency generator), and one 250-gallon aboveground gasoline tank. MES did not consider the tanks to be RECs.

MES identified the historic industrial ammunition production as a REC. MES also identified the Lead Shop - Building 112 (current Building 103F) and the former use of polychlorinated biphenyl (PCB)-containing oils in electrical transformers in Buildings 108 and 108B as RECs. MES indicated the site historically contained a tunnel complex between the various buildings. MES did not identify the tunnels as a REC, but recommended the tunnels and piping be investigated in accordance with confined space work procedures.

3.3 January 2004 Railroad Track Subgrade Soils Letter

The letter summarized the result of soil sample collection and analysis. One subgrade soil sample was collected from below an existing railroad track, which was unearthed during a loading dock expansion near the southeast corner of Building 104. The sample was analyzed for semi-volatile organic compounds (SVOCs), PCBs, and total metals. The soil sample did not exhibit concentrations of SVOCS, PCBs, or metals above Missouri Department of Natural Resources (MDNR) Cleanup Levels for Missouri (CALM)[2] Soil Target Concentrations.

3.4 June 2008 Lead Dust Investigation

The report summarized the results of lead dust testing performed in the interior of Building 103F. Twelve samples were collected from the Cafeteria and surrounding areas. Of the 12 samples, 11 had lead concentrations below the United States Department of Housing and Urban Development (HUD) clearance standard of 40 micrograms per square foot (µg/ft^2) (for floors), and one sample collected from the top of a ceiling tile in the dishwasher area exhibited a lead dust concentration of 110 µg/ft^2.

3.5 August 2008 Combined Preliminary Assessment/Site Inspection Report

The report summarized the results of subsurface soil sampling, dust wipe sampling, paint chip sampling, shallow soil and sediment sampling, air monitoring, and groundwater sampling performed at Buildings 101, 102, 103, 104, 105, 108, 110, 111, 115, 136, 137A, 141C, the utility tunnels, the sewers, and the railroad tracks. The report also contained a summary of previous documents / investigations. The previous investigations that were summarized consisted of the following.

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[2] *The CALM levels were established as guidance in 1998 by the MDNR for voluntary cleanup of contaminated sites. The CALM levels have since been replaced by the Missouri Risk-Based Corrective Action (MRBCA) levels used by the MDNR for sites enrolled in the B/VCP.*

- A March 3, 1986, memorandum indicated that four wipe samples were collected within transformer vaults in Buildings 102 through 105. The samples reportedly exhibited PCB concentrations between 13,000 and 26,000 µg/wipe. The memo also indicated that a wipe sample collected from substation 108B exhibited a PCB concentration of 47,000 µg/wipe, and a water sample collected from a pit at Substation 108B exhibited a PCB concentration of 210,000 µg/Liter.

- A GSA Routing Slip, dated April 17, 1989, with a transformer spreadsheet indicated that 80 transformers have been "retrofilled" at the 4300 Goodfellow complex. Certificates of disposal had been received for 66 transformers and certificates for the remaining 14 were pending.

- An Industrial Testing Laboratories, Inc. laboratory report dated April 9, 1990, addressed to GSA indicated that two samples of wood block flooring (collected from the main floor and second floor of Building 104) were analyzed for PCBs and the wood blocks exhibited concentrations of 71 and 2,200 parts per million (ppm) of Aroclor 1248.

- A Westinghouse Electric Corporation letter and analytical report, dated March 29, 1995, indicated that PCB concentrations in the transformer oils in the 108A and 108B transformer stations ranged between 5 and 11 ppm. PCB concentrations in soil samples collected from transformer stations 108A and 108B ranged between 2 and 45 ppm.

- A GSA Procurement Request, dated September 18, 1995, indicated that two transformers in Substation 108B were to be drained of PCB oil. Each transformer reportedly contained 3,050 gallons of PCB-containing oil.

- A Metropolitan St. Louis Sewer District Industrial Facility Inspection Report, dated June 2, 1998, indicated that the facility contained one 400-gallon diesel UST and one 8,000-gallon diesel fuel UST. The facility also contained one 250-gallon gasoline aboveground storage tank (AST).

- A SLOP Property Owner Questionnaire, dated June 3, 1999, and prepared for U.S. Army Corps of Engineers indicated that the federal center was operated by Olin Corp and manufactured ammunition from 1942 to the 1960s. The site was renovated into office space in the 1960s and 1970s. A photo lab and motor pool formerly existed in two small annex buildings. The photolab and motor pool operations no longer exist. One 20,000-gallon UST is located adjacent to Building 103. The UST supports an emergency electric generator.

- A Mold Contamination Inspection Report, dated July 16, 2002, and prepared by Professional Abatement and Remediation Technologies identified several areas of mold in Building 105.

- A St. Louis Ordnance Plant Site Operational History Report, dated April 28, 2003, and prepared by Dynamac Corporation indicated that the original SLOP facilities were placed in operation and the first expansion was 86% complete on December 1, 1941. The SLOP expansion continued through February 1942 and peak production occurred in January 1943. SLOP was designated as St. Louis Administration Center (SLAC) and was used for administration and military records storage in February 1945. In preparation for the decommissioning of Weldon Spring (another former defense site), 100,000 pounds of lead were shipped to SLOP to be re-melted in building 112 (current building 103F-cafeteria). The lead was then sold as scrap.

- A Small Arms Firing Range (SAFR) Remediation Report, dated March 18, 2003, and prepared by SCS Engineers indicated that a small arms firing range was formerly located in the basement of Building 105. Approximately 36,000 square feet of the basement was under containment during the remediation in which 30 cubic yards of hazardous waste (bullet pit sand, water rinsate, rinsate filters, and miscellaneous material) were removed and disposed. Post-remediation confirmation wipe sampling indicated the remediation was successful.

In addition, the August 2008 Preliminary Assessment/Site Inspection Report contained summaries of analytical results for the following buildings.

- Building 101 (former administrative building). Subsurface soil sampling did not identify concentrations of PCBs or metals above Missouri Risk-Based Correction Action (MRBCA) levels. Mercury concentrations were identified above detection levels (0.038 and 0.089 milligrams per kilogram, or mg/kg), but below MRBCA levels.

- Building 102 (former .30 caliber ammunition production). Wipe samples collected in the building identified concentrations of Aroclor 1260 at three locations above the Toxic Substances Control Act (TSCA) level of 10 micrograms per cubic centimeter ($\mu g/cm^2$). Wipe samples did not identify explosive compounds or mercury above clearance levels. Four wipe samples identified lead in excess of post-abatement clearance levels. The lead concentrations were identified in crawl spaces, in elevator shafts, and from above suspended ceilings.

Soil/sediment sampling identified arsenic, copper, lead, and polycylic aromatic hydrocarbon (PAH) concentrations above MRBCA levels.

- Building 102D (former powder loading building). Wipe samples did not identify PCBs above laboratory detection limits. One wipe sample identified an explosive compound concentration above detection limits but below clearance levels. One wipe sample exhibited a mercury concentration of 33,000 micrograms per kilogram (µg/kg), which exceeded the MRBCA level for construction workers of 21,600 µg/kg. Four wipe samples exhibited lead concentrations above a post-clearance level of 200 µg/ft^2. The lead concentrations were identified in crawl spaces, in the elevator shafts, and above the suspended ceiling. Soil sampling identified arsenic concentrations above MRBCA levels. Soil sampling did not identify PCBs, explosives, cyanide, phosphorus, metals, or SVOC compounds above MRBCA levels.

- Building 102E (former primer insertion building). Wipe samples did not identify PCBs. Mercury was identified in three samples above the method detection limits but below clearance levels. One wipe sample exhibited a lead concentration of 761,780 micrograms per square foot (µg/ft^2). The lead concentration was located in a crawl space level of the building. Soil/sediment sampling did not identify PCBs, explosives, or metals above MRBCA levels.

- Buildings 102F, 102G, and 102H (former powder canning and storage buildings). Soil samples did not identify explosives of metals above laboratory detection limits.

- Building 102J (former oil storage building). Soil sampling did not identify concentrations of PCBs, mercury, or metals above MRBCA levels.

- Building 103 (former .30 caliber ammunition production). Wipe samples did not identify PCBs, explosives, or mercury concentrations above clearance levels. Six of the wipe samples identified lead concentrations above clearance levels. The lead concentrations were located in crawl space levels, and from above the suspended ceilings. Shallow soil samples did not identify concentrations of PCBs, explosives, cyanide, phosphorus, mercury, metals, or SVOCs above MRBCA levels. Air monitoring performed inside the building did not identify mercury concentrations above the Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL).

- Building 103D (powder loading building). Wipe samples did not identify PCBs, explosives, mercury, or metals concentrations above clearance levels. Four wipe

samples identified lead concentrations above clearance levels. The lead concentrations were located in crawl spaces, from elevator shafts, and from above suspended ceilings. Shallow soils samples did not identify PCBs, explosives, cyanide, phosphorous, mercury, metals, SVOCs, or VOCs above MRBCA levels.

- Building 103E (former primer insertion building). Wipe samples did not identify PCBs, explosives, mercury, or metals above clearance levels. Two wipe samples identified lead concentrations above clearance levels. The lead concentrations were identified in the crawl space levels of the building. Shallow soil samples did not identify concentrations of PCB, explosives, phosphorus, mercury, metals, PAHs, or VOCs above MRBCA levels.

- Building 103F (former powder canning building). Wipe samples did not identify concentrations of PCBs or metals above clearance levels. Twenty wipe samples identified lead concentrations above clearance levels. The elevated lead concentrations were located in the crawl space level and one sample was located near the center of the east wall of the cafeteria. Shallow soil samples collected from inside the basement level did not identify concentrations of PCBs, explosives, cyanide, phosphorus, or metals above MRBCA levels. The shallow soil samples identified concentrations of mercury, antimony, arsenic, lead, and benzo(a)pyrene above MRBCA levels.

- Building 104 (former .50 caliber ammunition manufacturing). Wipe samples did not identify concentrations of PCBs, explosives, mercury, or metals above cleanup levels. Lead concentrations were identified above clearance levels in the crawl space, from the elevator shaft, and from above the suspended ceiling. Shallow soil/sediment samples did not identify concentrations of PCBs, explosives, cyanide, phosphorus, mercury, metals, or SVOCs above MRBCA levels. The water sample collected from a sump in the basement of Building 104F did not identify concentrations of explosives, mercury, or metals above laboratory detection limits and MRBCA levels. Air monitoring performed in the building did not identify mercury vapor or particulate mercury above laboratory detection limits.

- Building 104E (former powder loading building). Wipe samples did not identify concentrations of PCBs, explosives, mercury or metals above clearance levels. Wipe samples identified lead concentrations above clearance levels in the crawl spaces and above suspended ceilings. One paint chip sample collected from the building exhibited a mercury concentration of 2.3 mg/kg, below MRBCA levels.

Shallow soil/sediment sampling did not identify PCBs, explosives, cyanide, phosphorus, mercury, arsenic, or metals above MRBCA levels.

- Building 104F (former primer insertion building). Wipe samples did not identify PCBs, explosives, mercury, or metals above clearance levels. One lead concentration above clearance levels was identified in the crawl space of the building. Shallow soil/sediment sampling did not identify concentrations of PCBs, explosives, cyanide, phosphorus, mercury, or metals above MRBCA levels.

- Buildings 104G, 104H, and 104J (former powder canning and storage buildings). Soil samples did not identify concentrations of explosives, mercury, or metals above MBRCA levels.

- Former Buildings 104K and 104L (water softener plant and chemical storage building). Soil samples did not identify concentrations of PCBs or metals above MRBCA levels. One sample exhibited a mercury concentration above the MRBCA level. The sample was collected from SB22 below the former location of Building 104L.

- Building 105 (former production of .50 caliber ammunition). Wipe samples did not identify PCBs, explosive compounds, or metals above clearance levels. Lead concentrations above clearance levels were identified in crawl spaces, from I-beams above suspended ceilings, and from a floor near column H-18 and a masonry wall near column F-26. Shallow soil/sediment samples did not identify concentrations of PCBs, explosive compounds, cyanide, phosphorus, mercury, metals, or VOCs above MRBCA levels. Concentrations of arsenic, lead, and PAHs above the MRBCA levels were identified in a sample collected from 105 SS-1, which was identified as sediment within a steel process pipe adjacent to a former annealing trench. Sump water samples did not exhibit concentrations of PCBs, explosives, phosphorus, mercury, cyanide, or VOCs above MRBCA levels. Concentrations of one SVOC, bis(2-ethylhexyl)phthalate, above MRBCA levels, were identified in two sump water samples.

- Building 105E (former powder loading building). Wipe samples did not identify PCBs, explosive compounds, or metals above clearance levels. Lead concentrations above clearance levels were identified in the crawl space level and from I-beams above the suspended ceilings. Shallow soil/sediment samples did not identify concentrations of PCBs, explosive compounds, cyanide, phosphorus, mercury, metals, SVOCs, and VOCS above MRBCA levels. One sediment sample (105E SS-1) exhibited an arsenic concentration of 27 mg/kg, which exceeded the MRBCA level. The sample location was a brick-lined sump

in a crawl space. One soil sample collected from boring 105-3 exhibited a concentration of 3,700 µg/kg of benzo(a)pyrene, which exceeded its MRBCA level.

- Building 105F (former primer insertion building). Wipe samples did not identify concentrations of PCBs, explosive compounds, or metals above clearance levels. Lead concentrations above clearance levels were identified on I-beams above suspended ceilings. Shallow soil/sediment samples did not identify concentrations of PCBs, explosive compounds, cyanide, phosphorus, mercury, metals, SVOCs, or VOCs above MRBCA levels.

- Buildings 105G, 105H, and 105J (former powder canning and storage buildings). Soil samples did not identify concentrations of PCBs, explosives, cyanide, phosphorus, mercury, metals, SVOCs, or VOCs above MRBCA levels.

- Former Building 105N (oil storage building). Soil samples did not identify concentrations of PCBs, TPH-DRO, TPH-GRO, SVOCs, or VOCs above MRBCA levels.

- Building 108A and 108B (south and north electric substations). Wipe samples did not identify PCB concentrations above the Federal TSCA level of 10 µg/cm^2. Shallow soil/sediment samples did not identify PCBs or Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO) above MRBCA levels. One subsurface soil sample (SB 1265-1) exhibited an Aroclor 1260 concentration of 26,000 µg/kg, which exceeded MRBCA levels. Subsurface soil samples did not identify concentrations of TPH-DRO that exceeded MRBCA levels. Groundwater samples identified concentrations of Aroclor 1260 above MRBCA levels in groundwater samples collected from SB126 (adjacent to 108A) and SB133 (adjacent to 108B).

- Building 110 (tool and gauge shop). Wipe samples did not identify concentrations of PCBs above clearance levels. Wipe samples identified concentrations of lead above clearance levels. The samples were located from tank saddles and from a wall and steel column in the former track building. Shallow soil samples did not identify concentrations of TPH-DRO or Total Petroleum Hydrocarbons-Gasoline Range Organics (TPH-GRO) above laboratory detection limits. Subsurface soil samples did not identify concentrations of PCBs, TPH-DRO, TPH-GRO, mercury, or metals above MRBCA levels.

- Former Building 111 (boiler house). Soil samples did not identify concentrations of PCBs, TPH-DRO, mercury, or metals above MRBCA levels.

- Building 115 (truck garage). Wipe samples did not identify concentrations of PCBs or metals above clearance levels. One lead concentration that exceeded the clearance level was identified in the crawl space level. Soil samples did not identify concentrations of PCBs, TPH-DRO, TPH-GRO, mercury, metals, or VOCs above MRBCA levels. Groundwater samples did not identify concentrations of TPH-DRO or TPH-GRO above MRBCA levels.

- Former Building 136A and 136B (fire equipment storage buildings). Soil samples did not identify concentrations of PCBs, mercury, metals, or VOCs above MRBCA levels.

- Former Building 137 (building and grounds workshop). Soil samples did not identify concentrations of mercury, metals, or VOCs above the MRBCA levels.

- Building 141C (pump house). Soil samples did not identify concentrations of PCBs, mercury, or metals above MRBCA levels.

- Utility Tunnel Complex wipe samples did not identify concentrations of PCBs, explosive compounds, or metals above clearance levels. One concentration of lead, above the clearance level, was identified in a utility tunnel. One paint chip sample identified a lead paint concentration above the HUD threshold level. Sediment sampling did not identify concentrations of PCBs, explosive compounds, mercury, or metals above MRBCA levels. Sediments samples identified arsenic and lead concentrations above MRBCA levels. Tunnel water samples did not identify concentrations of explosives, mercury, or metals above MRBCA levels. One water sample exhibited a lead concentration that exceeded the MRBCA level. Air monitoring did not identify mercury vapor concentrations or particulate mercury above the OSHA PEL.

- Combined Storm and Sanitary Sewer System. Sediment samples did not identify concentrations of PCBs, explosive compounds, or metals above MRBCA levels. One sediment sample exhibited a concentration of lead above the MRBCA level.

- Railroad Track System. Soil Samples did not identify concentrations of PCBs, mercury metals, or SVOCs above the MRBCA levels.

3.6 August 2008 Addendum 1

Addendum 1 to the Preliminary Site Assessment/Site Inspection Report, dated August 2008, summarized the results of additional dust wipe samples performed in worker occupied spaces in Buildings 104 and 104F. Five sets of duplicate dust wipe samples were also collected from

Buildings 101, 103E, 103F, and 104. The dust wipe samples collected from Buildings 104 and 104E exhibited detectable lead concentrations that were below the EPA threshold value of 40 µg/ft^2. The duplicate wipe samples were submitted to two different laboratories to evaluate consistencies between laboratories and to confirm previous data. The maximum relative percent difference (RPD) calculated for the duplicates was 35 percent, the minimum was 15 percent, and the average was 25 percent. These were reported to be with the plus or minus 50 percent that is typically used for field duplicates. The duplicate samples confirmed that lead concentrations above the EPA threshold value were identified in crawl spaces in Buildings 102, 103E, 103F, and 104.

3.7 February 2009 Lead Air and Dust Wipe Investigation

This letter summarized the results of air sampling and surface dust sampling in Buildings 102, 103, 103D, 104, 104E, 105, 105E, 105F, and 110. None of the 34 air samples exhibited lead concentrations above laboratory detection limits or the OSHA PEL. Lead concentrations above the HUD clearance levels were identified in 29 of the 108 dust wipe samples. The consultant concluded that there were areas of significant settled lead dust in the affected buildings; however, there was no apparent source of the lead dust. The consultant recommended appropriate cleaning procedures, including High Efficiency Particulate Air (HEPA) vacuums, wet cleaning methods in areas of elevated lead dust levels prior to activities that might disturb the settled dust.

3.8 March 2009 Surface Lead Assessment Follow Up for Selected Areas

This document summarized the results of lead dust wipe sampling performed in Buildings 102, 103D, 105F, and 110. Based on the results of the sampling, the consultant concluded that area-wide lead contamination was not occurring in Building 102 and floor 2 in Building 103D. The consultant concluded that three areas exhibited surface lead concentrations above 200 µg/ft^2, specifically Building 103D (Floor 1 Mechanical Room), Building 105F (Basement Compressor Area), and Building 110 (Basement Storage Room). These areas are storage or mechanical areas that are accessed infrequently by maintenance personnel. The consultant recommended that access to the areas be restricted, informing the maintenance personnel of the presence of lead, and implementing decontamination procedures on the spaced and their contents.

3.9 2008 Contamination Issues Summary

This spreadsheet summarized the results of samples (dust wipes, soil borings, shallow soil or sediment, or groundwater) that exceeded applicable levels.

4.0 SITE RECONNAISSANCE

Terracon performed a site reconnaissance at the site on August 10, 2010. During the reconnaissance, Terracon was escorted by Mr. Alex Dunagan, GSA Facility Operations Specialist. Terracon viewed the interior of Buildings 101, 102, 103, 103F, 106, and 107. Mr. Dunagan stated that Building 102D was not considered "habitable" and personal protective clothing and equipment were required for entry. Mr. Dunagan stated that portions of several buildings were considered "secure" and Terracon was unable to gain access to those buildings.

4.1 Site Interviews

Terracon interviewed Mr. Dunagan during the site reconnaissance. Mr. Dunagan stated that the GSA maintained the site buildings, which were originally manufactured in the 1940s as an ammunition plant complex. He indicated that the current site tenants consisted of various government agencies. He added that GSA would consider leasing space to civilian companies. Mr. Dunagan stated that approximately 2,000 people were on-site during a normal workday. He indicated that most of the tenants operated five days per week; however, some of the departments maintained personnel onsite 7 days per week 24 hours per day.

4.2 Current Site Uses

Terracon obtained the following information regarding the current site tenants and recent renovation history from Mr. Dunagan.

Table 4-1 Summary of Current Site Uses

Building	Current Use	Renovation Status
101	(b) (7)(F)	Rehabilitated in 1990s, lead abatement performed in 2000
102		1971 - modernization 1973 - renovation 1978 - toilet renovation 1980 - space alterations 1981 - space alteration 1982 - floor replacement 1984 - dock and bridge, 1985 - carpet tile replace 1991 - electrical improvements
102D		Renovated 1981
102E		Completely renovated 2007-2008

Building	Current Use	Renovation Status
103	(b) (7)(F)	Part of first floor scheduled for renovation for GSA-PBS Building was last renovated in approximately 1995-1999 USDA-FSA - 2005 DISA 2010 carpet and paint February 2010 - Lay concrete path in crawl space for utility workers.
103D		Renovated in 1981/1982. No current renovation plans
103E		Renovated in 1981 No current renovation plans
103F		Renovated in 2002 and 2004 Dining room renovation scheduled for 2011
104		Completely renovated in last 5 years Veterans Administration (VA) - 1990 USDA-Rural Development - 2002 and 2006
104E		USDA-FSA - 1995 VA - 1990 and 2010 Part of first floor (vacant daycare) currently being abated and renovated for Veterans Administration
104F		USDA-OIG - 1996 OSDA-OCIO - 2009 Renovation scheduled for common spaces and stairwells
105		Completely renovated in last 5 years USDA-RD - 2002 and 2006 USDA-Food Safety and Inspection Service (FSIS) 2009-2010
105E		Army Audit Agency (AAA)-1996 USDA-RD - 2009 No current renovation plans
105F		USDA-RD - 2009 Snack shop - 2009 No current renovation plans
105L		Renovated in 1970 Upgrades scheduled for 2010, 2011, and 2012
106		No renovation records No current renovation plans

Building	Current Use	Renovation Status
107	(b) (7)(F)	Building renovations in 1979 Entry renovations in 1981 Elevator & Lobby work in 1982 2011 project to renovate the first floor
108A		Renovated in 1995 Transformer repaired in 2001 No current renovation plans
108B		Renovated in 2005 No current renovation plans
110		Renovated 2010
115		Renovated in 1988
122B		No renovation records No current renovation plans
141C		No renovation records No current renovation plans

4.3 Ongoing Activities

The facility has operated a combined storm and sanitary sewer system since construction in the 1940s. Construction began the first week of September 2010 which consists of relocating and separating the sewer system. The work includes the excavation of a stormwater detention basin between Buildings 102 and 103 and construction of an underground stormwater detention area in the parking lot in the west portion of the site.

The Terracon report entitled "*Limited Site Investigation - Federal Complex - 4300 Goodfellow Boulevard - St. Louis, MO*," and dated September 22, 2010, summarized the results of a Limited Site Investigation (LSI) performed between Buildings 102 and 103. A solar array was historically located between the buildings. The solar panels contained an ethylene glycol mixture which converted to an acid when heated. The panels reportedly leaked. The LSI was performed to evaluate subsurface conditions for protection of construction workers and management of excavated material. The soil in the areas tested did not appear to be contaminated above levels protective of construction workers, and conditions did not appear to be a concern for workers engaged in the proposed activities. However, as the potential existed for ethylene glycol, benzo(a)pyrene, and lead to be present above background (lead only) and/or concentrations intended to protect the health of occupants and/or the potable use of groundwater, Terracon recommended that near-surface (e.g., upper 2 feet) soil excavated from the parking lot area and soils near location B-1 be disposed of as special waste in accordance with applicable regulations.

A Terracon report entitled "*Limited Site Investigation - Federal Complex - 4300 Goodfellow Boulevard - St. Louis*, *MO*," and dated November 5, 2010, summarized the results of an LSI performed on the site. The LSI consisted of advancing 28 soil borings on the site to approximate

depths of 16 feet bgs. The LSI was performed to evaluate subsurface conditions in areas planned for excavation as part of storm sewer upgrades. Historical site investigation documents identified concentrations of metals and PAHs in buildings and shallow soil. The soil in the areas tested did not appear to be contaminated above levels protective of construction workers, and conditions did not appear to be a concern for workers engaged in the proposed activities. However, PAHs, arsenic, and/or lead were present in certain locations above background and/or concentrations intended to protect the health of occupants and/or the potable use of groundwater, particularly near the surface. As such, Terracon recommends that near-surface (e.g., upper 2 feet) of soil excavated from areas near B-7, B-11, B-13, B-16, B-19, and B-24 be disposed of as special waste in accordance with applicable regulations. These areas were generally located near the main buildings. Alternatively, excavated soil from these areas could be reused on-site.

5.0 REDEVELOPMENT CONSIDERATIONS

5.1 Building Components

5.1.1 Regulations

City of St. Louis Ordinances

St. Louis Ordinance #64690 requires childcare facilities to be free of lead hazards. The ordinance does not require the facility to be lead-free, but free of exposed lead-bearing substances.

State of Missouri Regulations

The Missouri Department of Health and Senior Services operates Missouri's Lead Licensing Program. The program's mission is to prevent lead poisoning from improper lead abatement activities. The program is responsible for licensing lead abatement professionals, which include lead abatement supervisors, lead abatement workers, lead inspectors, risk assessors and project designers. Individuals must attend training by an accredited provider. The program also licenses lead abatement contractors, which are the companies or firms that employ the lead professionals. Random inspections of lead abatement contractors are conducted to ensure that they are in compliance with state statutes and regulations. The program requires that a lead abatement contractor conducting a lead abatement project in target housing or in any child-occupied facility submit a notification to the department at least 10 business days prior to the onset of the lead abatement project.

The State of Missouri also has general daycare licensing requirements outlined in Missouri Title 19 Code of State Regulations (19 CSR) 30.60-.010, 19 CSR 30.61-.010, and 19 CSR 30.62-.010.

Federal Regulations

The Lead-Based Paint Renovation, Repair, and Painting Program (LRRP) is a federal regulatory program affecting contractors, property managers, and others who disturb painted surfaces. It applies to residential houses, apartments, and child-occupied facilities such as schools and day-care centers built before 1978. The program includes pre-renovation education requirements as well as training, certification, and work practice requirements.

The LRRP program applies to anyone who is paid to perform work that disturbs lead-based paint in residential houses, apartments, and child-occupied facilities such as schools and daycare centers built before 1978. Individuals, residential rental property owners or managers, general contractors, and special trade contractors such as painters, plumbers, and electricians are included in the program. Contractors are required by federal law to provide a copy of the Renovate Right brochure to dwelling occupants prior to performing any renovation on the aforementioned facilities. The Renovate Right brochure has been updated and reflects current changes to the LRRP regulation.

Activities subject to the LRRP program are, in general, anything that disturbs more than six square feet of lead-based paint surface on the interior or twenty square feet of lead-based painted surface on the exterior of a dwelling built before 1978. Remodeling and repair/maintenance, including electrical work, plumbing, painting, roofing, or window replacement completed for weatherization, etc. in houses, apartments and child-occupied facilities are examples of activities subject to this program.

The LRRP Program went into effect on April 22, 2010. Specific work practices must now be followed. In Missouri, the Environmental Protection Agency (EPA) will be responsible for administering the program, certifying renovation firms and renovators, and accrediting trainers for the program. The Missouri Department of Health and Senior Services is now only authorized to enforce regulations pertaining to lead abatement, risk assessments, lead inspections, clearances, accrediting training providers relating to lead-bearing substance activity and licensing. The state has no authority to regulate renovation activities.

5.1.2 Specific Redevelopment Scenarios

In the event of redevelopment of a portion of the site for a childcare facility, the GSA should be able to verify lead levels to be below HUD requirements for surfaces that could affect children.

The property manager of housing or childcare facilities must disclose all known lead exposures to tenants, as well as provide available written reports of known lead hazards upon request. Activities for a proposed daycare are summarized in Table 5-1.

Child Care Facilities

Mr. Dunagan indicated that a daycare facility had recently closed in Building 104E. [redacted] (b) (7)(F) [redacted] Mr. Dunagan stated that lead was being abated as part of renovation/construction activities.

(b) (7)(F) [redacted]

Based on a review of historical sampling activities at Building 110, four wipe samples collected in August 2008 identified lead dust levels that exceeded a clearance level of 200 µg/ft^2. The samples were collected from within the former fuel oil storage room and from a wall and steel column within the former track building. According to information provided by Mr. Dunagan, the first and second floors of Building 110 were renovated in 2010.

General Office / Warehouse

Activities / notifications for proposed general office / warehouse uses are summarized in Table 5-1.

Construction Activities

Activities / notifications for proposed construction activities are summarized in Table 5-1.

Table 5-1 Summary of Lead/Asbestos Requirements for Redevelopment Scenarios

Scenario	Activities	Notifications	Waste Handling / Disposal	State Notification Requirements
Proposed Child Care Facility	Perform lead paint, dust, and/or soil abatement to USEPA HUD clearance levels.	Documentation of Contractor and workers having been trained under USEPA Lead Renovation, Repair, and Painting (LRRP) Rule. Verify lead levels to be below HUD requirements. The contractor should post work verification.	Dispose of lead waste in accordance with state and federal requirements	10 Day Lead abatement project notification to MDHSS Missouri Daycare licensing Requirements 19CSR 30.60-.010 19CSR 30.61-.010 19CSR 30.62-.010
General Office/ Warehouse	Review previous investigations to assess potential hazards in buildings Perform asbestos or lead sampling in building areas to be disturbed, renovated, or demolished	10 Day Demolition notice to City of St. Louis Air Pollution Control Program for abatement and/or demolition Perform abatement. Ensure abatement contractors are licensed.	Dispose asbestos or lead waste in accordance with state and federal requirements	
Construction Activities	Review previous investigations to assess potential hazards in buildings Assess potential hazards in soil/groundwater	Perform lead/asbestos sampling in building areas to be disturbed Perform subsurface soil sampling and analysis in areas to be disturbed/excavated	Dispose of lead, asbestos, or other wastes in accordance with state and federal regulations Dispose of impacted soil and groundwater in accordance with state and federal regulations	10 Day Demolition notice to City of St. Louis Air Pollution Control Program for abatement and/or demolition Notify MDNR if contaminant concentrations indicate a petroleum release or if contaminant concentrations exceed Missouri Risk Based Corrective Action (MRBCA) target concentrations

5.2 Soil and Groundwater

5.2.1 Missouri Brownfields/Voluntary Cleanup Program

The Brownfields/Voluntary Cleanup Section addresses and handles brownfields cleanup and redevelopment for MDNR. First established by the state legislature in 1994, Missouri's Brownfields/Voluntary Cleanup Program, also known as B/VCP, is administered by the Hazardous Waste Program to provide state oversight for voluntary cleanups of properties contaminated with hazardous substances. Many of the sites entering the B/VCP are not heavily contaminated, and are contaminated by sources not addressed by any of Department of Natural Resources' regulatory programs such as Emergency Response, Superfund, Resource Conservation and Recovery Act, or Petroleum Storage Tanks. Although excavation and off-site disposal of contaminated soil is the most common cleanup method, a variety of traditional and innovative cleanup technologies can be used.

The property owner or anyone having an interest in a piece of property can apply to the program, provided the property owner allows MDNR access to the site for its oversight activities. When a site enters the program, the B/VCP reviews existing site assessment reports and determines whether or not additional investigation or cleanup is required to meet state standards. The site investigation and any necessary cleanup are conducted by the applicant or their consultants and contractors. Site assessment reports, remedial action plans, and a final report are submitted to the B/VCP for review and approval. When the B/VCP is satisfied that the cleanup has met the objectives, the department provides the applicant with a Certification of Completion or No Further Action Letter. The department's Brownfields/Voluntary Cleanup Memorandum of Agreement with the Environmental Protection Agency states that the EPA will not plan or anticipate action relating B/VCP sites after closure by the department.

The B/VCP is a fee-for-service program where the participant pays the department's site-specific oversight costs and overhead. Currently, oversight time is billed at $65 - $80 per hour based on personnel salaries plus overhead. The total oversight cost depends on the nature and extent of contamination and other site-specific factors. Total costs average about $3,000 per site but vary widely among the different types of sites. Oversight cost is usually a minor portion of the total costs incurred by the participant in site investigation and cleanup.

5.2.2 Missouri Risk-Based Corrective Action

Risk-Based Corrective Action is a streamlined approach, defined by the ASTM, in which exposure and risk assessment practices are integrated with traditional components of the corrective action process to ensure that appropriate and cost-effective remedies are selected and that limited resources are properly allocated. In 2006, the MDNR adopted a risk-based corrective action process, detailed in the *Departmental Missouri Risk-Based Corrective Action Technical Guidance*. It protects human health and the environment while allowing constructive current and future site use. The adoption was initiated when the Department decided to move

away from drinking water standards as the cleanup criteria for contaminated groundwater when the groundwater was not, and will not, be used as drinking water. Using a risk-based process, site remediation is based on site-specific human health and environmental risk from exposure to contamination rather than the application of generic standards to all sites.

If determined to be safe based upon exposure routes and receptors, contamination may be left in place with appropriate controls, whether engineering or institutional controls or both, to ensure long term protection.

Site Characterization

A site must first be characterized, which includes delineation of impacts to soil, groundwater, surface water, sediments, and soil vapor to the extent necessary based upon site-specific considerations. Site characterization information is used to develop a conceptual site model and the development of an exposure model. The objective is to identify with certainty the maximum concentrations of the contaminants in each impacted environmental media and compare those concentrations with default target levels (DTLs). DTLs are the levels necessary to quantify and protect receptors from all complete exposure pathways for unrestricted use.

Soil Types

When initially implemented, the MRBCA process included one set of Tier 1 risk-based target levels (RBTLs). The initial set of RBTLs applied to all media, receptor, and exposure pathways addressed by the new MRBCA process. The Department has since put into effect new Tier 1 RBTLs that are soil type dependent. There are three sets of Tier 1 RBTLs; one set for Type 1/sandy soils, one for Type 2/silty soils, and one for Type 3/clayey soils. The soil type determination must be applicable to the entire geographical extent of the site and 10 feet below the vertical extent of the soil contamination. A Missouri-registered geologist (RG) or Missouri-licensed professional engineer (PE) must seal the soil type determination applicable to the site.

Based on the Terracon September and November 2010 site investigations (see Section 4.3 above), Terracon anticipates the site soil would be Type 3/clayey soils. Under the B/VCP, formal testing to determine the soil's dry bulk density, total porosity, and moisture content would be required to determine the proper Unified Soil Classification System (USCS) soil classification.

Plume Stability

To assess plume stability, groundwater monitoring must be conducted for a period of time sufficient to show a reliably consistent trend in contaminant concentrations. Sampling and analysis of groundwater must be performed at a frequency and for parameters that are appropriate for site-specific conditions and are sufficient to enable assessment of contaminant trends natural attenuation rates, and seasonal or temporal variations in groundwater quality. The MDNR currently requires a minimum of four consecutive quarters of monitoring for all sites enrolled in the B/VCP.

Risk Assessment - Tier 1, Tier 2, or Tier 3 Levels

Risk assessment culminates in the estimation of risk and, as appropriate, the development of site-specific RBTLs for the environmental media impacted by chemicals of concern (COC) at the site. The assessment of risk involves determining exposure pathways and the routes of exposure. The exposure pathway is the course a chemical takes from a source of contamination to the receptor. The route of exposure is the manner in which the contaminant enters the receptor.

If the maximum soil or groundwater concentrations exceed the DTLs, the remediating party may choose to complete a Tier 1 Risk Assessment in lieu of cleanup to the DTLs. Tier 1 provides RBTLs based upon the receptor, land use, soil type, and pathway. Based on the comparison of representative concentrations and Tier 1 RBTLs, the remediation party can make one of three decisions: request a determination from the Department that the residual contaminant concentrations are protective of human health, public welfare, and the environment; adopt Tier 1 RBTLs as the cleanup levels and prepare a Risk Management Plan to manage the risk associated with the levels; or perform a Tier 2 Risk Assessment.

Tier 2 risk assessments allow for the use of site-specific fate and transport parameters to calculate site-specific RBTLs. Tier 2 site-specific RBTLs are calculated values based on site-specific data such as the nature and extent of contamination and physical characteristics of the site. Tier 3 risk assessments allow considerable flexibility in managing risk at a contaminated site. Because of the many options available at Tier 3, the department requires that a work plan be submitted and approved prior to the performance of a Tier 3 risk assessment. Higher tiers will require the collection of more site-specific data, which will increase data collection, data analysis, and labor costs.

Default Target Levels

DTLs are the most conservative chemical and medium-specific concentrations that allow unrestricted use of the property. For each contaminant and each medium, the DTL is the lowest of the Tier 1 RBTLs. Because DTLs are the most conservative values, their application does not require evaluation of site-specific exposure pathways, the development of a conceptual site model, any activity and use limitations, or the determination of whether groundwater is used or is likely to be used for domestic consumption.

Activity and Use Limitations

Activity and use limitations (AUL) establish limits and conditions on the future use of contaminated property and allow the cleanup to be tailored to these uses. To work properly, an AUL must provide critical information about the risks remaining at the site for people who will control and use the property in the future. The AUL policy presented by MDNR allows certain circumstances under which one or more specific AULs may be used to manage risks associated

with a site. Included are deed restrictions, groundwater ordinances, highway authority agreements, engineering controls such as pavement construction, and construction worker protection, to name a few.

Groundwater Ordinance

MRBCA allows the use of an ordinance as an AUL. The guidance allows AULs to be considered in determining whether the current and future groundwater domestic use pathway is or is not complete in association with a specific site. However, the guidance does not allow the domestic use pathway to be considered incomplete based solely on an ordinance unless 1) there is no existing use; 2) the aquifer is not capable of providing the quantity and quality of water to provide reasonable domestic use; and 3) the ordinance is the subject of a Memorandum of Understanding (MOU) between the entity responsible for the ordinance and the MDNR.

On August 1, 2005, the City of St. Louis approved Ordinance 66777. The Ordinance prohibits the use or attempted use of groundwater as a potable water supply and the drilling or installation of wells to be used for a potable water supply within the corporate limits of the City of St. Louis. On October 25, 2006, the City of St. Louis and DNR entered into the MOU referred to in Ordinance 66777. The MOU ensures that both the MDNR and the City track remediated sites and that the City notifies MDNR of changes to, and violations of, the Ordinance.

The site is located on the St. Louis County and City of St. Louis border and a groundwater ordinance does not exist for St. Louis County. This factor would need to be taken into consideration if a groundwater ordinance is required. Additionally, a survey for existing wells (which would have been grandfathered into the Ordinance) would be required.

5.2.3 Specific Redevelopment Scenarios

The site is a federal office complex and the site buildings are currently utilized as office and warehouse space. Future development will likely consist of periodic renovation/remodeling of existing buildings. Assuming confirmation of the soil classification as Type 3/clayey, the contaminants were compared to the lowest Type 3 Tier 1 RBTLs for Residential, Non-Residential, and Construction Worker values. The following sections are based on a Groundwater Use Evaluation and reliance on the City's Ordinance would allow for exclusion of groundwater use and direct contact pathways. If the site was enrolled in the B/VCP, additional samples, collected on a limited basis, for broad-spectrum contaminant analysis, would be required by the MDNR.

Child Care Facilities

A child care facility falls under the criteria for Residential Land Use. The following bullets detail the sample locations and contaminants that exceed the lowest Tier 1 RBTL for Residential Land-Use criteria.

1. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and ideno(1,2,3-cd)pyrene at sample location Building 102, Crawl space soil, 0”-6” depth, near Col. 9H.

2. Benzo(a)pyrene at sample location Building 102, Crawl space soil, 0”-6” depth, near Col. 38D.

3. Benzo(a)pyrene, dibenzo(a,h)anthracene, and lead at sample location Building 102D Crawl space sediment from inside process piping near Col. 10H.

4. Benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and ideno(1,2,3-cd)pyrene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 8H.

5. Benzo(a)pyrene and lead at sample location Building 102D, Crawl space sediment from inside process piping near Col. 11E.

6. Benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and lead at sample location Building 102D, Crawl space sediment from inside process piping near Col. 10E.

7. Benzo(a)pyrene, copper, and lead at sample location Building 102D, Crawl space sediment from inside wood settling tank near Col. 21D.

8. Benzo(a)pyrene and dibenzo(a,h)anthracene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 38D.

9. Arsenic at sample location Building 102D, Crawl space soil, 0”-6” depth, near Col. 35P.

10. Lead at sample locations Building 103F, Crawl space soil sample, 4”-8”, near Col. 8F, 8E, 10D, 11F, 10C, 4F, 3F, 2F.

11. Antimony, arsenic, and lead at sample locations Building 103F, crawl space, surface sediment near Col. 2F, and sediment from within process piping near Col 5C.

12. Lead at sample location Building 103F, Crawl space, soil sample, 0”-6” on gridline E between 1 & 2.

13. Antimony at sample location Building 103F, Crawl space soil sample, 0”-6” adjacent to Col. 9E.

14. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and lead at sample location Building 105, Crawl space sediment collected from within process piping near Col. 18H.

15. Lead at sample locations utility tunnel, sediment collected in the area of former buildings 104G, H, and I; former buildings 104K & L; east of Building 112; area of Building 104F; area between former buildings 104G, H, & I and Building 104E.

16. PCB Aroclor 1260 at sample location soil sample from 0-4’ collected north of building 108A.

17. PCB Aroclor 1260 groundwater samples collected from SB-126 and SB-133.

Moving forward, to create a child care facility onsite in any of the above mentioned areas, additional site characterization and delineation would be required. This would likely include soil sampling and analysis outside of crawl spaces to document the extent of contamination. In addition, some groundwater sampling would likely be required. Once monitoring wells are installed, the MDNR typically requires a minimum of four quarters of monitoring to document stable conditions. The GSA may be able to leave existing contamination in place under floor slabs and in crawl spaces, as the contaminants are not highly volatile and the building slab would serve as a barrier. The MDNR would require long-term stewardship (LTS) for any barriers used in this manner, to ensure that they remain in sufficient condition to limit human exposure to residual contamination.

Under this scenario, the GSA may also be required to subdivide the parcel, as the MDNR issues Certificates of Completion only for stand-alone real estate parcels. Subdividing a portion of the property for daycare use would allow for other land uses (considered non-residential) at other locations on the property.

<u>General Office / Warehouse</u>
The areas identified as general office use and warehouse/storage can be categorized as Non-Residential Use. The following bullets detail the sample locations and contaminants that exceed the lowest Tier 1 RBTL for Non-Residential Land-Use criteria.

1. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and ideno(1,2,3-cd)pyrene at sample location Building 102, Crawl space soil, 0-6” depth, near Col. 9H.

2. Benzo(a)pyrene at sample location Building 102, Crawl space soil, 0-6" depth, near Col. 38D.

3. Benzo(a)pyrene and dibenzo(a,h)anthracene at sample location Building 102D Crawl space sediment from inside process piping near Col. 10H.

4. Benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and ideno(1,2,3-cd)pyrene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 8H.

5. Benzo(a)pyrene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 11E.

6. Benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 10E.

7. Benzo(a)pyrene and copper at sample location Building 102D, Crawl space sediment from inside wood settling tank near Col. 21D.

8. Benzo(a)pyrene and dibenzo(a,h)anthracene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 38D.

9. Arsenic at sample location Building 102D, Crawl space soil, 0"-6" depth, near Col. 35P.

10. Antimony, arsenic, and lead at sample locations Building 103F, crawl space, surface sediment near Col. 2F, and sediment from within process piping near Col 5C.

11. Antimony at sample location Building 103F, Crawl space soil sample, 0"-6" adjacent to Col. 9E.

12. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene at sample location Building 105, Crawl space sediment collected from within process piping near Col. 18H.

13. PCB Aroclor 1260 at sample location soil sample from 0-4' collected north of building 108A.

14. PCB Aroclor 1260 groundwater samples collected from SB-126 and SB-133.

As in the previous scenario, the MDNR would require additional site characterization to delineate the residual contamination. As with the daycare option, the GSA may be able to leave existing contamination in place under floor slabs and in crawl spaces as long as LTS requirements are met. Unique to this scenario is the requirement for a non-residential land use restrictions. As with the prior scenario, the MDNR may require subdivision of the real estate parcel, particularly if the GSA wishes to use other portions of the facility for other types of land uses.

Construction Activities

During construction activities, construction workers can come into contact with contaminated soil and groundwater. The following bullets detail the sample locations and contaminants, as documented in the supplied excel spreadsheet that exceed the lowest Tier 1 RBTL for Construction worker criteria.

1. Benzo(a)pyrene and benzo(b)fluoranthene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 8H.

2. Benzo(b)fluoranthene at sample location Building 102D, Crawl space sediment from inside process piping near Col. 10E.

3. Copper at sample location Building 102D, Crawl space sediment from inside wood settling tank near Col. 21D.

4. Arsenic at sample location Building 102D, Crawl space soil, 0”-6” depth, near Col. 35P; and at sample location Building 103F, crawl space, sediment from within process piping near Col 5C.

5. Antimony and arsenic at sample locations Building 103F, crawl space, surface sediment near Col. 2F.

6. Antimony at sample location Building 103F, Crawl space soil sample, 0”-6” adjacent to Col. 9E.

7. PCB Aroclor 1260 at sample location soil sample from 0-4’ collected north of building 108A.

8. PCB Aroclor 1260 groundwater samples collected from SB-126.

Due to the nature of construction activities, engineered barriers are not sufficient to protect the health and welfare of construction workers during site construction activities. To address these exposures, the GSA could consider a requirement that construction worker activity in

contaminated areas be conducted under appropriate health and safety precautions (e.g., personal protective equipment) and that construction spoils are properly disposed of. The MDNR supports these types of requirements as conditions of closure within the B/VCP.

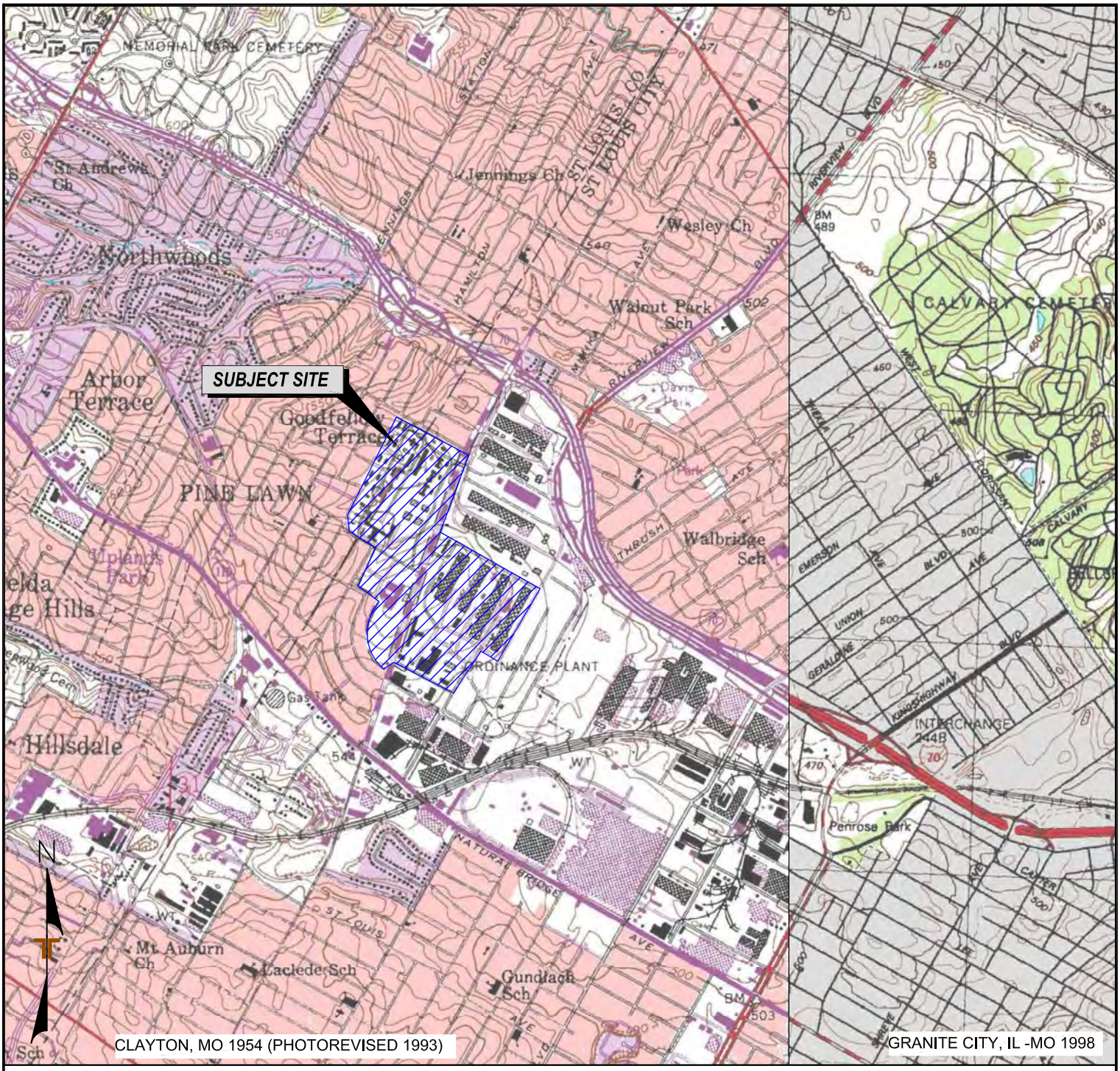
6.0 CONCLUSIONS

Terracon has provided a summary of the site conditions including the asbestos and lead wipe samples, and soil and groundwater samples. The asbestos and lead summary outlines the reporting and notification procedures if renovation or demolition should move forward. Similarly, various soil and groundwater sample concentrations exceed levels set forth by the MDNR. Terracon has provided summaries to move forward with child care facilities, maintaining the office/warehouse buildings, and handling construction worker activities.

7.0 RECOMMENDATIONS

If GSA is willing to accept land use restrictions (i.e., non-residential land use limitations, etc.) then it appears that areas of residual contamination at the site can be addressed without physical remediation. In order to characterize residual contamination at the facility sufficiently for the MDNR to issue a Certificate of Completion, exterior areas around Buildings 102, 102D, 103F, and 105 would require additional soil and groundwater investigation activities. During Terracon's site visit and the review of historical documents, areas that were immediately dangerous to life or health were not identified.

Terracon recommends that the GSA enroll the property in the B/VCP in order to pursue a Certificate of Completion. Additional investigative and groundwater monitoring activities needed are typically negotiated with the MDNR at the time of enrollment. To initiate this process, the GSA will need to complete a B/VCP application found online at http://www.dnr.mo.gov/forms/780-1712.pdf and provide the MDNR with all historical environmental documents for their review and consideration.

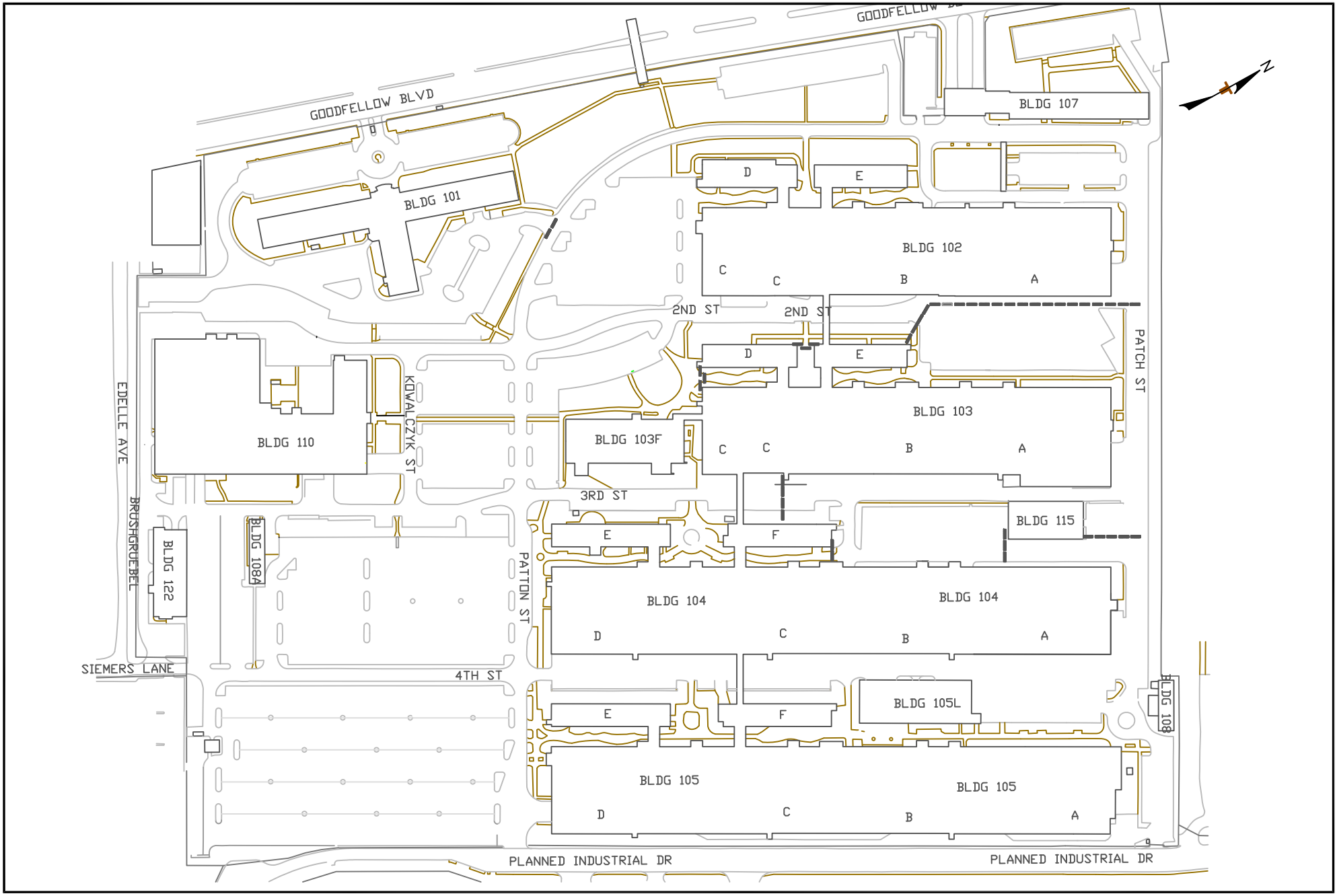


LEGEND

Approximate Site Boundary

Project Mngr: BRP	Project No. 15107048	Terracon Consulting Engineers and Scientists	TOPOGRAPHIC MAP
Drawn By: MMR	Scale: 1"=2000'	11600 LILBURN PARK ROAD ST. LOUIS, MO 63146	FILE REVIEW & SUMMARY OF SITE CONDITIONS
Checked By: MMR	File No. 15107048 TOPO	PH. (314) 692-8811 FAX. (314) 692-8810	GENERAL SERVICES ADMINISTRATION
Approved By: BRP	Date: 12/6/2010		4300 GOODFELLOW AVENUE
			SAINT LOUIS MISSOURI

EXHIBIT 1 (TOPO)



Project Mngr:	BRP
Drawn By:	MMR
Checked By:	MMR
Approved By:	BRP

Project No.	15107048
Scale:	1"=250'
File No.	15097075 D2
Date:	12/6/2010

Terracon
Consulting Engineers and Scientists
11600 LILBURN PARK ROAD ST. LOUIS, MO 63146
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SITE DIAGRAM

FILE REVIEW & SUMMARY OF SITE CONDITIONS

GENERAL SERVICES ADMINSTRATION

4300 GOODFELLOW AVENUE

SAINT_LOUIS MISSOURI

EXHIBIT

2