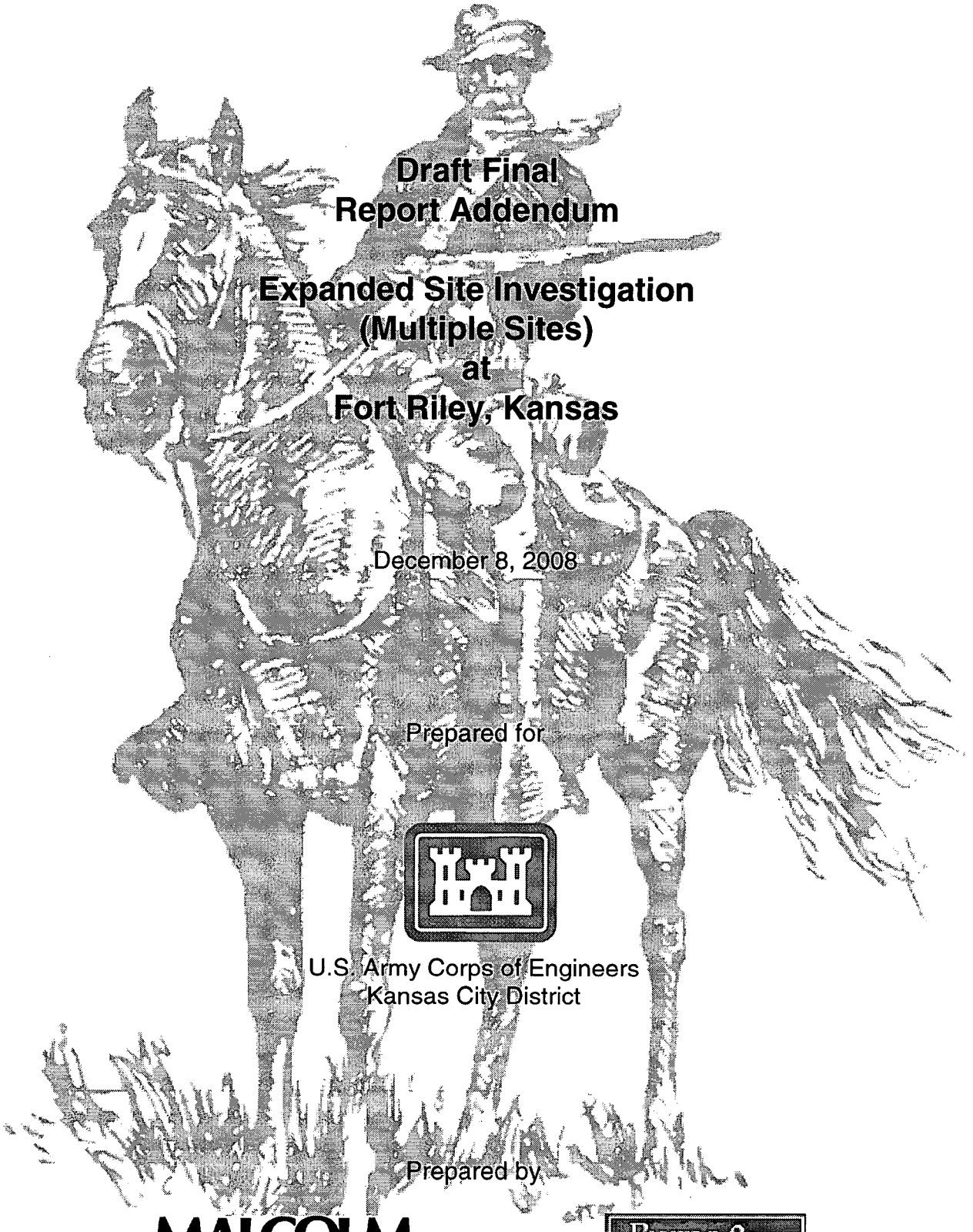

Draft Final
Report Addendum

Expanded Site Investigation
(Multiple Sites)
at
Fort Riley, Kansas

December 8, 2008

Prepared for

U.S. Army Corps of Engineers
Kansas City District

Prepared by

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Burns & McDonnell
SINCE 1898

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LIST OF ACRONYMS AND ABBREVIATIONS

AEHA	Army Environmental Hygiene Agency
bgs	below ground surface
BMcD	Burns & McDonnell Engineering Company, Inc.
BTEX	benzene, toluene, ethylbenzene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DA	Department of the Army
DAF	Dilution Attenuation Factor
1,2-DCA	1,2-dichloroethane
DCE	cis-1,2-dichloroethene
DEH	Fort Riley – Directorate of Engineering and Housing
DS/GS	Direct Support/General Support
1,2-EDB	1,2-dibromoethane
ESI	Expanded Site Investigation
FFA	Federal Facility Agreement
FID	flame ionization detector
FSPA	Field Sampling Plan Addendum
ft	feet
HRA	Hazard Ranking System
IDWPA	*Investigative-Derived Waste Management Plan Addendum, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas*
IRP	Installation Restoration Program
IW-FSP	*Installation-Wide Field Sampling Plan for Environmental Investigations, Fort Riley, Kansas*
IW-IDW	*Installation-Wide Investigative-Derived Waste Management Plan for Environmental Investigations, Fort Riley, Kansas*
IW-SAP	*Installation-Wide Sampling and Analysis Plan for Environmental Investigations at Fort Riley, Kansas*
IW-SSHP	*Installation-Wide Site Safety and Health Plan for Environmental Investigations at Fort Riley, Kansas*
IW-QAPP	*Installation-Wide Quality Assurance Project Plan for Environmental Investigations, Fort Riley, Kansas*
IWSA	*Installation-Wide Site Assessment for Fort Riley, Kansas*
KDHE	Kansas Department of Health and Environment
KPSRL	Kansas Petroleum Site Remediation Level
KSARNG	Kansas Army National Guard
LBA	Louis Berger and Associates

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

MAAF	Marshall Army Airfield
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MP	Malcolm Pirnie, Inc.
NCP	National Contingency Plan
NPL	National Priorities List
PA	Preliminary Assessments
PAOC	Potential Areas of Concern
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
POL	petroleum, oil, and lubricants
PRG	Preliminary Remediation Goals
PW	Public Works
PWE	Fort Riley Directorate of Public Works – Environmental Division
QA	Quality Assurance
QAPPA	Quality Assurance Project Plan Addendum
QCSR	Quality Control Summary Report
RCRA	Resource Conservation and Recovery Act
RPMP	Real Property Master Plan
RSK	Risk-Based Standards for Kansas
SAPA	Sampling and Analysis Plan Addendum
SI	Site Investigation
SSHP	*Site-Specific Safety and Health Plan, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas*
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCE	trichloroethene
TEPH	total extractable petroleum hydrocarbons
TPH	total petroleum hydrocarbons
TPH-DRO	total petroleum hydrocarbons-diesel range organics
TPH-GRO	total petroleum hydrocarbons-gasoline range organics
TVPH	total volatile petroleum hydrocarbons
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

UST	underground storage tank
VOC	volatile organic compound
WP	Work Plan
WPA	Work Plan Addendum

* * * * *

1.0 INTRODUCTION

1.1 PURPOSE OF EXPANDED SITE INVESTIGATION (ESI) REPORT

The Fort Riley Directorate of Public Works – Environmental Division (PWE) is performing the Installation Restoration Program (IRP) at Fort Riley, Kansas. This program, designed to identify and address potential threats to human health and the environment, has been underway for several years at the post. Numerous investigations, pilot studies, and environmental sampling events have been conducted by the United States Army Corps of Engineers (USACE) at several sites on the post to support the IRP effort.

Upon review of the public record, Fort Riley has determined that multiple potentially contaminated sites identified during previous investigations have not had a formal decision on their regulatory status signed by the parties to the Federal Facility Agreement (FFA). These multiple sites have been organized into five groups based on similar site characteristics or contaminants as indicated below:

- Pesticide / Polychlorinated Biphenyl (PCB) Sites
- Wastewater Sites
- Petroleum / Volatile Organic Compound (VOC) Sites
- Former Landfill / Incinerator Sites
- Former Vehicle Maintenance Shops / Gas Stations / Petroleum Dispensing Stations (collectively referred to as the Former Petroleum, Oil, and Lubricant [POL] Sites)

The purpose of the first phase of the ESI was to conduct additional evaluation of each of the sites and obtain formal determinations of their future status by the parties to the FFA. The first phase of the ESI included literature searches to identify available information on each site and determination of data gaps, collection of soil and groundwater samples to close identified data gaps, and preparation of individual ESI Reports for each of the five site groups which included specific recommendations for the future status of each of the sites. Malcolm Pirnie, Inc. (MP) has a contract with the USACE to conduct this investigation. MP subcontracted Burns & McDonnell Engineering Company, Inc. (BMcD) to prepare work plan documents, execute the field work, and prepare the ESI Reports. This first phase was completed and the reports were issued during the fall of 2007. These report documents included the following:

- *Report Pesticide / PCB Sites (Group 1), Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (MP-BMcD, 2007a)

- *Report Wastewater Sites (Group 2), Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (MP-BMcD, 2007b)

- *Report Petroleum / VOC Sites (Group 3), Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (MP-BMcD, 2007c)

- *Report Former Landfill / Incinerator Sites (Group 4), Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (MP-BMcD, 2007d)

- *Report Former POL Sites (Group 5), Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (MP-BMcD, 2007e)

As a result of this initial phase of the ESI, it was determined that most of the sites were eligible for closed status. However, the following five sites required additional sampling in order to fill data gaps that were identified during the first phase of the ESI:

- PCB Storage Building 343 (FTRI-007)
- Fire Training Area Facility 892 (FTRI-018)
- Furniture Repair Shop Building 1605 (FTRI-041)
- Building 727 Waste Pit (FTRI-051)
- Former Gas Station - Camp Forsyth I Street Site (FTRI-043)

In addition, the following location, which was not initially identified as an ESI site of interest, was added:

- Former Direct Support / General Support (DS/GS) Maintenance Area - Building 1693

This draft report addendum includes a complete summary of all previous investigative work conducted at these locations, as well as the results of field work completed as part of the ESI. The evaluation includes a critical analysis of the new data with respect to the historical data. The analysis considers whether or not the new data are consistent with the historical data and includes possible explanations for any variance observed. A recommendation on the determination of the future status of each of the site is also presented. The results for Building 1693 are presented in a separate, stand-alone report (MP-BMcD, 2008a).

Figure 1-1 presents the locations of the six sites on Fort Riley. Survey data is presented in Appendix A.

1.2 PROJECT DOCUMENTATION

The following installation-wide documents were prepared which provide detailed procedures for conducted environmental investigations on the post:

- *Installation-Wide Sampling and Analysis Plan for Environmental Investigations at Fort Riley, Kansas* (IW-SAP) (MP-BMcD, 2004a), which consists of the following two volumes:
    - *Volume I, Installation-Wide Field Sampling Plan* (Volume I – IW-FSP)
    - *Volume II, Installation-Wide Quality Assurance Project Plan* (Volume II – IW-QAPP)
- *Installation-Wide Site Safety and Health Plan for Environmental Investigations at Fort Riley, Kansas* (IW-SSHP) (MP-BMcD, 2004b)
- *Installation-Wide Investigative-Derived Waste Management Plan for Environmental Investigations, Fort Riley, Kansas* (IW-IDW) (BMcD, 2003a)

The following work plan addendum was prepared to support the field work:

- *Work Plan Addendum, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (WPA) (MP-BMcD, 2008b)

The following project specific plan addenda have been prepared to support the ESI:

- *Work Plan, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (WP) (MP-BMcD, 2006a)
- *Sampling and Analysis Plan Addendum, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (SAPA) (MP-BMcD, 2006b), which consists of the following two volumes:
    - *Volume I, Field Sampling Plan Addendum* (FSPA)
    - *Volume II, Quality Assurance Project Plan Addendum* (QAPPA)
- *Site-Specific Safety and Health Plan, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (SSHP) (MP-BMcD, 2006c)
- *Investigative-Derived Waste Management Plan Addendum, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (IDWPA) (MP-BMcD, 2006d)

1.3 SITE DESCRIPTION

General site conditions, including the physical setting, surface features, ecology, geology and hydrogeology, and climate have been summarized in the IW-FSP. Conditions specific to each ESI site are addressed in the individual site discussions.

1.4 REGULATORY HISTORY

Fort Riley was established in 1853 and has been owned and operated by the United States Department of the Army (DA) since that time. Environmental investigations and sampling events were performed at Fort Riley during the 1970s and 1980s. These investigations identified activities and facilities where hazardous substances had been released or had the potential to be released to the environment. Potential sources of contamination include a variety of landfills; printing, dry cleaning, and furniture shops; POL sites; and pesticide storage facilities. On July 14, 1989, the United States Environmental Protection Agency (USEPA) proposed inclusion of Fort Riley on the National Priorities List (NPL), and listed the installation on the USEPA NPL in August 1990, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The DA – Fort Riley, the Kansas Department of Health and the Environment (KDHE) and the USEPA entered into a FFA, to address environmental releases subject to Resource Compensation and Recovery Act (RCRA) and CERCLA or CERCLA alone.

The FFA, which became effective in June 1991, required Fort Riley to conduct a systematic site assessment to identify all potential areas of concern (PAOCs) at Fort Riley. The systematic site assessment was performed in 1992, with the results presented in the *Installation-Wide Site Assessment for Fort Riley, Kansas* (IWSA) dated 07 December 1992 and revised on 16 February 1993 (Louis Berger and Associates [LBA], 1993). The IWSA summarized existing data and identified 25 groups of PAOCs, with 23 sites being identified for further site investigation. Contaminants associated with these sites vary greatly from potential lead-contaminated soils at old firing ranges to potential releases of solvents due to practices at furniture repair shops. The IWSA was conducted consistent with the USEPA requirements for Preliminary Assessments (PA) under CERCLA. Based on USEPA's PA method, potential risk posed by PAOCs was estimated using the Hazard Ranking System (HRS). The IWSA identified PAOCs subject to RCRA corrective actions and/or CERCLA where a release of hazardous substances to the environment has occurred or is considered likely, migration pathways from the site exist, and potential receptors are known to exist. Specifically, 23 PAOCs were identified and evaluated using the HRS PA score method. As outlined in the National Contingency Plan (NCP), the results of the PA were used to identify sites requiring further investigation.

These PAOCs were addressed under a Multiple Site Investigations project which was further broken down into these groupings: the Sensitive Receptor Lead Sites; "High Priority" Sites; and "Other Sites". The Sensitive Receptor Lead Sites investigation was expedited due to the accessibility of the areas to the general public (especially children). Only one area near the Coyler Manor Family Housing Area was identified as having elevated levels of lead in the soils, and a removal action involving excavation and off-site disposal of soil was performed. The High Priority Sites field investigations were completed in November 1993. The "Other Sites" grouping consisted of 14 sites which had very low PA HRS scores and had a low potential for release of contaminants to the environment. Field work for these "Other" sites was performed in the spring and summer of 1994. Site investigations for seven POL / underground storage tank (UST) sites were conducted from 1992 to 1995.

Fort Riley has a RCRA Part B permit that became effective October 1, 1998 and expires October 1, 2008. Part I of the permit allows Fort Riley to operate as a storage facility for hazardous waste. Part II of the permit defers corrective action requirements to those conditions specified in the Fort Riley FFA.

The permit states that the IWSA and subsequent modifications thereto, shall constitute the identification of all known past and present sites/solid waste management units (SWMUs), effective with the issuance of Part II of the permit. Table 2.2 of the permit lists sites/SWMUs covered under the FFA and their current status (revised October 2000). The current status of the ESI sites/groupings listed in the permit are determined to not have the potential to pose a risk to human health or the environment. Although the RCRA permit states these sites pose no potential risk, the regulatory status under CERCLA is currently open; i.e., the sites have not received regulatory concurrence to terminate further response activities or to initiate a removal or to proceed to the next phase under CERCLA for a remedial investigation, if warranted.

1.5 RATIONALE AND TECHNICAL APPROACH

The objective of this ESI Addendum was to provide a defensible rationale for ending environmental investigations at the identified ESI sites, if that decision was supported by data. In the event that closed status was not supported by the data, then future work required for closed status was proposed. This was accomplished using a three step process:

- A project workplan was prepared (MP-BMcD, 2008b). This document presented the rationale for the collection of additional samples at each location and was approved by the regulatory agencies.

- Additional field sampling was conducted during the early summer of 2008. Samples collected included soil, groundwater, and concrete samples. All results were validated and a Quality Control Summary Report (QCSR) was issued (MP-BMcD, 2008c).

- This draft ESI Report Addendum was prepared and will include a discussion of results for the five sites previously sampled during the first phase of the ESI. This report will provide information on the field activities conducted and the results of laboratory analysis, and a recommendation for the future status of the sites.

The field activities and analytical results for the Former DS/GS Maintenance Area Building 1693 are discussed in a separate, stand-alone report (MP-BMcD, 2008a).

1.6 RISK-BASED SCREENING CRITERIA

Field data were screened against existing risk-based screening criteria in order to determine if contaminants detected in soil or groundwater present a hazard to potential receptors. No effort was made to perform a formal risk assessment for any of the ESI sites. The screening process was developed in collaboration with Fort Riley and is described in the following bullets:

- Data were screened initially against USEPA Region 9 Preliminary Remediation Goals (PRGs) (USEPA, 2004a). These are risk-based standards and are more stringent than other regulatory standards available. For soil, the residential PRGs were used initially. For groundwater, the tap water PRGs were applied. If leaching to groundwater appeared to be a potential issue, then the soil data were screened against the dilution attenuation factor (DAF) 20 standards for "migration to groundwater."

- If soil at a site failed screening against the Region 9 residential PRGs, then the industrial PRGs were applied, assuming their use was justified based on current and/or future use of the site.

- If groundwater at a site failed screening against the tap water PRGs, then the USEPA Maximum Contaminant Levels (MCLs) (USEPA, 2004b) were applied.

- If soil failed screening against both residential and industrial PRGs, then the KDHE Risk-Based Standards for Kansas (RSK) screening standards (KDHE, 2007) were applied.

- If soil and/or groundwater failed screening against all regulatory standards, then an effort was made to justify closed status based on the lack of completed pathways to potential receptors. This was a qualitative assessment; no formal risk assessment was performed.

In the event that a recommendation for closed status could not be made, then recommendations were made for additional work at that location.

1.7 REPORT ORGANIZATION

Each section of this report addendum (Sections 2 through 6) consists of individual, stand alone descriptions of each site. Each discussion includes the following elements:

- Site Location, Land Use, Potential Migration Pathways, and Receptors – a brief description of the physical location of the site, including the nature of the surrounding area. A description of geology and hydrogeology is included. Any protected or special ecological and cultural features observed or known to occur at or near the site are described. Any significant receptors, especially water supply wells, are also described.

- Site Background and Previous (Historical) Sampling Results – This section includes a brief history of the site. Also discussed are any previous site investigation activities and a discussion of analytical results from those activities.

- ESI Field Activities (2006), Analytical Results, and Proposed Additional Sampling – Significant observations which drove the sampling rationale are listed. The field activities conducted as part of the initial ESI in 2006 are described in detail and the analytical results are addressed. Fort Riley's proposal for additional sampling at the site is also discussed.

- Additional ESI Field Activities and Analytical Results – The field activities conducted as part of the additional ESI in the summer of 2008 are described and the analytical results are addressed.

- Discussion and Recommendations – This section provides a discussion of both previous and ESI sampling results. Any anomalies in the data sets are described and explained, if possible. Based on a comparison of analytical data to screening criteria, a recommendation for closed status was made. If closed status is not indicated, then a recommendation for additional work was made.

This draft report addendum is organized as follows:

- Section 2.0 - PCB Storage Building 343 (FTRI-007)
- Section 3.0 - Fire Training Area Facility 892 (FTRI-018)
- Section 4.0 - Furniture Repair Shop Building 1605 (FTRI-041)
- Section 5.0 - Building 727 Waste Pit (FTRI-051)
- Section 6.0 - Former Gas Station - Camp Forsyth I Street Site (FTRI-043)
- Section 7.0 – References

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2.0 PCB STORAGE BUILDING 343 (FTRI-007)

2.1 SITE LOCATION, LAND USE, POTENTIAL MIGRATION PATHWAYS, AND RECEPTORS

Building 343 is located within the Public Works (PW) maintenance compound at the Main Post cantonment area (Figures 1-1 and 2-1). The PW maintenance compound is located north of the Union Pacific Railroad (UPRR) grade. Building 343 is located at the eastern portion of the PW maintenance compound. It is a wood frame and metal building, approximately 150 feet (ft) by 40 ft in size, and open to the south. The eastern portion of the building is enclosed and has a cement floor (25 ft by 40 ft).

The area around Building 343 is an industrial area, with large open areas of gravel and asphalt. The entire PW maintenance compound sits on an ancient alluvial terrace, which consists of unconsolidated clay, silt, and sand. These terrace deposits overlie shale and/or limestone bedrock, and are approximately 35 ft thick at the Building 343 location. Groundwater is present approximately 30 ft below ground surface (bgs), and flows to the south, towards the Kansas River alluvial aquifer. Surface drainage at this location will also be to the south.

No protected or special ecological or cultural features were observed or are known to occur at or near this Site.

Due to the limited mobility of PCBs, contamination of groundwater should not be an issue. The main environmental hazard associated with PCBs would be from the ingestion or inhalation of PCBs in dust.

2.2 SITE BACKGROUND AND PREVIOUS (HISTORICAL) SAMPLING RESULTS

Building 343 was put in use in 1988 and has been used for the temporary storage of PCB equipment awaiting pickup and off-site disposal. The storage of PCB equipment at Building 343 ceased in October 2002. In the Army Environmental Hygiene Agency (AEHA) report, it was noted that stained soil was observed at this location, and the report indicated that Fort Riley – Directorate of Engineering and Housing (DEH) had plans to address the spills. Fort Riley has conducted a cleanup of this facility and the stained soil, which tested non-detect for PCB contamination, was removed (AEHA, 1988).

No sampling data was available prior to completing the first phase of the ESI. However, the IWSA indicated that materials tested during removal of soil stains at this site were not contaminated with PCBs (LBA, 1993). During the IWSA in 1993, no oily stains were observed in Building 343. Steel secondary

containment trays were used and should have prevented releases of PCBs onto the concrete floor. There are no records of any spill in either Fort Riley or KDHE's spill records.

2.3 ESI FIELD ACTIVITIES (2006), ANALYTICAL RESULTS, AND PROPOSED ADDITIONAL SAMPLING

Six debris/surface samples were collected from the enclosed, eastern portion of Building 343 on June 26, 2006. This area consisted of a concrete, slab floor. The field geologist divided the floor into six zones of equal surface area. He then collected surface debris from these zones to provide sufficient sample for laboratory analysis. These samples were analyzed for PCBs (USEPA Method 8082).

Analytical results (positive hits only) for the PCB Storage Building 343 are presented in Table 2-1. The PCB isomers Aroclor-1242 and Aroclor-1260 were detected in surface debris samples. Aroclor-1242 was detected in four of the six samples collected, at concentrations ranging from 0.08J to 0.34J milligrams per kilogram (mg/kg). Only one debris sample (S05) had a detection of Aroclor-1260 at a concentration of 0.05 mg/kg. Although two of these samples exceeded the USEPA Region 9 Residential PRG of 0.22 mg/kg, none exceeded the Region 9 PRG (industrial) of 0.74 mg/kg.

The debris/surface samples consisted of dirt and gravel dust, which are not representative of evidence of any release of PCB contamination. Fort Riley proposed that a concrete sample should be collected in the area where PCB containing materials/equipment were stored inside the testing and storage area to determine residual concentrations of PCBs, if any, in the concrete. In addition, since the concrete floor slopes to the southeast and the PCB materials were stored prior to testing in the southeast quadrant of the building, two representative samples should be collected from soil near the southeast corner outside the building.

2.4 ADDITIONAL ESI FIELD ACTIVITIES (2008) AND ANALYTICAL RESULTS

The following additional ESI sampling activities were conducted at Building 343 (FTRI-007) on June 23, 2008. One concrete sample was collected from the floor of the testing and storage area at the east end of Building 343. Approximately 12 drill holes were advanced into the concrete floor using a hand drill and a new, clean masonry bit. The drill holes were arrayed in a circular pattern approximately two feet in diameter set against the northeast wall of the testing and storage area. The concrete dust generated was collected and analyzed off the site for PCBs (USEPA Method 8082). Following sample collection, the floor was patched. PCBs were not detected in the concrete sample at concentrations above the reporting limits.

One direct-push boring (DP01) was advanced immediately south of the door to the storage area (Figure 2-1). This direct-push boring was continuously sampled from the ground surface to a depth of five ft using a 2-inch Macrocore™ sampler. Two soil samples were collected from this direct-push boring at depth intervals of 0 – 0.5 ft bgs and 4.5 – 5.0 ft bgs. The field geologist prepared a lithologic log of this boring (boring logs are included in Appendix B). Soil samples were analyzed off the site for PCBs (USEPA Method 8082). PCBs were not detected in either of the two soil samples at concentrations above the reporting limits.

A table of analytical results is not presented since there were no detections of PCBs which exceeded analytical reporting limits.

2.5 DISCUSSION AND RECOMMENDATIONS

PCBs were not detected at concentrations above the reporting limits in either the concrete sample or the soil samples taken immediately south of Building 363. Based on these results, plus the data collected in 2006, a recommendation is made for closure of the PCB Storage Building 343 (FTRI-007).

* * * * *

3.0 FIRE TRAINING AREA FACILITY 892 (FTRI-018)

3.1 SITE LOCATION, LAND USE, POTENTIAL MIGRATION PATHWAYS, AND RECEPTORS

The former Fire Training Area Facility 892 is located off Marshall Drive, along the southeastern boundary of Marshall Army Airfield (MAAF) (see Figures 1-1 and 3-1). The facility was constructed in 1987 to provide a training area for the crash rescue unit of the Fort Riley Fire Department after the former fire training area at the north end of the airfield was closed. The burn pit consisted of a 75-ft by 75-ft concrete pad surrounded by a six-inch concrete curb. The area immediately surrounding the concrete pad consisted of crushed aggregate paving. The concrete pad, upon which the fire training exercises were conducted, was designed to drain (via an underground drainage line) through an oil/water separator to the sanitary sewer. Product removed from the oil/water separator was stored in a 550-gallon UST. Fuel was stored on the Site in a 4,000-gallon UST (BMcD, 1998). The USTs, underground piping, concrete pad, oil/water separator, and associated piping have been removed, and the area is overgrown with native grasses (BMcD, 1998). The Site is flat and a ditch parallels Marshall Drive on the southeastern perimeter of the Site.

The Site is located approximately 3,500 ft east of the Kansas River. The Site lies within the southeast margin of the Kansas River floodplain, and is underlain by clay, silt, and sand deposits. Groundwater flows generally toward the north-northeast at MAAF and the water table is typically between 20 and 25 ft bgs (BMcD, 1998). Alluvial deposits can reach a thickness of up to 70 ft near the river and decrease in thickness toward the valley margin. The alluvium tends to coarsen with depth and lies on bedrock composed of limestone and shale (BMcD, 1998).

Although the Site is located within the 500-year floodplain, it is considered unlikely that such a flood event would coincide with a burn event at the Site. There are no direct drainages from the Site to the river (LBA, 1993).

No protected or special ecological or cultural features were observed or are known to occur at or near this Site. Current and future land use at this site, based on the post environmental overlay, is anticipated to be as an airfield.

3.2 SITE BACKGROUND AND PREVIOUS (HISTORICAL) SAMPLING RESULTS

This Site was first used for training beginning in 1988 and ending in 1991. The exercises were conducted by releasing fuel onto the concrete pad, followed by ignition of the fuel and extinguishing the resultant

fire. The type of fuel used was reportedly JP-4, composed of approximately 65% gasoline and 35% kerosene; however, it is unknown whether the fuel was pure or a mixture of other petroleum POL products. The fuel was released onto the concrete pad from a 4,000-gallon UST through underground lines connected to the pad. At the conclusion of the training session, the pad was washed down with water which drained into the oil/water separator prior to discharge to the sanitary sewer (BMcD, 1998).

The two USTs at the Site (Tank 892A – water/used fuel storage and Tank 892B – fuel storage) were removed in March 1996, and the Site received a "closed" status from the KDHE. The underground piping, concrete pad, and oil/water separator were removed concurrently with the USTs. Soil samples collected from around the USTs and associated piping showed no measurable contamination present. BMcD inferred from the Permanent Tank Abandonment Report that the samples were screened on the Site visually and with a photoionization detector PID. In addition, the report stated that no groundwater was encountered during the UST removal, thus BMcD assumed that no groundwater samples were collected (BMcD, 1998).

As previously stated, the Kansas River alluvial aquifer is a source of drinking water. All of Fort Riley's supply wells are located upgradient of the 892 Site. The one well located at MAAF is a non-potable source for fire fighting and is located approximately one mile upgradient of the Site. The nearest public supply wells are those for the community of Ogden, which are located approximately 4 miles to the northeast of the Site. These supply wells are on the other side of the Kansas River, which is a hydrologic boundary for the alluvial aquifer system. There are no other public supply wells within 4 miles of the Site. There are no identifiable overland migration pathways from the Site to the river.

In 1998, BMcD conducted a field investigation, which included a soil-gas survey for VOCs; groundwater screening sampling for benzene, toluene, ethylbenzene, and xylene (BTEX), trichloroethene (TCE), tetrachloroethene (PCE), and cis-1,2-dichloroethene (DCE); groundwater confirmation sampling for VOCs; and subsurface soil sampling for VOCs. Results are presented in the following bullets:

- Only BTEX compounds were detected in the soil-gas samples, with the highest concentrations located in a boring in the former crushed aggregate paving south of the former concrete pad. Concentrations of BTEX compounds in soil-gas samples from this location were 8,000, 4,000, 200, and 500 micrograms per liter (µg/L), respectively. (BMcD, 1998).

- BTEX were the only compounds detected in the groundwater screening samples, with the highest concentrations located inside the former fenced UST area located just outside the

former crushed aggregate paving area on the southeastern portion of the Site. These detections were below the USEPA MCLs, with the exceptions of two sample locations that had benzene detections above the MCL (7,000 and 6 µg/L; see locations P33 and P34 on Figure 3-2). These locations were near the former USTs which appeared to be the source of the groundwater contamination. The extent of groundwater contamination was not defined (BMcD, 1998).

- The groundwater confirmation samples compared reasonably well with the screening samples, but only benzene, toluene, and xylenes were detected. No confirmation samples were collected in the vicinity of the former USTs (BMcD, 1998).

- There were no detections in the subsurface soil samples (BMcD, 1998).

In 1999, BMcD conducted additional field sampling which included groundwater screening sampling for BTEX and subsurface soil sampling for benzene, 1,2-dichloroethane (1,2-DCA), 1,2-dibromoethane (1,2-EDB), total extractable petroleum hydrocarbons (TEPH), and total volatile petroleum hydrocarbons (TVPH) in the vicinity of the UST basin. Additionally, three monitoring wells (892-99-01, 892-99-02, and 892-99-03) were installed based on the results of the groundwater field screening and were sampled for VOCs, naphthalene, and EDB. Results are presented in the following bullets:

- BTEX compounds were detected in at least 7 of the 15 groundwater screening samples, with the highest concentrations located inside the former fenced UST area located just outside the former crushed aggregate paving area on the southeastern portion of the Site (Figure 3-3). Detections were below the USEPA MCLs, with the exceptions of five sample locations that had benzene detections above the MCL (see locations P35, P41, P43, P44, and P47 on Figure 3-3 [BMcD, 1999]).

- Benzene, TVPH, and TEPH as kerosene were detected in soil samples collected from Soil Boring SB01, but only TVPH was detected in Soil Boring SB02 (Figure 3-4). The concentration of TEPH detected in Soil Boring SB01 exceeded the Kansas Petroleum Site Remediation Level (KPSRLs). TVPH concentrations exceeded the KPSRL in both of the borings (BMcD, 1999).

- BTEX and 1,2-DCA were detected in only one of the three groundwater samples collected from the monitoring wells. This detection occurred in the sample collected from Monitoring Well 892-99-02, which is located in the immediate vicinity of the UST

basin. Detections of 1,2-DCA, benzene, and toluene at concentrations of 550, 22,000, and 10,700 µg/L, respectively, were in excess of the USEPA MCLs. This indicates that contamination did migrate from the former UST basin into the underlying aquifer (BMcD, 1999).

- Data from the three monitoring wells, along with the groundwater screening, delineate the extent of groundwater contamination at the Site (BMcD, 1999).

Burning of fuels during the training exercises were conducted under a written exemption to Fort Riley's air permit with the State of Kansas. Because of the flammable liquids placed in the burn pit for ignition, it was considered a PAOC (LBA, 1993).

3.3 ESI FIELD ACTIVITIES (2006), ANALYTICAL RESULTS, AND PROPOSED ADDITIONAL SAMPLING

Groundwater samples were collected as part of the initial ESI effort in 2006 from Monitoring Wells 892-99-01 and 892-99-03 (Figure 3-1). Groundwater was not collected from Monitoring Well 892-99-02 as there was an insufficient amount of water present for sampling. The field crew noted that a hydrocarbon odor was present at Monitoring Well 892-99-02 and that an oily residue was present on the water level indicator probe. The two groundwater samples collected were sent to an off-site laboratory for analysis of VOCs (USEPA Method 8260). No VOCs were detected in either groundwater sample.

Since no groundwater sample was collected from Monitoring Well 892-99-02, it was not possible to compare results with historical data or assess current conditions at this location. Fort Riley proposed advancing a direct-push boring adjacent to Monitoring Well 892-99-02 to collect both soil and groundwater samples for VOC analysis.

3.4 ADDITIONAL ESI FIELD ACTIVITIES (2008) AND ANALYTICAL RESULTS

On June 24, 2008 one direct-push boring was advanced adjacent to Monitoring Well 892-99-02 (Figure 3-1). This direct-push boring was continuously sampled from the ground surface to groundwater using a 2-inch Macrocore™ sampler. The field geologist prepared a lithologic log of this boring and screened the soil with a PID (boring logs are included in Appendix B). Three soil samples were collected from this direct-push boring at depth intervals of 0 – 0.5 ft bgs, 4 – 8 ft bgs, and 8 – 12 ft bgs. In addition, a groundwater sample was collected at this location. All samples samples were analyzed off the site for VOCs (USEPA Method 8260).

There were no detections of VOCs in any of the three soil samples at concentrations above the reporting limits. Both benzene and ethylbenzene were detected in the groundwater sample at concentrations of 3,930 and 70 µg/L, respectively (Table 3-1). Benzene exceeded both its USEPA Region 9 PRG (tap water) of 0.35 µg/L and its USEPA MCL of 5 µg/L (Figure 3-5).

3.5 DISCUSSION AND RECOMMENDATIONS

There were no detections of VOCs in the soil samples collected from Direct-Push Boring DP01. However, both benzene and ethylbenzene were detected in the groundwater sample from this boring. Benzene exceeded both USEPA Region 9 PRG (tap water) and USEPA MCL regulatory standards.

Historical and ESI sampling results can be summarized as follows:

- Investigations conducted in 1999 resulted in the detection of BTEX compounds in both soil-gas and groundwater screening samples. Benzene was detected in groundwater in excess of the USEPA MCL. Concentrations were highest in groundwater samples taken in vicinity of the former UST area and dropped off significantly along the groundwater flow path to the north. (Figure 3-3).

- Groundwater samples collected from monitoring wells installed in 1999 resulted in detections of 1,2-DCA, benzene, and toluene in samples from one well (892-99-02) in excess of USEPA MCLs.

- There were no detections of VOCs in groundwater samples collected during 2006 from Monitoring Wells 892-99-01 and 892-99-03 for the initial ESI. No samples were collected from Monitoring Well 892-99-02 due to a lack of water. These results suggest that the distribution of contaminants determined during the 1999 investigations remain essentially unchanged. This data also suggests that biodegradation processes in the subsurface could be actively degrading BTEX compounds along the groundwater flow path.

- The USTs at Fire Training Area Facility 892 have received clean closure from KDHE under RCRA.

Closed status and no further action for the Fire Training Area Facility 892 is recommended, based on the following information/observations:

- BTEX compounds are susceptible to biodegradation in an alluvial environment. The distribution of BTEX compounds in the subsurface along the groundwater flow path suggests biodegradation is taking place. There were no detections of BTEX compounds in groundwater samples collected at Monitoring Well 892-99-03, which is located approximately 300 ft down gradient from the source.

- No completed pathways exist to potential receptors at this Site. There are no public supply wells in the vicinity of this Site or within four miles down gradient of the Site. There is no likelihood, under the post Real Property Master Plan (RPMP), that supply wells will ever be installed in this area.

- These USTs at the Site have already received closed status from KDHE under RCRA per the April 1996 Buried Tank Leak Assessment #U5-081-10926.

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4.0 FURNITURE REPAIR SHOP BUILDING 1605 (FTRI-041)

4.1 SITE LOCATION, LAND USE, POTENTIAL MIGRATION PATHWAYS, AND RECEPTORS

During the preparation of the ESI report on the furniture repair shops, it was discovered that the location of the former Building 1605, as noted in the work plan, was not correct. Rather than being located on the northeast corner of G Street and Seventh Street, former Building 1605 was located on the southeast corner of that intersection. As a result of this error, subsurface soil and groundwater sampling conducted during the initial phase of the ESI were performed at the wrong location. To rectify this error, soil and groundwater samples will be collected from the actual location of the former Building 1605 as part of the additional ESI field activities.

Former Building 1605, which has been demolished, was located on the southeast corner of G Street and Seventh Street, in Camp Funston (Figures 1-1 and 4-1). The former Building 1605 area is currently occupied by Building 1580, which is used as a Kansas Army National Guard (KSARNG) vehicle maintenance facility. Other structures are present in the area, which is flat and covered with gravel.

The former Building 1605 Site is located on the floodplain of the Kansas River, which is located approximately 3,000 ft to the south-southeast. The Site is underlain by unconsolidated alluvial deposits consisting of clay, silt, and sand. Six inches of gravel fill were present at the ground surface at the borehole locations. Depth to groundwater as measured during the ESI field investigation ranged from 23 to 24 ft bgs. Groundwater movement is generally eastward toward the Kansas River (United States Geological Survey [USGS], 2005).

No protected or special ecological or cultural features were observed and are known to occur at or near the Site.

Fort Riley has no water supply wells located at Camp Funston. The nearest supply wells are those for the community of Ogden, which are located approximately 1 ½ miles northeast of the Site. There are no other public supply wells within four miles of the Site.

4.2 SITE BACKGROUND AND PREVIOUS (HISTORICAL) SAMPLING RESULTS

Former Building 1605 was used as a furniture repair shop between about 1984 and 1988 when it was destroyed by fire. Activities related to the cleaning, repair, and finishing of furniture were conducted at this building. Chemicals used possibly included chlorinated solvents (e.g., methylene chloride), lacquers,

thinners, paints, and cleaners. It is possible that sludge and stripper may have seeped through the floor and onto the ground surface under the building.

A soil-gas survey was conducted on the footprint of the former Building 1605 location as part of the investigation of high priority sites at Fort Riley. One of ten locations evaluated had flame ionization detector (FID) concentrations of 660 µg/L (Figure 4-2). A Phase 2 survey was conducted, which included the collection of groundwater and additional soil-gas samples. There were no detections of VOCs in any of these additional samples (LBA, 1994).

4.3 ESI FIELD ACTIVITIES (2006) AND PROPOSED ADDITIONAL SAMPLING

Three direct-push borings were advanced on August 1, 2006 at the presumed former Building 1605 location. However, as noted in Section 4.1, these borings were not spotted in the correct location. In order to correct this oversight, three direct-push borings were proposed to be advanced at the locations depicted on Figure 4-1. The following observations drive the sampling rationale:

- The holes in the floor of former Building 1605 may have potentially resulted in the release of contaminants to the surrounding soil and water.
- There are no current, definitive data available for the purposes of ambient concentration determination and the application of a screening-level, risk assessment using the soil and groundwater risk-based standards for Kansas and/or action levels.

4.4 ADDITIONAL ESI FIELD ACTIVITIES (2008) AND ANALYTICAL RESULTS

The following additional ESI sampling activities were conducted at the former Building 1605 location on June 23 and 24, 2008. Three direct-push borings (DP10, DP11, and DP12) were advanced at the locations depicted on Figure 4-1. These direct-push borings were continuously sampled, using a 2-inch Macrocore™ sampler, from the ground surface to a depth where groundwater is encountered. The field geologist prepared a lithologic log of each boring and screened the soil with a PID (boring logs are included in Appendix B). Three soil samples were collected from each direct-push boring at depth intervals of 0 – 2 ft bgs, 4 – 8 ft bgs, and 8 – 12 ft bgs. Soil samples were analyzed off the site for VOCs (USEPA Method 8260) and RCRA metals (USEPA Method 6010/7000). The probe was then advanced to groundwater at each boring, and groundwater samples were collected and analyzed for VOCs (USEPA Method 8260) and RCRA metals (USEPA Method 6010/7000; both filtered and unfiltered).

Soil analytical results (detections only) are presented in Table 4-1. There were no detections of VOCs in the soil samples collected. Arsenic, barium, cadmium, chromium, lead, and selenium were detected in soil samples. Only arsenic was present in concentrations which exceeded regulatory standards. Arsenic exceeded the USEPA Region 9 residential and industrial PRGs of 0.39 mg/kg and 1.6 mg/kg, respectively. Exceedences of the PRGs were present in soil samples collected from all three direct-push borings. Concentrations of arsenic in soil samples ranged from 2.1 to 5.7 mg/kg (Figure 4-3).

Groundwater analytical results (detections only) are presented in Table 4-2. There were no detections of VOCs in any of the groundwater samples collected. Arsenic, barium, cadmium, chromium, lead, mercury, and selenium were detected in unfiltered groundwater samples collected from the direct-push borings at the Building 1605 location. No effort was made to compare these total metals concentrations against drinking water standards because all samples were very turbid. Only arsenic, barium, chromium, lead, and selenium were detected in filtered groundwater samples taken at this location. Arsenic was the only metal present in filtered samples which exceeded the USEPA MCL of 0.01 mg/L. This exceedance occurred in the primary sample and duplicate collected from Direct-Push Boring DP12, where arsenic was detected at a concentration of 0.013 mg/L in both samples (Figure 4-4).

4.5 DISCUSSION AND RECOMMENDATIONS

Both subsurface soil and groundwater samples were collected and analyzed for both VOCs and RCRA metals. Filtered and unfiltered groundwater samples were evaluated for RCRA metals. Additional ESI sampling results are summarized as follows:

- VOCs were not detected in historical groundwater samples collected at the site.
- Only arsenic was detected in soil and filtered groundwater samples at concentrations which exceeded regulatory standards.
- Arsenic in soil exceeded the USEPA Region 9 residential and industrial PRGs. All results were below the KDHE industrial RSK for arsenic. Exceedences of arsenic are a result of naturally occurring concentrations of arsenic at levels in excess of regulatory screening criteria, which are ubiquitous throughout Fort Riley soils.
- Only arsenic exceeded its USEPA MCL of 0.010 mg/L in filtered groundwater samples collected from one location at this site. However, there are no supply wells in this area and therefore no completed pathway to potential receptors.

Based on these results, the Furniture Repair Shop Building 1605 (FTRI-041) is recommended for closed status.

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5.0 BUILDING 727 WASTE PIT (FTRI-051)

5.1 SITE LOCATION, LAND USE, POTENTIAL MIGRATION PATHWAYS, AND RECEPTORS

Building 727 is one of the maintenance hangars located at MAAF. The Site is in the controlled active area on the north side of MAAF and is located on Ray Road (Figures 1-1 and 5-1). Building 727 is at an elevation of 1,061 ft, which is approximately 20 ft above the normal elevation of the Kansas River. The terrain surrounding the Site and the building is essentially flat. The area where the waste pit was located is landscaped and covered with grass. However, a concrete pad exists just west of the former pit.

The Site is located 500 ft southeast of the Kansas River. Although located on the floodplain of the Kansas River, it is protected from 100-year floods by a levee. Due to the topographic position and the use of the Site and surrounding area, there are no streams or other surface water bodies on or in the immediate vicinity of the Site. There are no wetlands at or adjacent to the Site. Surrounding land uses consist of activities associated with an airfield including hangar maintenance and airfield support operations.

The Site is underlain by alluvial sediments of the Kansas River, which overlie shale and limestone bedrock. The alluvial materials are composed of clay, silt, and sand, with some gravel. There is a layer of silt, with some clay, occurring at the surface with a thickness of up to 15 ft. The remaining alluvial materials are fine- to coarse-grained sand. These alluvial materials probably have a thickness of 60 to 80 ft. Groundwater is encountered at a depth of 20 to 25 ft bgs and flows in a general direction to the northeast.

The Fort Riley well field is located approximately 2 ½ miles west-northwest of the Site, in the floodplain of the Republican River. The back-up, non-potable supply well for MAAF is located approximately 4,500 ft south of the Site. Several private supply wells are located approximately one mile to the northeast of the Site.

No protected or special ecological or cultural features were observed or are known to occur at or near this Site. Current and future land use at this site, based on the post environmental overlay, is anticipated to be as an airfield.

5.2 SITE BACKGROUND AND PREVIOUS (HISTORICAL) SAMPLING RESULTS

Around 1983, an office area was added to the main hangar building. This office space was built directly over the old wash rack facility that dated from the World War II era. The wash rack had four service pits associated with it that were used by workers to stand underneath vehicles without the use of vehicle jacks.

During construction of the addition to Building 727, three of the four service pits were removed. The piping that carried "kerosene detergent" for the one remaining pit was also removed along with the other three pits. The remaining pit was left in place because it was not located under the office addition and was exposed on the eastern corner of the building until the summer of 1992, at which time the concrete pit was removed and the area backfilled. The main concern with the Building 727 service pit is that the remaining former service pit may have been used for unauthorized management of wastes generated by the maintenance hangar (LBA, 1995).

Several common hazardous materials, including petroleum fuels, industrial solvents, paints, and chemicals, were used in and around Building 727. Because some of these materials may have been disposed in the former service pit, the contaminants of concern at the Site were VOCs, semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), and metals.

During the Site Investigation (SI) conducted in 1994, 30 soil-gas samples were collected from 15 sampling locations, but there were no detections. In addition, there were five soil samples collected from the vicinity of the former waste pit (Figure 5-2). There were no detections of either VOCs, SVOCs, or TPH-gasoline range organics (GRO) in these soil samples. Three of the samples had detections of TPH-diesel range organics (DRO) ranging from 7 mg/kg to 16 mg/kg. All five samples had positive detections for arsenic, chromium, copper, lead, nickel, and zinc. Three samples had detections of beryllium. Two samples had detections of silver. Cadmium and selenium were detected in one sample each. The detections of arsenic in the soil samples, although above the lowest USEPA risk-based guidelines, were consistent with detections found across the entire installation. Beryllium was also detected above the residential guidelines for USEPA Region 9; however, these guidelines are not applicable at a non-residential usage area such as Building 727 (LBA, 1995).

A driven well point (MW01) was installed and developed to sample groundwater in September 1997 (Figure 5-1). A groundwater field sample, a field duplicate sample, a matrix spike sample, and a matrix spike duplicate sample were collected on September 25, 1997 and analyzed for VOCs, SVOCs, TPH (gasoline and diesel), and priority pollutant metals. VOC, SVOC, and TPH compounds were not detected in any of the samples collected. Several metals were detected in the groundwater samples; however, none exceeded their respective MCLs (BMcD, 1997).

5.3 ESI FIELD ACTIVITIES (2006), ANALYTICAL RESULTS, AND PROPOSED ADDITIONAL SAMPLING

Two direct-push borings (DP01 and DP02) were advanced on the north side of the former waste pit as part of the initial phase of ESI field work during 2006 (Figure 5-1). These direct-push borings were continuously sampled, using a 2-inch Macrocore™ sampler, from the ground surface to a depth where groundwater was encountered. Three soil samples were collected from each direct-push boring from the depth intervals of 0 - 2 ft bgs, 4 - 8 ft bgs, and 8 - 12 ft bgs. The field geologist prepared a lithologic log of each direct-push boring. Soil samples were analyzed at an off-site laboratory for TPH-DRO (USEPA Method 8015) and RCRA metals (USEPA Methods 6010/7000). The probe was then advanced to the water table, and groundwater samples were collected and analyzed for TPH-DRO (USEPA Method 8015) and RCRA metals (USEPA Method 6010/7000; both filtered and unfiltered). Following the completion of field activities at the Site, all direct-push boring locations were surveyed.

Surface and subsurface soil analytical results (positive hits only) for the former waste pit are presented in Table 5-1. TPH as motor oil was detected in two soil samples, 051-DP01/SB01 (0 to 2 ft bgs) and 051-DP02/SB01 (0 to 1 ft bgs) at 158 J and 30 J mg/kg, respectively, below the KDHE industrial RSK level of 20,000 mg/kg. Arsenic, barium, cadmium, chromium, lead and selenium were detected in the soil samples with only arsenic detected at levels greater than the USEPA Region 9 industrial screening level. Arsenic was detected in all six samples at levels ranging from 2.1 to 4.5 mg/kg, above the USEPA Region 9 industrial screening level of 1.6 mg/kg but below the KDHE industrial RSK value of 38 mg/kg (Figure 5-3). The arsenic levels reported in these soil samples are typical for soil samples from Fort Riley.

Groundwater analytical results (positive hits only) for the former waste pit are presented in Table 5-2. TPH-DRO was not detected in the groundwater samples. Total metals including arsenic, barium, cadmium, chromium, lead, mercury, and selenium were detected in the groundwater samples. As the total metals groundwater samples were collected from undeveloped piezometers, the groundwater samples were turbid and, therefore, were not screened against drinking water standards. Dissolved metals, including arsenic, barium, cadmium, chromium, and lead were detected in the groundwater samples. Arsenic (0.017 and 0.025 milligrams per liter [mg/L]) and lead (0.032 and 0.061 mg/L) were detected in both groundwater samples at levels greater than their respective MCLs or action levels of 0.01 and 0.015 mg/L (Figure 5-4).

Due to the depth to groundwater at the former waste pit (20 to 25 ft bgs), the lack of water supply wells within the immediate area, and the presence of the Fort Riley potable water system, groundwater at this Site does not now and is unlikely in the future to reach potential receptors.

TPH as motor oil and six metals were detected in the seven (including one duplicate) soil samples from the Building 727 Waste Pit area. Of these, only arsenic was detected at levels greater than the USEPA Region 9 industrial screening level, but less than the KDHE industrial RSK values. TPH was not detected in the groundwater. Seven total metals and five dissolved metals were detected in the two groundwater samples. Dissolved arsenic and lead were detected in both groundwater samples at levels greater than their respective MCLs or action levels. Fort Riley proposed advancing three additional direct-push borings in the vicinity of the Building 727 Waste Pit to collect groundwater samples for analysis of lead and arsenic as part of the additional ESI. This data will be used to support a recommendation on the future status of the Building 727 Waste Pit.

5.4 ADDITIONAL ESI FIELD ACTIVITIES (2008) AND ANALYTICAL RESULTS

On June 23, 2008, three direct-push borings (DP03, DP04, and DP05) were advanced to groundwater at the locations indicated on Figure 5-1. Groundwater samples were collected and analyzed off the site for lead and arsenic (USEPA Methods 6010/7000). Both filtered and unfiltered groundwater samples were collected.

Groundwater analytical results (detections only) are presented in Table 5-3. Arsenic and lead were both detected in all unfiltered groundwater samples collected from the direct-push borings at the Building 727 Waste Pit location. No effort was made to compare these total metals concentrations against drinking water standards because all groundwater samples were very turbid. Neither arsenic or lead were detected in filtered groundwater samples collected at this location.

5.5 DISCUSSION AND RECOMMENDATIONS

Neither arsenic or lead were detected in filtered groundwater samples collected at the Building 727 Waste Pit location. Based on these results, plus the data collected in 2006, a recommendation is made for closure of the Building 727 Waste Pit (FTRI-051).

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6.0 FORMER GAS STATION – CAMP FORSYTH I.STREET SITE (FTRI-043)

6.1 SITE LOCATION, LAND USE, POTENTIAL MIGRATION PATHWAYS, AND RECEPTORS

The Camp Forsyth I Street Site lies just east of I Street, between the intersections of I Street with 6th and 7th Streets (Figures 1-1 and 6-1). This area is in the east portion of the Camp Forsyth cantonment area and lies on the floodplain of the Republican River. This area is protected from 100-year flood events by a levee. The general use of the surrounding area is semi-industrial. The site overlies alluvial deposits of the Republican River, which is the source of drinking water for Fort Riley and nearby communities. The well field for Fort Riley is located approximately one mile to the northeast of the Site. The depth to groundwater is approximately 23 to 24 ft bgs, with groundwater flow most likely to the east, towards the Republican River. The Republican River joins the Smoky Hill River to form the Kansas River a little over one mile east of the Site (LBA, 1993).

No protected or special ecological or cultural features were observed or are known to occur at or near the Site. Current and future land use at the Site, based on the post environmental overlay, is anticipated to be industrial, medical, or open space.

6.2 SITE BACKGROUND AND PREVIOUS (HISTORICAL) SAMPLING RESULTS

A gasoline and diesel dispensing facility was constructed at the Camp Forsyth I Street Site (former Building 2345) in 1942. Two 12,000-gallon USTs were installed, along with product lines. In December 1992, the two USTs and all product lines were removed. At this time, screening samples indicated the presence of possible POL contamination. Samples collected from within the tank excavation reported TPH concentrations of less than 100 mg/kg. Samples collected from within the product piping trenches reported TPH concentrations above 100 mg/kg. Leaks from the corroded product lines along with spilling and overfills were thought to have contributed to this soil contamination. The KDHE recommended that this Site be placed on active status pending further investigation (Dames & Moore, 1995).

Dames & Moore performed a preliminary site assessment in 1993 and a Phase II site investigation in 1994. Work conducted included the installation and sampling of soil borings, a soil-gas survey at both 4- and 12-ft depths, and the collection of groundwater samples. Based on the results of the soil-gas survey, soil borings were advanced and soil samples were collected for both on-site immunoassay analysis and off-site laboratory analysis. These results indicated that soil and groundwater contamination were below the KDHE action levels. As a result, Dames & Moore recommended that a request be submitted to the KDHE for no further action at the former Building 2345 Site (Dames & Moore, 1995).

6.3 ESI FIELD ACTIVITIES (2006), ANALYTICAL RESULTS, AND PROPOSED ADDITIONAL SAMPLING

Direct-push soil and groundwater samples were collected from this site during 2006 as part of the initial phase of the ESI. Four direct-push borings (DP05, DP06, DP07, and DP08) were advanced at the locations indicated on Figure 6-1. These direct-push borings were continuously sampled using a 2-inch Macrocore™ sampler from the ground surface to groundwater. Three soil samples were collected from each direct-push boring at depth intervals of 0 – 4 ft bgs, 5 – 8 ft bgs, and 9 – 12 ft bgs. The field geologist prepared a lithologic log of each direct-push boring and screened soil samples with a PID. Soil samples were collected and analyzed at an off-site laboratory for VOCs (USEPA Method 8260) and TPH – GRO (USEPA Method 8015). The probe was then advanced to the water table, and groundwater samples were collected, where possible, and analyzed at an off-site laboratory for VOCs (USEPA Method 8260) and TPH-GRO (USEPA Method 8015). All four direct-push borings contained sufficient water for sampling. Following the completion of field activities, all direct-push boring locations were surveyed.

Both VOCs and TPH-GRO were detected in soil samples collected from Direct-Push Borings DP05 and DP07 (Table 6-1). Ethylbenzene was detected in Direct-Push Boring DP05 (8 to 9 ft bgs) at a concentration of 50 micrograms per kilogram (µg/kg). Acetone, ethylbenzene, and m,p-xylene were detected in Direct-Push Boring DP07 (10 to 11 ft bgs) at concentrations of 190, 14.3, and 68.1 µg/kg, respectively. All of these detections were below their respective Region 9 residential PRGs. TPH-GRO was detected in samples collected from two soil intervals from Direct-Push Boring DP05 (5 to 6 and 8 to 9 ft bgs) at concentrations of 340 mg/kg and 52 mg/kg, respectively. TPH-GRO was also detected in samples collected from two soil intervals from Direct-Push Boring DP07 (5 to 6 and 10 to 11 ft bgs) at concentrations of 1,300 and 290 mg/kg, respectively. Three of four TPH-GRO detections at Direct-Push Borings DP05 and DP07 exceeded the KDHE residential RSK of 220 mg/kg, and one of four exceeded the industrial RSK of 450 mg/kg. Three of the TPH-GRO detections also exceeded the industrial RSK for the soil to groundwater protection pathway of 150 mg/kg (Figure 6-2). There were no detections of either VOCs or TPH-GRO in groundwater at the Site.

VOCs and TPH-GRO were detected in soil samples collected at the Camp Forsyth I Street Site, but only one detection of TPH-GRO exceeded the industrial RSK. This soil sample was collected from a depth greater than 5 ft bgs, greatly reducing the possibility of a completed pathway to a receptor. No VOC or TPH-GRO compounds were detected in groundwater samples collected at the Site. KDHE proposed the collection of additional subsurface soil samples and a groundwater sample for VOC analysis to the west of Direct-Push Borings DP05 and DP07. These samples were proposed in order to confirm a clean line to

the west of the Site. This additional data will be used to support a recommendation on the future status of the Camp Forsyth I Street Site.

6.4 ADDITIONAL ESI FIELD ACTIVITIES (2008) AND ANALYTICAL RESULTS

The following additional ESI sampling activities were conducted at the Camp Forsyth I Street Site on June 23, 2008. Three direct-push borings (DP17, DP18, and DP19) were advanced in the area to the west of Direct-Push Borings DP05 and DP07, as depicted on Figure 6-1. These direct-push borings were continuously sampled from the ground surface to a depth of approximately 12 ft bgs using a 2-inch Macrocore™ sampler. Three soil samples were collected from each direct-push boring at depth intervals of 0 – 2 ft bgs, 4 – 8 ft bgs, and 8 – 12 ft bgs. The field geologist prepared a lithologic log of each direct-push boring and all soil was field screened with a PID (boring logs are included in Appendix B). Soil samples collected for off-site analysis were analyzed for VOCs (USEPA Method 8260). At Direct-Push Boring DP17 only, the probe was advanced to the water table and a groundwater sample was collected and analyzed off-site for VOCs (USEPA Method 8260). No soil samples were collected below a depth of 12 ft bgs.

There were no detections of VOCs in any of the soil samples or the groundwater sample at concentrations above the reporting limit.

6.5 DISCUSSION AND RECOMMENDATIONS

No VOCs were detected at concentrations above reporting limits in any of the soil samples or the groundwater sample collected as part of the additional ESI. Based on these results, plus the data collected in 2006, a recommendation is made for closure of the Camp Forsyth I Street Site (FTRI-043).

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MP-BMcD, 2008a, *Building 1693 Report, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas.*

MP-BMcD, 2008b, *Work Plan Addendum, Expanded Site Investigation (Multiple Sites) at Fort Riley, Kansas* (WPA).

MP-BMcD, 2008c, *Quality Control Summary Report, Expanded site Investigation (Multiple Sites) at Fort Riley, Kansas.*

United States Environmental Protection Agency (USEPA), 2004a, *Region 9 Preliminary Remediation Goals (PRG) Table.*

USEPA, 2004b, *2004 Edition of the Drinking Water Standards and Health Advisories,* EPA 822-R-04-005, Office of Water.

United States Geological Survey (USGS), 2005, *Potentiometric Surface (Water Table) in Alluvium for March 28-29, 2005, Camp Funston Area, Fort Riley, Kansas*

* * * * *

Tables

Table 2-1
Surface Debris Detections (2006)
PCB Storage Building 343 (FTRI-007)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	007-S01/SS01 6/26/2006 Surface 06062023	007-S02/SS01 6/26/2006 Surface 06062024	007-S03/SS01 6/26/2006 Surface 06062022	007-S04/SS01 6/26/2006 Surface 06062025
Polychlorinated Biphenyls	UNITS						
Aroclor-1242	mg/kg	0.22 / 0.74	4.3 / 9.5	0.05 U	***0.09 J***	***0.08 J***	0.05 U
Aroclor-1260	mg/kg	0.22 / 0.74	4.3 / 9.5	0.05 U	0.05 U	0.05 U	0.05 U

Notes:

1. All data screened against the USEPA Region 9 PRGs (industrial). All exceedences are shaded.

USEPA Region 9 PRGs - U.S. Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Dept of Health and Environment Risk-Based Standards

res/ind - residential / industrial

mg/kg - milligrams per kilogram

J - qualified as estimated during QC evaluation

U - compound was not detected

Table 2-1
Surface Debris Detections (2006)
PCB Storage Building 343 (FTRI-007)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: / Date Sampled: / Sample Depth: / Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	007-S05/SS01 6/26/2006 Surface 06062021	007-S06/SS01 6/26/2006 Surface 06062026
Polychlorinated Biphenyls	UNITS				
Aroclor-1242	mg/kg	0.22 / 0.74	4.3 / 9.5	***0.25 J***	***0.34 J***
Aroclor-1260	mg/kg	0.22 / 0.74	4.3 / 9.5	***0.05***	0.05 U

Notes:

1. All data screened against the USEPA Region 9 PRGs (industrial). All exceedences are shaded.

USEPA Region 9 PRGs - U.S. Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Dept of Health and Environment Risk-Based Standards

res/ind - residential / industrial

mg/kg - milligrams per kilogram

J - qualified as estimated during QC evaluation

U - compound was not detected

Table 3-1
Groundwater Detections (2008)
Fire Training Area Facility 892 (FTRI-018)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Identification: Date Sampled: Laboratory Number:		USEPA Region 9 PRGs (tap water)	USEPA MCLs / Action Level	018-DP01-GW01 6/24/2008 08061647R
Volatile Organic Compounds	UNITS			
Benzene	ug/L	0.35	5	***3930***
Ethylbenzene	ug/L	1,300	700	***70***

Notes:

1. All detections are in bold font.
2. All data screened against the USEPA Region 9 PRGs (tap water) except for lead, which is screened against the USEPA MCL. All exceedences are shaded.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals

USEPA MCLs - United States Environmental Protection Agency Maximum Contaminant Levels

NA - not applicable / not analyzed

ND - Compounds not detected

mg/L - milligrams per liter

J - qualified as estimated during data validation

U - compound was not detected

Table 4-1
Soil Detections (2008)
Furniture Repair Shop Building 1605 (FTRI-041)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Identification: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	041-DP10-SB01 6/23/2008 1 - 2 ft 08061530	041-DP10-SB02 6/23/2008 5 - 7 ft 08061531/ 08061532	041-DP10-SB03 6/23/2008 11 - 12 ft 08061533	041-DP11-SB01 6/24/2008 1 - 2 ft 08061648
Volatile Organic Compounds	UNITS						
		---	---	ND	ND	ND	ND
Metals, Total	UNITS						
Arsenic, Total	mg/kg	0.39 / 1.6	11 / 38	***2.2***	***5.7***	1.1 U	***3.2***
Barium, Total	mg/kg	5,400 / 67,000	5,500 / 140,000	***100***	***180***	***50***	***80***
Cadmium, Total	mg/kg	37 / 450	39 / 1,000	0.61 U	0.63 U	0.53 U	***1***
Chromium, Total	mg/kg	210 / 450	390 / 4,000	***10.1***	***24.2***	***3.4***	***16***
Lead, Total	mg/kg	400 / 800	400 / 1,000	***7.5***	***11***	***2.5***	***28.9***
Selenium, Total	mg/kg	390 / 5,100	390 / 10,000	1.2 U	***2.1***	1.1 U	***1.5***

Notes:

1. All detections are in bold font.
2. All data screened against the USEPA Region 9 PRGs (industrial). All exceedences are shaded.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals
KDHE RSKs - Kansas Department of Health and Environment Risk-Based Standards
res/ind - residential / industrial
ft - feet
ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
J - qualified as estimated during data validation
U - compound was not detected
NA - not applicable / not analyzed
ND - no detections for these compounds

Table 4-1
Soil Detections (2008)
Furniture Repair Shop Building 1605 (FTRI-041)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Identification: / Date Sampled: / Sample Depth: / Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	041-DP11-SB02 6/24/2008 7 - 8 ft 08061649	041-DP11-SB03 6/24/2008 11 - 12 ft 08061650	041-DP12-SB01 6/24/2008 0 - 1 ft 08061652	041-DP12-SB02 6/24/2008 4 - 5 ft 08061653
Volatile Organic Compounds	UNITS						
		---	---	ND	ND	ND	ND
Metals, Total	UNITS						
Arsenic, Total	mg/kg	0.39 / 1.6	11 / 38	***3.6***	***3.3***	***3.2***	***3.5***
Barium, Total	mg/kg	5,400 / 67,000	5,500 / 140,000	***140***	***150***	***120***	***140***
Cadmium, Total	mg/kg	37 / 450	39 / 1,000	0.62 U	0.61 U	0.59 U	0.62 U
Chromium, Total	mg/kg	210 / 450	390 / 4,000	***15.8***	***9.9***	***13.8***	***17***
Lead, Total	mg/kg	400 / 800	400 / 1,000	***12.3***	***5.9***	***22.6***	***7.5***
Selenium, Total	mg/kg	390 / 5,100	390 / 10,000	1.2 U	1.2 U	1.2 U	1.2 U

Notes:

1. All detections are in bold font.
2. All data screened against the USEPA Region 9 PRGs (industrial). All exceedences are shaded.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Department of Health and Environment Risk-Based Standards

res/ind - residential / industrial

ft - feet

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

J - qualified as estimated during data validation

U - compound was not detected

NA - not applicable / not analyzed

ND - no detections for these compounds

Table 4-1
Soil Detections (2008)
Furniture Repair Shop Building 1605 (FTRI-041)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Identification: / Date Sampled: / Sample Depth: / Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	041-DP12-SB03 6/24/2008 10 - 11 ft 08061654
Volatile Organic Compounds	UNITS			
		---	---	ND
Metals, Total	UNITS			
Arsenic, Total	mg/kg	0.39 / 1.6	11 / 38	***2.1***
Barium, Total	mg/kg	5,400 / 67,000	5,500 / 140,000	***135***
Cadmium, Total	mg/kg	37 / 450	39 / 1,000	0.52 U
Chromium, Total	mg/kg	210 / 450	390 / 4,000	***9.13***
Lead, Total	mg/kg	400 / 800	400 / 1,000	***5.7***
Selenium, Total	mg/kg	390 / 5,100	390 / 10,000	1 U

Notes:

1. All detections are in bold font.
2. All data screened against the USEPA Region 9 PRGs (industrial). All exceedences are shaded.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals
KDHE RSKs - Kansas Department of Health and Environment Risk-Based Standards
res/ind - residential / industrial
ft - feet

ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
J - qualified as estimated during data validation
U - compound was not detected
NA - not applicable / not analyzed
ND - no detections for these compounds

Table 4-2
Groundwater Detections (2008)
Furniture Repair Shop Building 1605 (FTRI-041)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Identification: / Date Sampled: / Laboratory Number:		USEPA Region 9 PRGs (tap water)	USEPA MCLs / Action Level	041-DP10-GW01 6/23/2008 08061523	041-DP11-GW01 6/24/2008 08061651	041-DP12-GW01 6/24/2008 08061655
Volatile Organic Compounds	UNITS					
		---	---	ND	ND	ND
Metals, Total	UNITS					
Arsenic, Total	mg/L	---	---	***0.237***	***0.393 J***	***0.266***
Barium, Total	mg/L	---	---	***9.17***	***6.71***	***7.06***
Cadmium, Total	mg/L	---	---	***0.039***	***0.03 J***	***0.034***
Chromium, Total	mg/L	---	---	***0.881***	***0.816 J***	***0.797***
Lead, Total	mg/L	---	---	***0.777***	***0.81***	***0.623***
Mercury, Total	mg/L	---	---	0.0002 U	***0.0002***	0.002 U
Selenium, Total	mg/L	---	---	***0.096***	0.1 U	***0.081***
Metals, Dissolved						
Arsenic, Dissolved	mg/L	4.50E-06	0.01	0.01 U	0.01 U	***0.013***
Barium, Dissolved	mg/L	2.6	2	***0.79***	***0.34***	***0.37***
Chromium, Dissolved	mg/L	NA	0.1	0.005 U	0.005 U	0.005 U
Lead, Dissolved	mg/L	NA	0.015	0.005 U	0.005 U	0.005 U
Selenium, Dissolved	mg/L	0.18	0.05	0.01 U	0.01 U	***0.017***

Notes:

1. All detections are in bold font.
2. All data screened against the USEPA Region 9 PRGs (tap water) except for lead, which is screened against the USEPA MCL. All exceedences are shaded.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals

USEPA MCLs - United States Environmental Protection Agency Maximum Contaminant Levels

NA - not applicable / not analyzed

ND - Compounds not detected

mg/L - milligrams per liter

J - qualified as estimated during data validation

U - compound was not detected

Table 5-1
Soil Detections (2006)
Building 727 Waste Pit (FTRI-051)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	051-DP01/SB01 8/3/2006 0 - 2 ft 06080445	051-DP01/SB02 8/3/2006 6 - 8 ft 06080446	051-DP01/SB03 8/3/2006 10 - 11 ft 06080448	051-DP02/SB01 8/3/2006 0 - 1 ft 06080442
Miscellaneous Analyses	UNITS						
Quantified as Motor Oil	mg/kg	---	2,000 / 20,000	***158 J***	12 U	13 U	***30 J***
Metals, Total	UNITS						
Arsenic, Total	mg/kg	0.39 / 1.6	11 / 38	***2.7***	***2.6***	***3.3***	***3.6***
Barium, Total	mg/kg	5,400 / 67,000	5,500 / 140,000	***130***	***160***	***190***	***150***
Cadmium, Total	mg/kg	37 / 450	39 / 1,000	***0.56***	0.59 U	0.65 U	***0.72***
Chromium, Total	mg/kg	210 / 450	390 / 4,000	***12***	***9.6***	***16***	***13***
Lead, Total	mg/kg	400 / 800	400 / 1,000	***13***	***4.7***	***7.2***	***11.8***
Selenium, Total	mg/kg	390 / 5,100	390 / 10,000	***1.5***	1.2 U	***1.5***	***1.7***

Notes:

1. All data screened against the USEPA Region 9 PRGs (industrial). All exceedances are shaded. All detections are in bold.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Department of Health and Environment Risk-Based Standards

res/ind - residential / industrial

ft - feet

mg/kg - milligrams per kilogram

J - qualified as estimated during QC evaluation

U - compound was not detected

QC - quality control

Table 5-1
Soil Detections (2006)
Building 727 Waste Pit (FTRI-051)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	051-DP02/SB02 8/3/2006 7 - 8 ft 06080443	051-DP02/SB03 8/3/2006 11 - 12 ft 06080444
Miscellaneous Analyses	UNITS				
Quantified as Motor Oil	mg/kg	---	2,000 / 20,000	13 U	13 U
Metals, Total	UNITS				
Arsenic, Total	mg/kg	0.39 / 1.6	11 / 38	***2.1***	***4.5***
Barium, Total	mg/kg	5,400 / 67,000	5,500 / 140,000	***180***	***300***
Cadmium, Total	mg/kg	37 / 450	39 / 1,000	0.63 U	***0.79***
Chromium, Total	mg/kg	210 / 450	390 / 4,000	***10***	***20***
Lead, Total	mg/kg	400 / 800	400 / 1,000	***4.8***	***11***
Selenium, Total	mg/kg	390 / 5,100	390 / 10,000	1.3 U	***2.2***

Notes:

1. All data screened against the USEPA Region 9 PRGs (industrial). All exceedances are shaded. All detections are in bold.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Department of Health and Environment Risk-Based Standards

res/ind - residential / industrial

ft - feet

mg/kg - milligrams per kilogram

J - qualified as estimated during QC evaluation

U - compound was not detected

QC - quality control

Table 5-2
Groundwater Detections (2006)
Building 727 Waste Pit (FTRI-051)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (tap water)	USEPA MCLs/ Action Level	051-DP01/GW01 8/3/2006 LIQUID 06080451	051-DP02/GW01 8/3/2006 LIQUID 06080449/ 06080450
Metals, Total	UNITS				
Arsenic, Total	mg/L	---	---	***0.704***	***0.067***
Barium, Total	mg/L	---	---	***5.53***	***3.25***
Cadmium, Total	mg/L	---	---	***0.014***	***0.024***
Chromium, Total	mg/L	---	---	***0.345***	***0.301***
Lead, Total	mg/L	---	---	***0.364***	***0.269***
Mercury, Total	mg/L	---	---	***0.0002***	0.0002 U
Selenium, Total	mg/L	---	---	***0.095***	***0.015***
Metals, Dissolved	UNITS				
Arsenic, Dissolved	mg/L	4.50E-06	0.01	***0.017***	***0.025***
Barium, Dissolved	mg/L	2.6	2	***0.71***	***1.2***
Cadmium, Dissolved	mg/L	0.018	0.005	0.003 U	***0.004***
Chromium, Dissolved	mg/L	0.11*	0.1	***0.02***	***0.053***
Lead, Dissolved	mg/L	---	0.015	***0.032***	***0.061***

Notes:

1. All data screened against the USEPA Region 9 PRGs (tap water) or the USEPA action limit (for lead). All exceedances are shaded. All detections are in bold.

USEPA Region 9 PRGs - United States Environmental Protection Agency Region 9 Preliminary Remediation Goals

USEPA MCLs - United States Environmental Protection Agency Maximum Contaminant Levels

NA - not applicable / not analyzed

* for Chromium VI

mg/L - milligrams per liter

U - compound was not detected

Table 5-3
Groundwater Detections (2008)
Building 727 Waste Pit (FTRI-051)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Identification: Date Sampled: Laboratory Number:		USEPA Region 9 PRGs (tap water)	USEPA MCLs / Action Level	051-DP03-GW01 6/23/2008 08061522	051-DP04-GW01 6/23/2008 08061520	051-DP04-GW01 6/23/2008 08061521	051-DP05-GW01 6/23/2008 08061519
Metals, Total	UNITS						
Arsenic, Total	mg/L	---	---	***0.084***	***0.038***	***0.026***	***0.046***
Lead, Total	mg/L	---	---	***0.285***	***0.134***	***0.086***	***0.278 J***
Metals, Dissolved	UNITS						
		---	---	ND	ND	ND	ND

Notes:

font.

ND - Compounds not detected

mg/L - milligrams per liter

J - qualified as estimated during data validation

U - compound was not detected

Table 6-1
Soil Detections (2006)
Camp Forsyth I Street Site (FTRI-043)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	043-DP05/SB01 7/24/2006 0 - 1 ft 06071643	043-DP05/SB02 7/24/2006 5 - 6 ft 06071644	043-DP05/SB03 7/24/2006 8 - 9 ft 06071646	043-DP06/SB01 7/21/2006 0 - 1 ft 06071557
Volatiles	UNITS						
Acetone	ug/kg	1.4E7 / 5.4E7	1.7E7 / 6.2E7	110 U	6300 U	610 U	110 U
Dichloromethane	ug/kg	9,100 / 21,000	1.5E5 / 2.3E5	5.3 U	320 UR	30 U	5.6 U
Ethylbenzene	ug/kg	4.0E5 / 4.0E5	6.5E5 / 6.5E5	5.3 U	***1020 R***	***50***	5.6 U
m,p-Xylene	ug/kg	2.7E5 / 4.2E5	7.0E5 / 7.0E5	10.6 U	***914 R***	60.8 U	11.3 U
o-Xylene	ug/kg	2.7E5 / 4.2E5	7.0E5 / 7.0E5	5.3 U	320 UR	30 U	5.6 U
Toluene	ug/kg	5.2E5 / 5.2E5	9.3E5 / 1.0E6	5.3 U	320 UR	30 U	5.6 U
Miscellaneous Analyses	UNITS						
TPH-GRO	mg/kg	- / -	220 / 450	110 U	***340***	***52***	110 U

Notes:

1. All VOC data screened against the USEPA Region 9 PRGs (residential). The TPH-GRO data is screened against the KDHE RSKs industrial. All exceedances are shaded.

USEPA Region 9 PRGs - U.S. Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Dept of Health and Environment Risk-Based Standards

res/ind - residential / industrial

ft - feet

NA - not applicable / not analyzed

TPH-GRO - total petroleum hydrocarbons - gasoline range organics

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

R - data was rejected

U - compound was not detected

Table 6-1
Soil Detections (2006)
Camp Forsyth I Street Site (FTRI-043)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: Date Sampled: Sample Depth: Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	043-DP06/SB02 7/21/2006 4 - 5 ft 06071558	043-DP06/SB03 7/21/2006 8 - 9 ft 06071559	043-DP07/SB01 7/24/2006 0 - 1 ft 06071647	043-DP07/SB02 7/24/2006 5 - 6 ft 06071648
Volatiles	UNITS						
Acetone	ug/kg	1.4E7 / 5.4E7	1.7E7 / 6.2E7	100 U	100 U	120 U	6500 U
Dichloromethane	ug/kg	9,100 / 21,000	1.5E5 / 2.3E5	5 U	5 U	5.9 U	330 UR
Ethylbenzene	ug/kg	4.0E5 / 4.0E5	6.5E5 / 6.5E5	5 U	5 U	5.9 U	***1340 R***
m,p-Xylene	ug/kg	2.7E5 / 4.2E5	7.0E5 / 7.0E5	10 U	10.1 U	11.9 U	***4660 R***
o-Xylene	ug/kg	2.7E5 / 4.2E5	7.0E5 / 7.0E5	5 U	5 U	5.9 U	***610 R***
Toluene	ug/kg	5.2E5 / 5.2E5	9.3E5 / 1.0E6	5 U	5 U	5.9 U	***340 R***
Miscellaneous Analyses	UNITS						
TPH-GRO	mg/kg	- / -	220 / 450	100 U	100 U	120 U	***1300***

Notes:

1. All VOC data screened against the USEPA Region 9 PRGs (residential). The TPH-GRO data is screened against the KDHE RSKs industrial. All exceedances are shaded.

USEPA Region 9 PRGs - U.S. Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Dept of Health and Environment Risk-Based Standards

res/ind - residential / industrial

ft - feet

NA - not applicable / not analyzed

TPH-GRO - total petroleum hydrocarbons - gasoline range organics

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

R - data was rejected

U - compound was not detected

Table 6-1
Soil Detections (2006)
Camp Forsyth I Street Site (FTRI-043)
Expanded Site Investigation
Additional Sites
Fort Riley, Kansas

Sample Point: / Date Sampled: / Sample Depth: / Laboratory Number:		USEPA Region 9 PRGs (res/ind)	KDHE RSKs (res/ind)	043-DP07/SB03 7/24/2006 10 - 11 ft 06071649	043-DP08/SB01 7/24/2006 1 - 2 ft 06071650	043-DP08/SB02 7/24/2006 6.5 - 7.5 ft 06071651	043-DP08/SB03 7/24/2006 11 - 12 ft 06071652
Volatiles	UNITS						
Acetone	ug/kg	1.4E7 / 5.4E7	1.7E7 / 6.2E7	***190***	110 U	110 U	110 U
Dichloromethane	ug/kg	9,100 / 21,000	1.5E5 / 2.3E5	6 U	5.3 U	5.4 U	5.3 U
Ethylbenzene	ug/kg	4.0E5 / 4.0E5	6.5E5 / 6.5E5	***14.3***	5.3 U	5.4 U	5.3 U
m,p-Xylene	ug/kg	2.7E5 / 4.2E5	7.0E5 / 7.0E5	***68.1***	10.5 U	10.9 U	10.5 U
o-Xylene	ug/kg	2.7E5 / 4.2E5	7.0E5 / 7.0E5	6 U	5.3 U	5.4 U	5.3 U
Toluene	ug/kg	5.2E5 / 5.2E5	9.3E5 / 1.0E6	6 U	5.3 U	5.4 U	5.3 U
Miscellaneous Analyses	UNITS						
TPH-GRO	mg/kg	- / -	220 / 450	***290***	110 U	110 U	110 U

Notes:

1. All VOC data screened against the USEPA Region 9 PRGs (residential). The TPH-GRO data is screened against the KDHE RSKs industrial. All exceedances are shaded.

USEPA Region 9 PRGs - U.S. Environmental Protection Agency Region 9 Preliminary Remediation Goals

KDHE RSKs - Kansas Dept of Health and Environment Risk-Based Standards

res/ind - residential / industrial

ft - feet

NA - not applicable / not analyzed

TPH-GRO - total petroleum hydrocarbons - gasoline range organics

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

R - data was rejected

U - compound was not detected

Figures

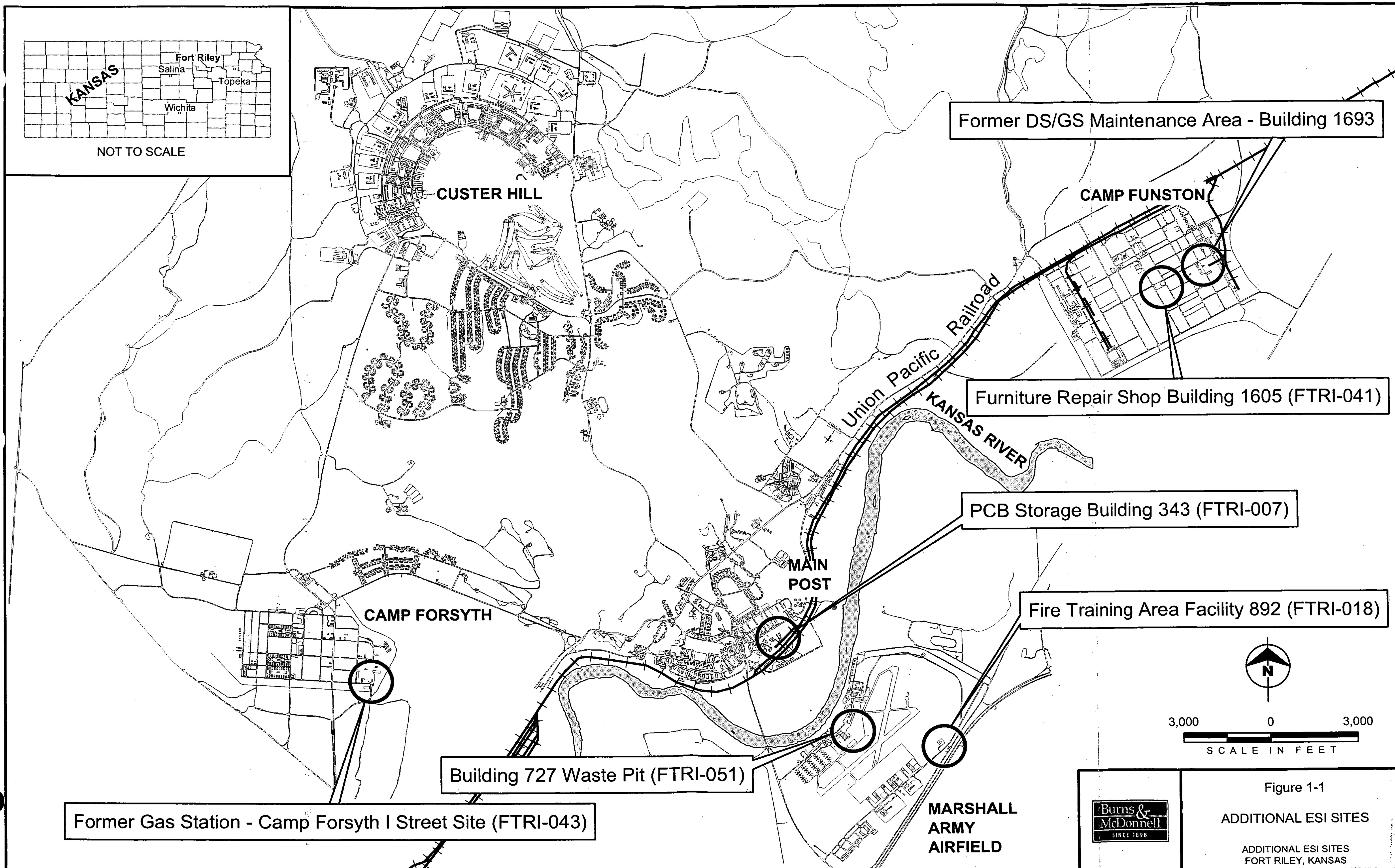
KANSAS
Fort Riley
Salina
Topeka
Wichita
NOT TO SCALE
CUSTER HILL
CAMP FUNSTON
Former DS/GS Maintenance Area - Building 1693
Union Pacific Railroad
KANSAS RIVER
Furniture Repair Shop Building 1605 (FTRI-041)
PCB Storage Building 343 (FTRI-007)
MAIN POST
CAMP FORSYTH
Fire Training Area Facility 892 (FTRI-018)
N
3,000
0
3,000
SCALE IN FEET
Building 727 Waste Pit (FTRI-051)
Former Gas Station - Camp Forsyth I Street Site (FTRI-043)
MARSHALL ARMY AIRFIELD
Burns & McDonnell
SINCE 1898

Figure 1-1

ADDITIONAL ESI SITES

ADDITIONAL ESI SITES
FORT RILEY, KANSAS

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U:\armycorp\Projects\obod\ArcDocs\2008\Fig2-1_FTRI-007-PCB.mxd 1:600 sos Sept 22, 2008

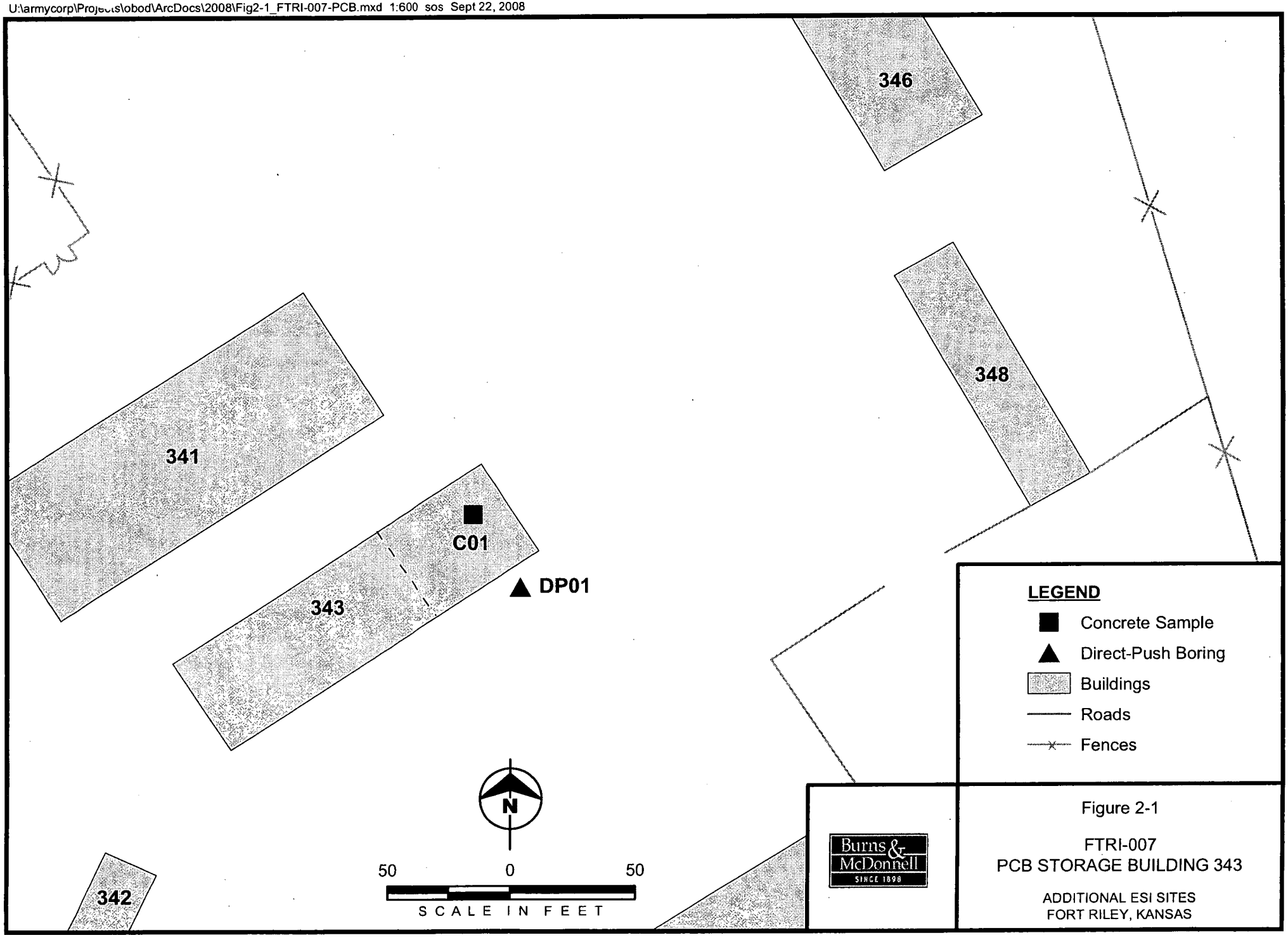
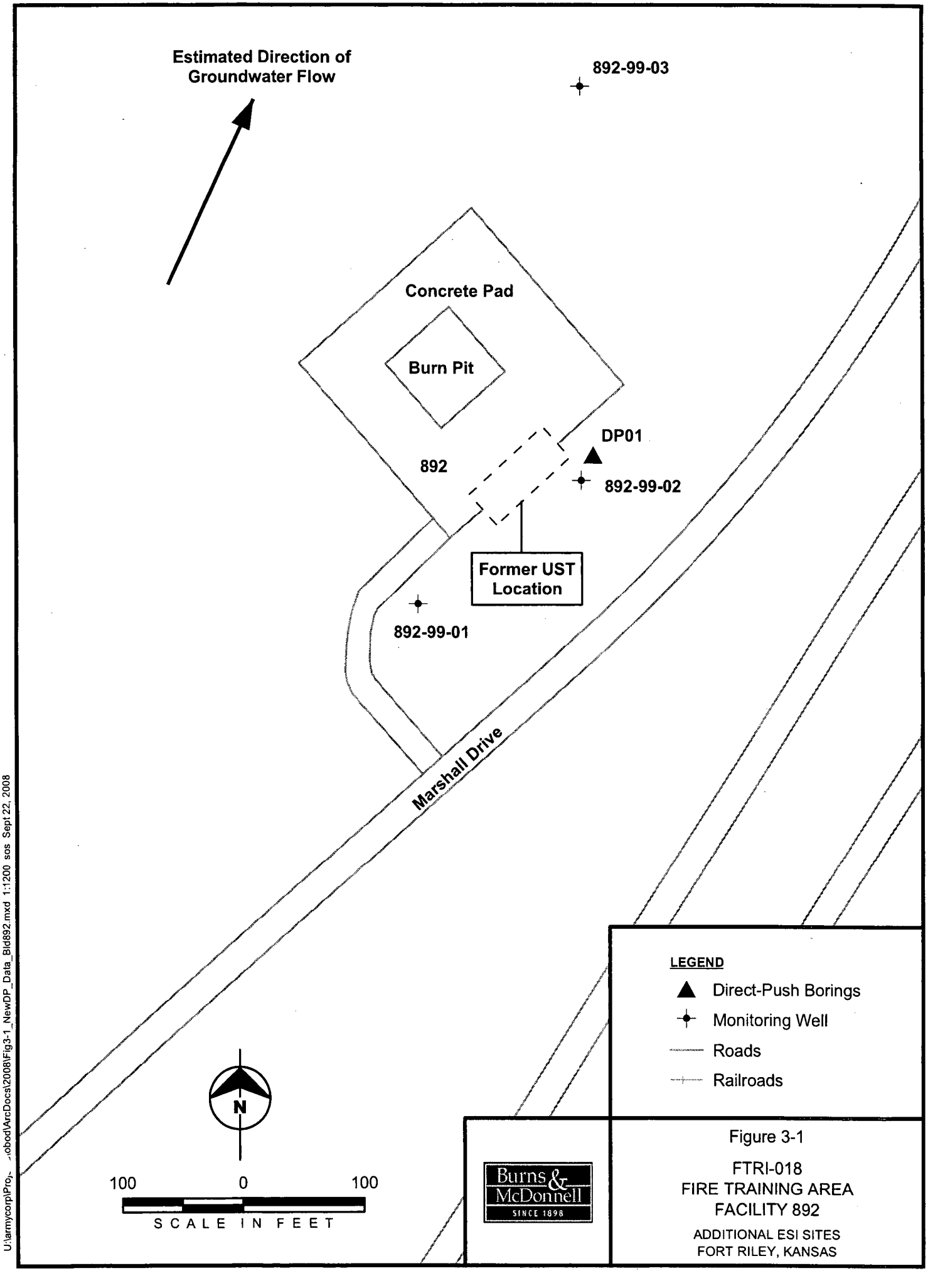


Figure 2-1

FTRI-007
PCB STORAGE BUILDING 343

ADDITIONAL ESI SITES
FORT RILEY, KANSAS


Estimated Direction of Groundwater Flow
892-99-03
Concrete Pad
Burn Pit
DP01
892
892-99-02
Former UST Location
892-99-01
Marshall Drive
LEGEND
Direct-Push Borings
Monitoring Well
Roads
Railroads
N
100 0 100
SCALE IN FEET
Burns & McDonnell
SINCE 1898
Figure 3-1
FTRI-018
FIRE TRAINING AREA
FACILITY 892
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Proj...obod\ArcDocs\2008\Fig3-1_NewDP_Data_Bld892.mxd 1:1200 sos Sept 22, 2008

NOTES:
1. Concentrations in ug/L.
2. ND - Not Detected (< 0.1 ug/L)
3. Field duplicate run on P-28
   Benzene = ND, Toluene = 0.3,
   Ethylbenzene = 0.1, Xylenes = 0.2.
4. USEPA MCLs:
   Benzene = 5 ug/L,
   Toluene = 1,000 ug/L,
   Ethylbenzene = 700 ug/L,
   Total Xylenes = 10,000 ug/L.
5. Results have been rounded to one significant figure to reflect their screen nature.

LEGEND

ND/0.3/ND/0.2 — Benzene/Toluene/Ethylbenzene/Xylenes Concentrations

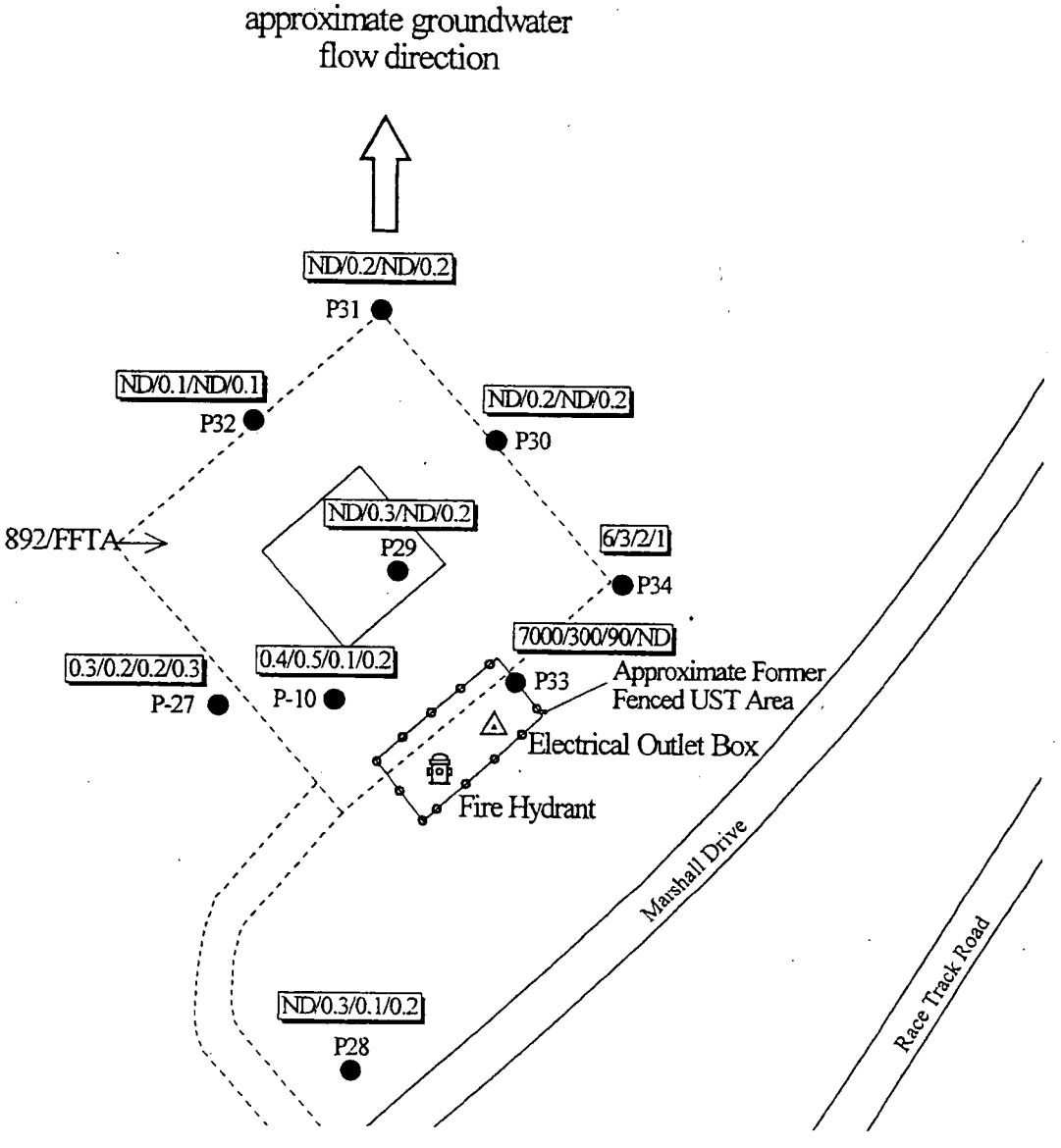
Groundwater screening sample location

Approximate Former Fenced UST Area.

Approximate extent of crushed aggregate paving.

N

100 0 100 Feet

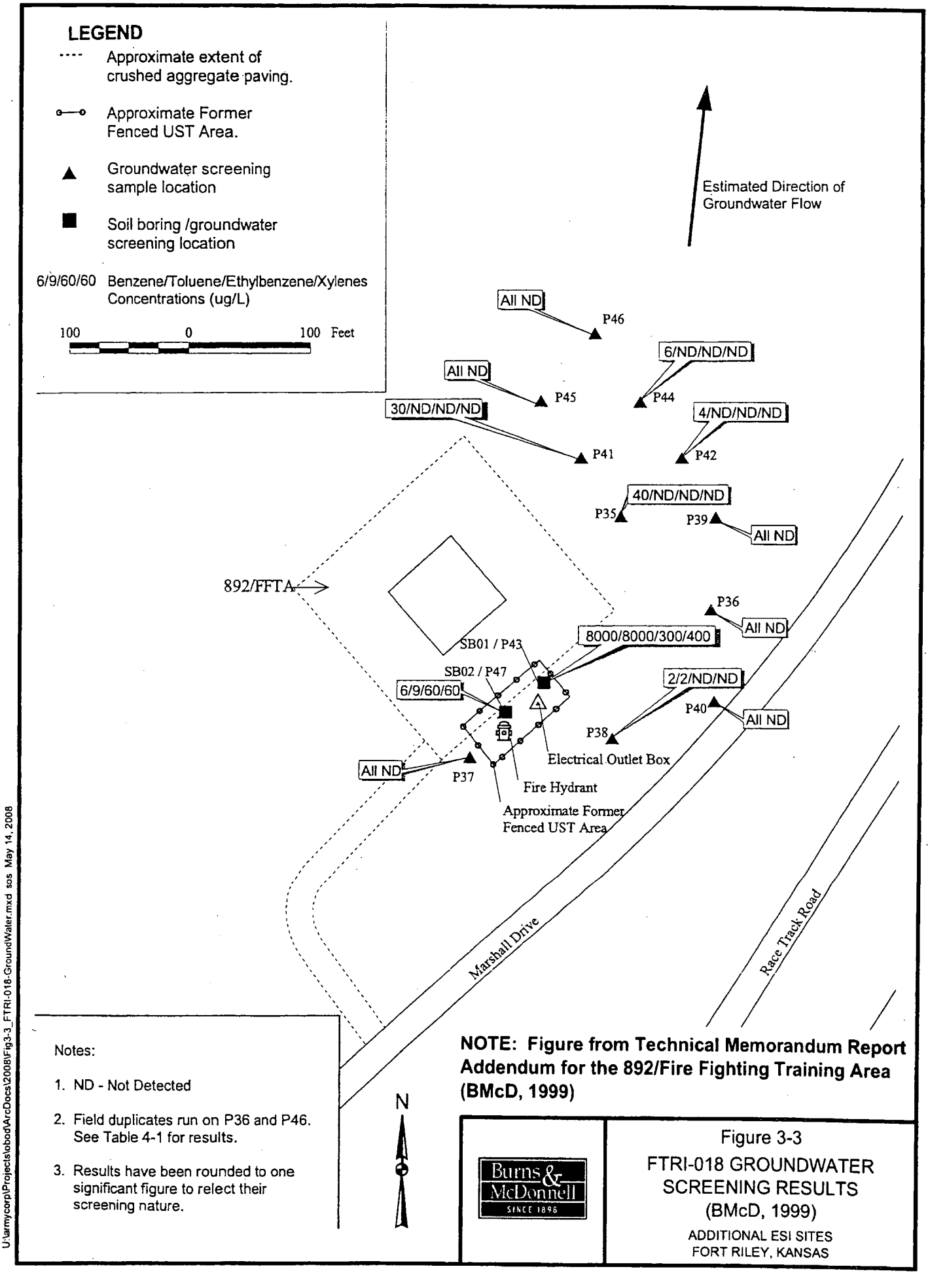


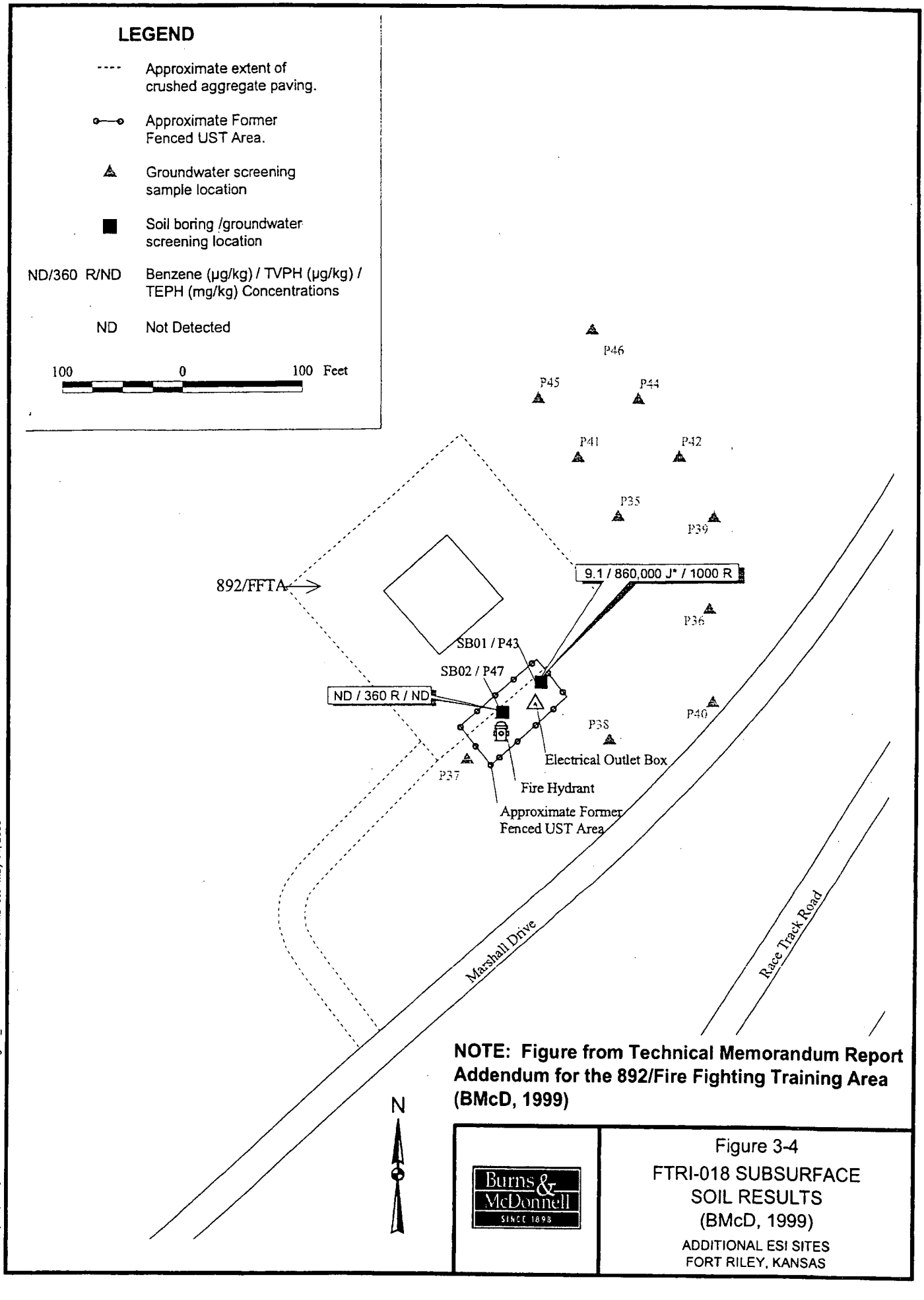
NOTE: Figure from Technical Memorandum Report for the 892/Fire Fighting Training Area (BMcD, 1998)

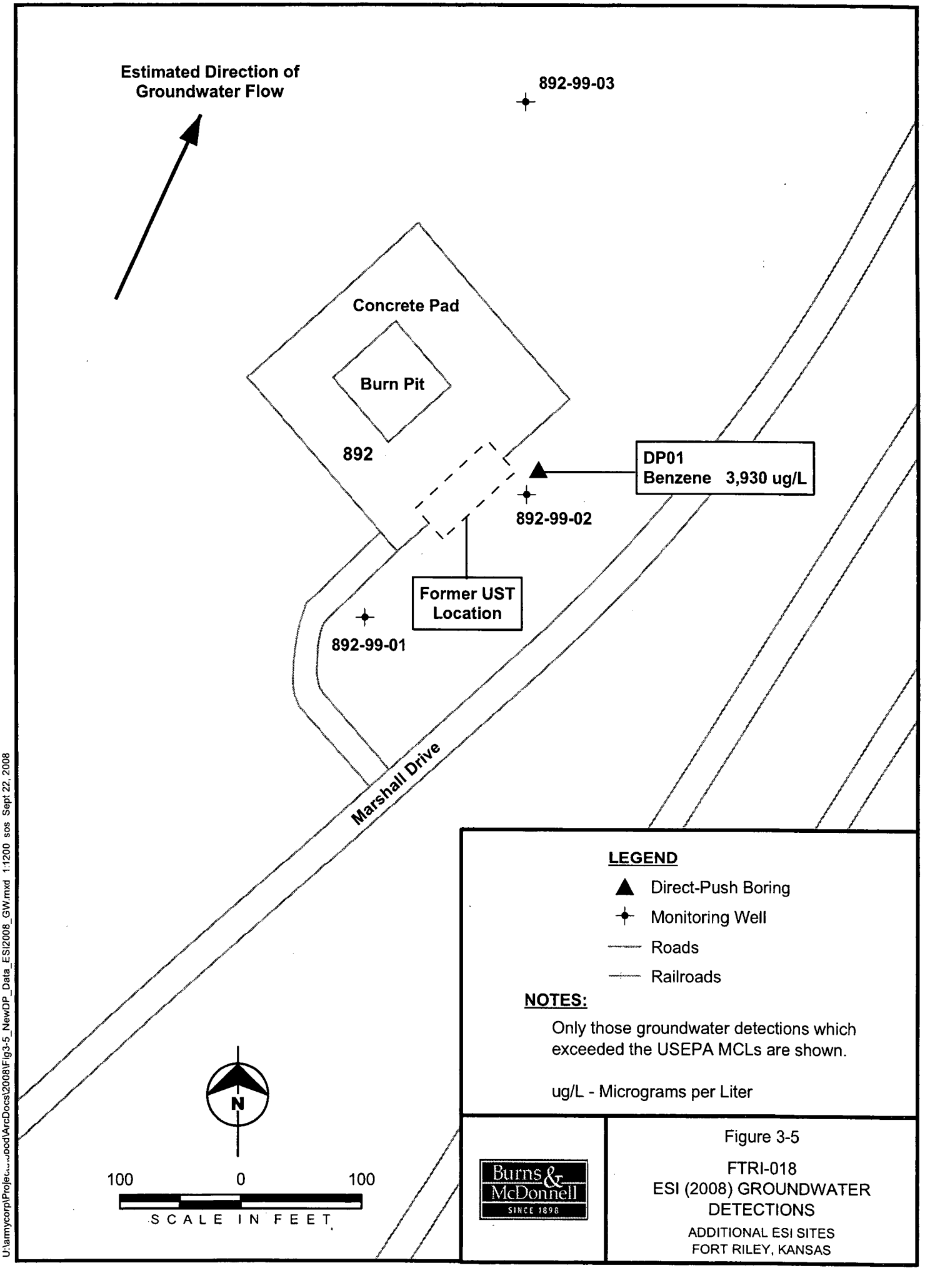
Burns & McDonnell SINCE 1898

Figure 3-2
FTRI-018 GROUNDWATER SCREENING RESULTS
(BMcD, 1998)
ADDITIONAL ESI SITES
FORT RILEY, KANSAS

U:\armycorp\Projects\obod\ArcDocs\2008\Fig3-2_FTRI-018-GroundWater.mxd sos May 14, 2008


LEGEND
Approximate extent of crushed aggregate paving.
Approximate Former Fenced UST Area.
Groundwater screening sample location
Soil boring /groundwater screening location
6/9/60/60 Benzene/Toluene/Ethylbenzene/Xylenes Concentrations (ug/L)
100 0 100 Feet
Estimated Direction of Groundwater Flow
All ND
P46
6/ND/ND/ND
P44
All ND
P45
4/ND/ND/ND
30/ND/ND/ND
P41
P42
40/ND/ND/ND
P35
P39
All ND
892/FFTA
P36
All ND
8000/8000/300/400
SB01 / P43
SB02 / P47
2/2/ND/ND
6/9/60/60
P40
All ND
P38
Electrical Outlet Box
All ND
P37
Fire Hydrant
Approximate Former Fenced UST Area
Marshall Drive
Race Track Road
N
Notes:
1. ND - Not Detected
2. Field duplicates run on P36 and P46. See Table 4-1 for results.
3. Results have been rounded to one significant figure to relect their screening nature.
NOTE: Figure from Technical Memorandum Report Addendum for the 892/Fire Fighting Training Area (BMcD, 1999)
Burns & McDonnell SINCE 1896
Figure 3-3
FTRI-018 GROUNDWATER SCREENING RESULTS (BMcD, 1999)
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projects\obodArcDocs\2008\Fig3-3_FTRI-018-GroundWater.mxd sos May 14, 2008


LEGEND
Approximate extent of crushed aggregate paving.
Approximate Former Fenced UST Area.
Groundwater screening sample location
Soil boring /groundwater screening location
ND/360 R/ND
Benzene (µg/kg) / TVPH (µg/kg) / TEPH (mg/kg) Concentrations
ND
Not Detected
100
0
100 Feet
P46
P45
P44
P41
P42
P35
P39
892/FFTA
9.1 / 860,000 J* / 1000 R
P36
SB01 / P43
SB02 / P47
ND / 360 R / ND
P40
P38
Electrical Outlet Box
P37
Fire Hydrant
Approximate Former Fenced UST Area
Marshall Drive
Race Track Road
N
NOTE: Figure from Technical Memorandum Report Addendum for the 892/Fire Fighting Training Area (BMcD, 1999)
Burns & McDonnell
SINCE 1898
Figure 3-4
FTRI-018 SUBSURFACE SOIL RESULTS
(BMcD, 1999)
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projects\obod\ArcDocs\2008\Fig3-4_FTRI-018-Subsurface.mxd sos May 14, 2008


Estimated Direction of Groundwater Flow
892-99-03
Concrete Pad
Burn Pit
892
DP01
Benzene 3,930 ug/L
892-99-02
Former UST Location
892-99-01
Marshall Drive
N
100
0
100
SCALE IN FEET
LEGEND
Direct-Push Boring
Monitoring Well
Roads
Railroads
NOTES:
Only those groundwater detections which exceeded the USEPA MCLs are shown.
ug/L - Micrograms per Liter
Burns & McDonnell
SINCE 1898
Figure 3-5
FTRI-018
ESI (2008) GROUNDWATER DETECTIONS
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projec...ood\ArcDocs\2008\Fig3-5_NewDP_Data_ESI2008_GW.mxd 1:1200 sos Sept 22, 2008

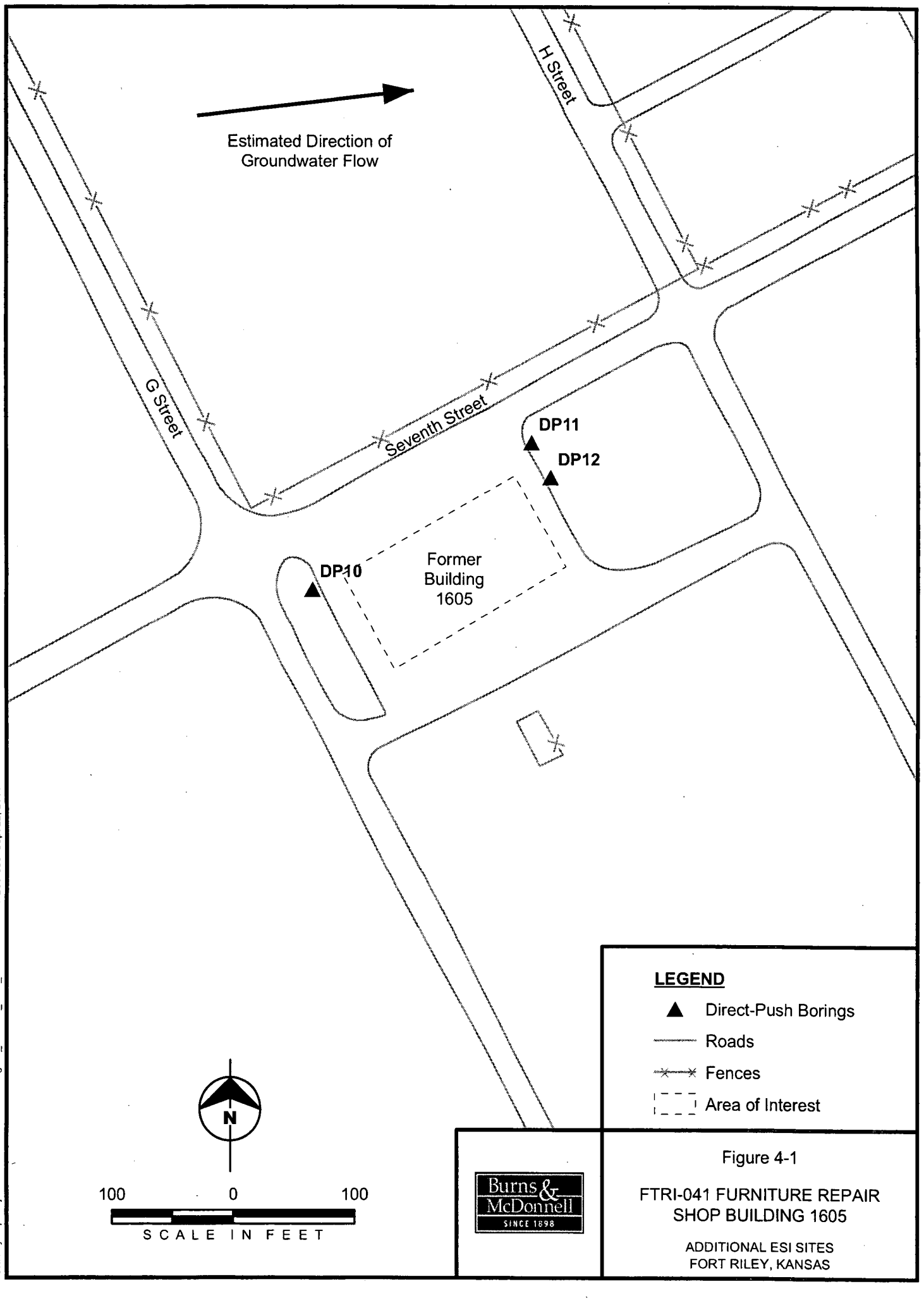


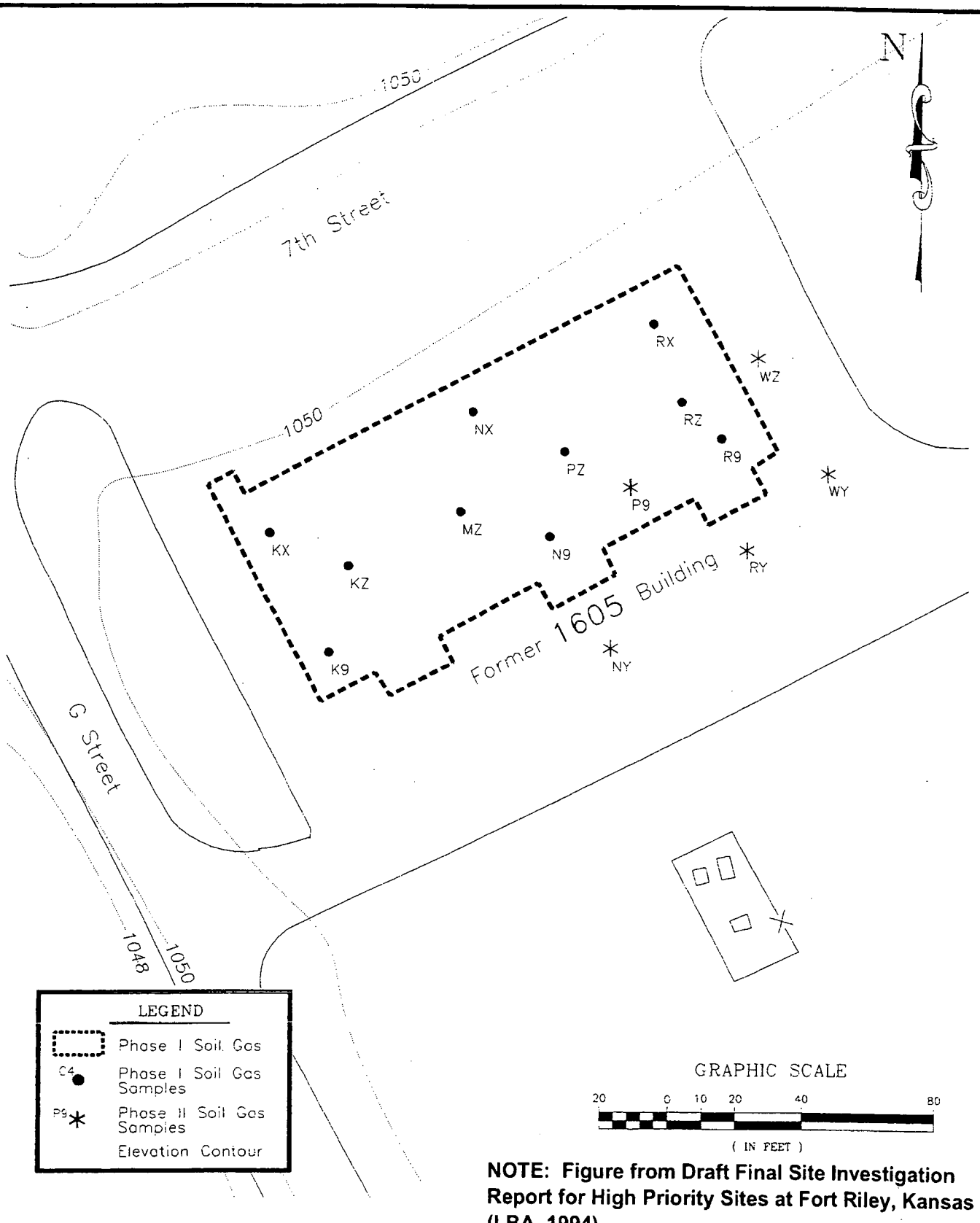
Figure 4-1

FTRI-041 FURNITURE REPAIR SHOP BUILDING 1605

ADDITIONAL ESI SITES
FORT RILEY, KANSAS

Burns & McDonnell
SINCE 1898

U:\armycorp\Projects\...\ArcDocs\2008\Fig4-1_NewDP_Data_Bld1605.mxd 1:1200 sos Sept 22, 2008



NOTE: Figure from Draft Final Site Investigation Report for High Priority Sites at Fort Riley, Kansas (LBA, 1994)

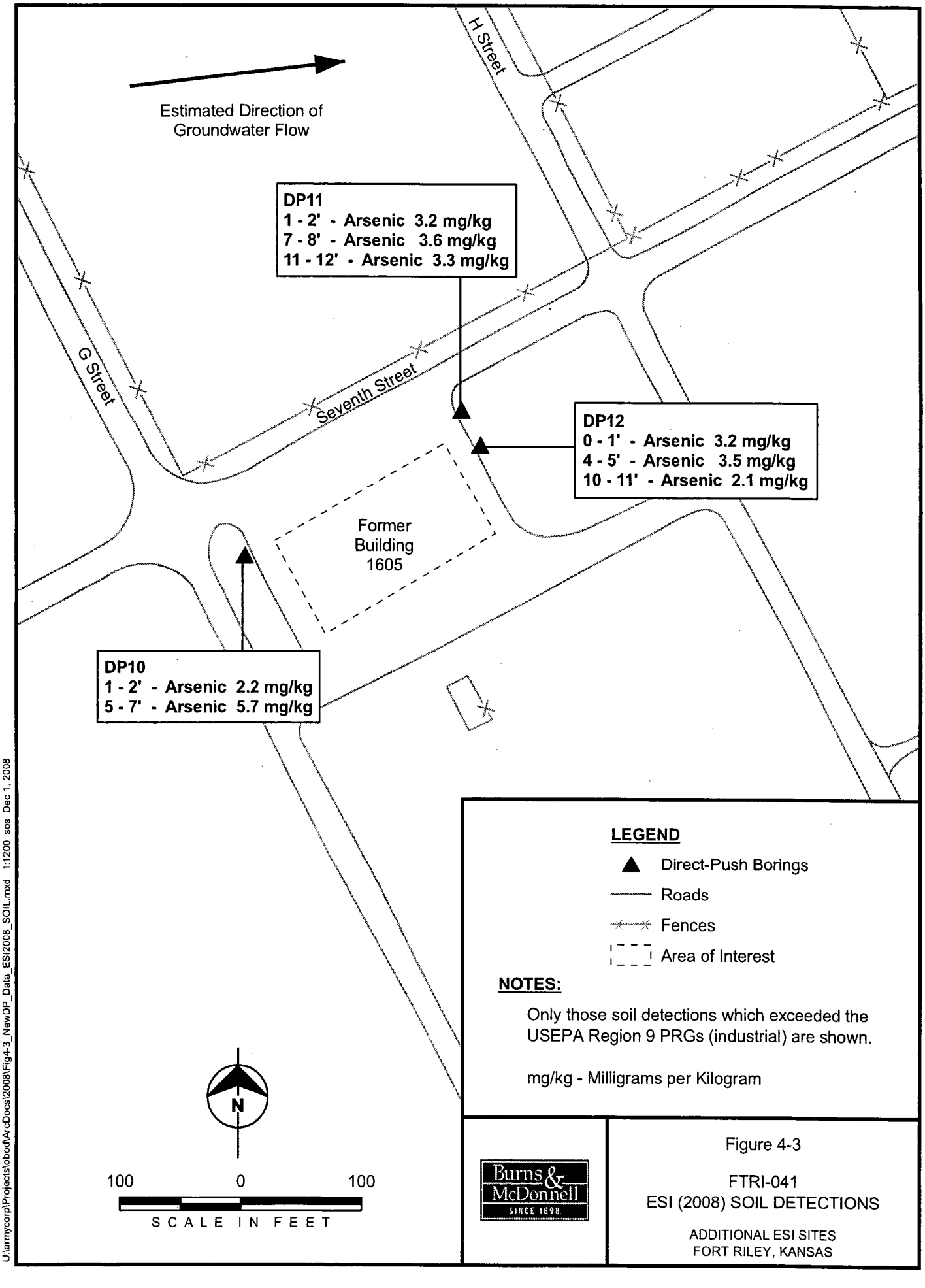
Burns & McDonnell SINCE 1898

Figure 4-2

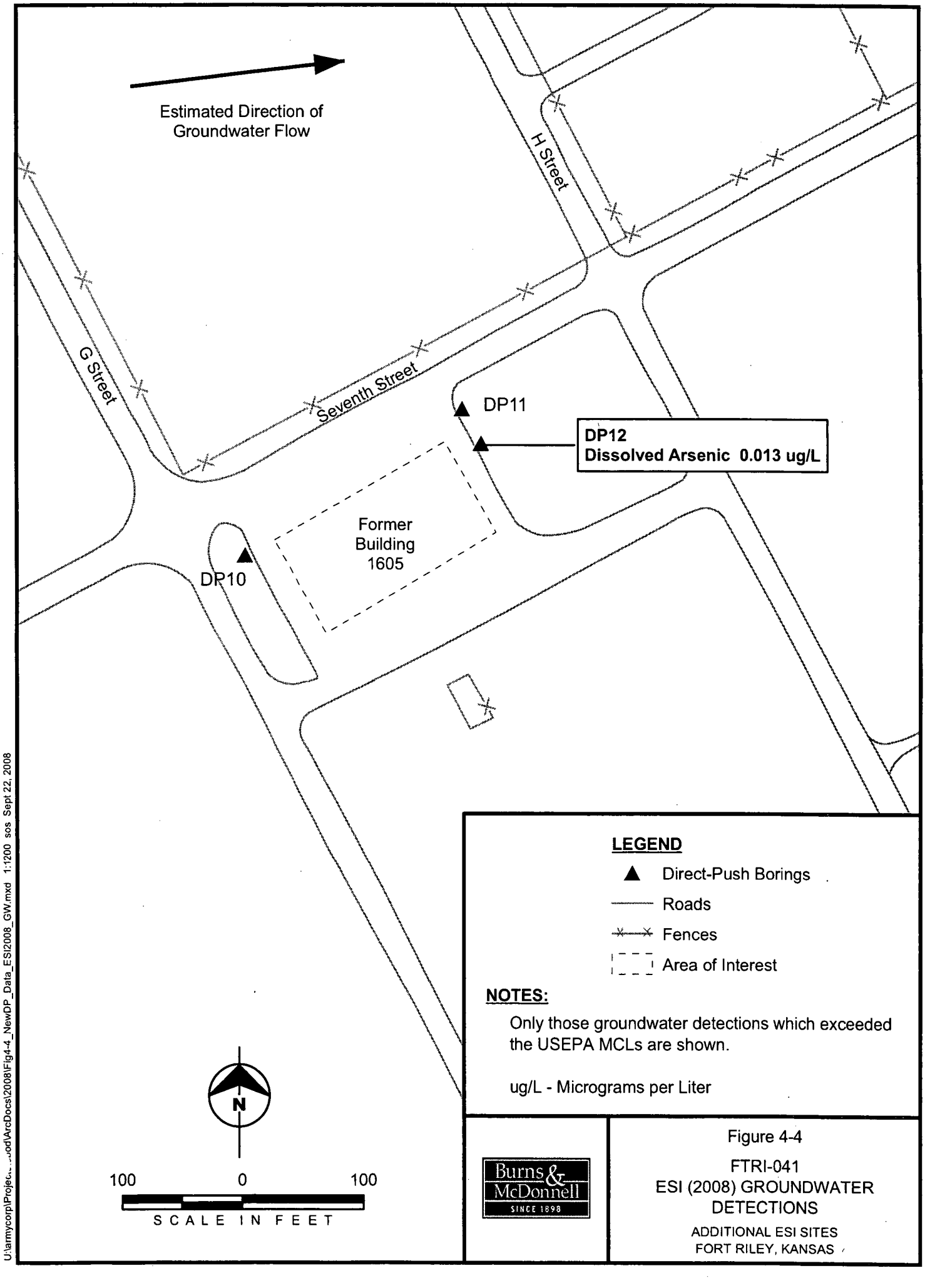
FTRI-041 SOIL GAS RESULTS (LBA, 1994)

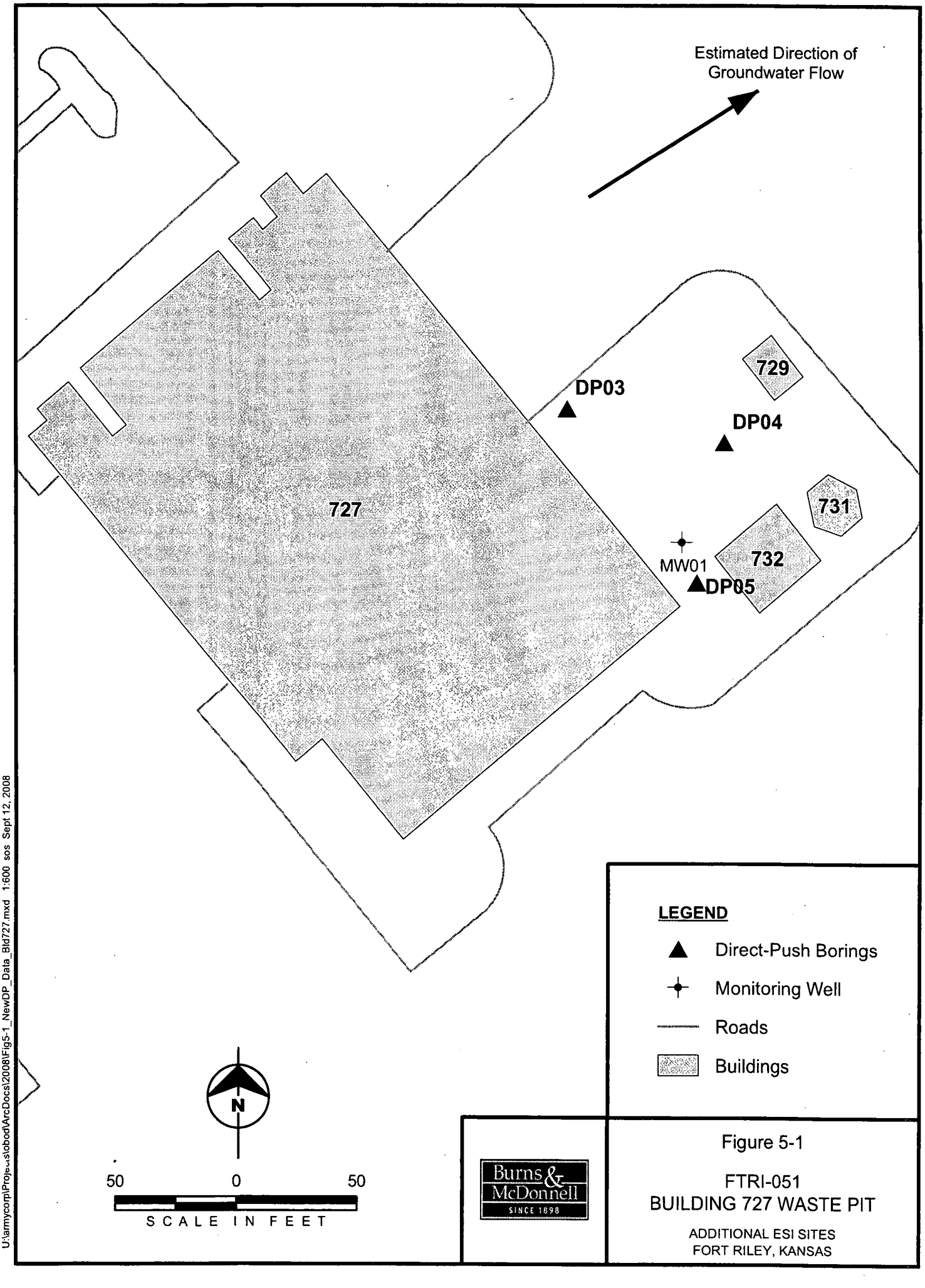
ADDITIONAL ESI SITES
FORT RILEY, KANSAS

U:\armycorp\Projects\obod\ArcDocs\2008\Fig4-2_FTRI-041-Soil.mxd sos March 20, 2008



U:\armycorp\Projects\obod\ArcDocs\2008\Fig4-3_NewDP_Data_ESI2008_SOIL.mxd 1:1200 sos Dec 1, 2008

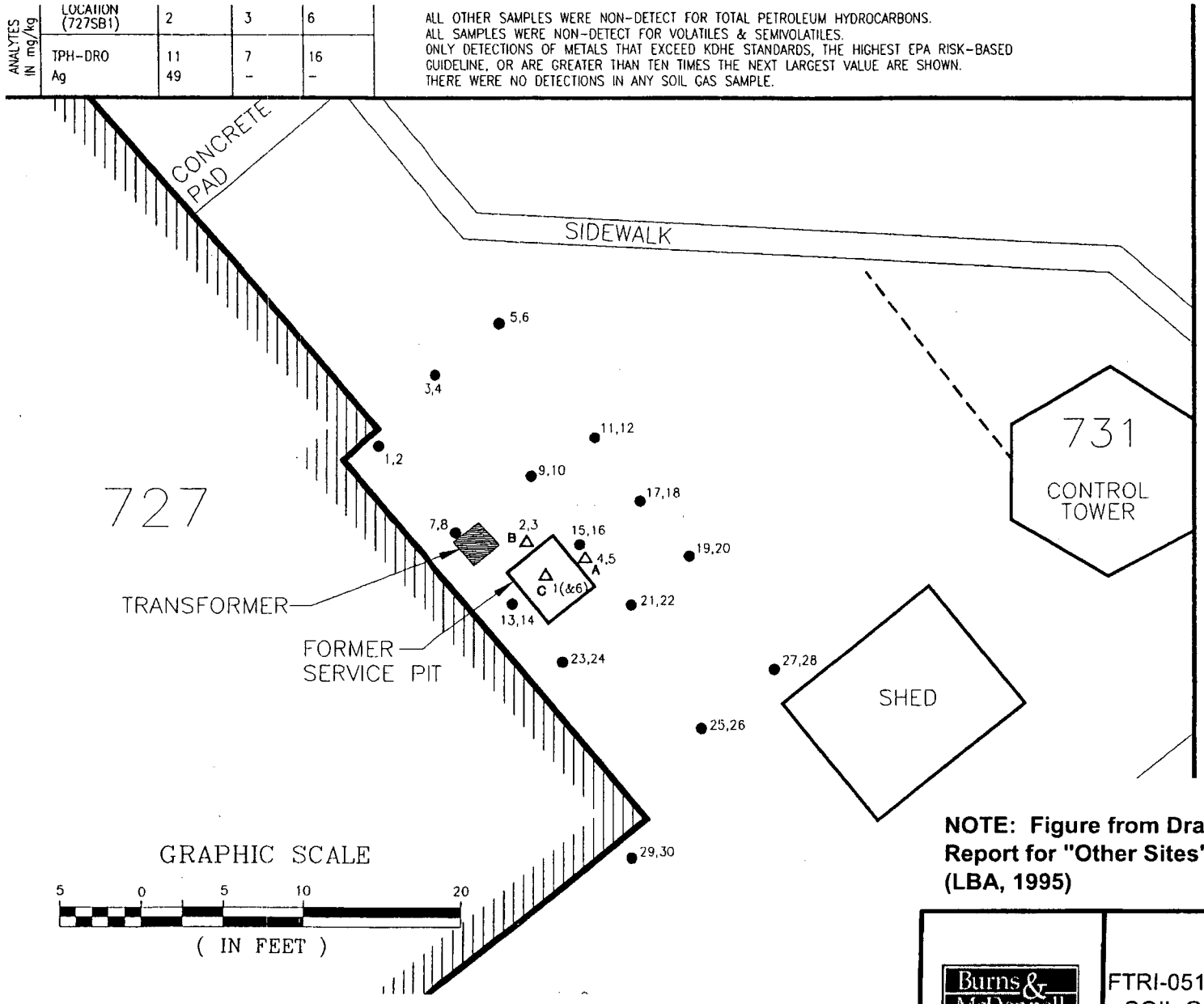

Estimated Direction of Groundwater Flow
H Street
G Street
Seventh Street
DP11
DP12
Dissolved Arsenic 0.013 ug/L
Former Building 1605
DP10
LEGEND
Direct-Push Borings
Roads
Fences
Area of Interest
NOTES:
Only those groundwater detections which exceeded the USEPA MCLs are shown.
ug/L - Micrograms per Liter
N
100 0 100
SCALE IN FEET
Burns & McDonnell
SINCE 1898
Figure 4-4
FTRI-041
ESI (2008) GROUNDWATER DETECTIONS
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projec...\odVArcDocs\2008\Fig4-4_NewDP_Data_ESI2008_GW.mxd 1:1200 sos Sept 22, 2008


Estimated Direction of Groundwater Flow
729
DP03
DP04
731
727
MW01
732
DP05
LEGEND
Direct-Push Borings
Monitoring Well
Roads
Buildings
N
50
0
50
SCALE IN FEET
Burns & McDonnell
SINCE 1898
Figure 5-1
FTRI-051
BUILDING 727 WASTE PIT
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Proje...s\lobod\ArcDocs\2008\Fig5-1_NewDP_Data_Bld727.mxd 1:600 sos Sept 12, 2008

U:\armycorp\Projects\obod\ArcDocs\2008\Fig5-2_FTRI-051-Sampling.mxd 1:600 sos March 20, 2008

ANALYTES IN mg/kg	LOCATION (727SB1)	2	3	6
	TPH-DRO	11	7	16
	Ag	49	–	–

ALL OTHER SAMPLES WERE NON-DETECT FOR TOTAL PETROLEUM HYDROCARBONS.
ALL SAMPLES WERE NON-DETECT FOR VOLATILES & SEMIVOLATILES.
ONLY DETECTIONS OF METALS THAT EXCEED KDHE STANDARDS, THE HIGHEST EPA RISK-BASED GUIDELINE, OR ARE GREATER THAN TEN TIMES THE NEXT LARGEST VALUE ARE SHOWN.
THERE WERE NO DETECTIONS IN ANY SOIL GAS SAMPLE.



N

LEGEND

- SOIL GAS (4 & 12') ODD NUMBERS=4'SAMPLE EVEN NUMBERS=12'SAMPLE
- SOIL BORING
- BUILDINGS
- SEWER LINE

NOTE:

- SOIL GAS SAMPLES HAVE PREFIX (727SG1-)
- SOIL GAS SAMPLES HAVE PREFIX (727SB1-)
- A, B, C POINT DESIGNATION FOR CROSS SECTION LOG LINE

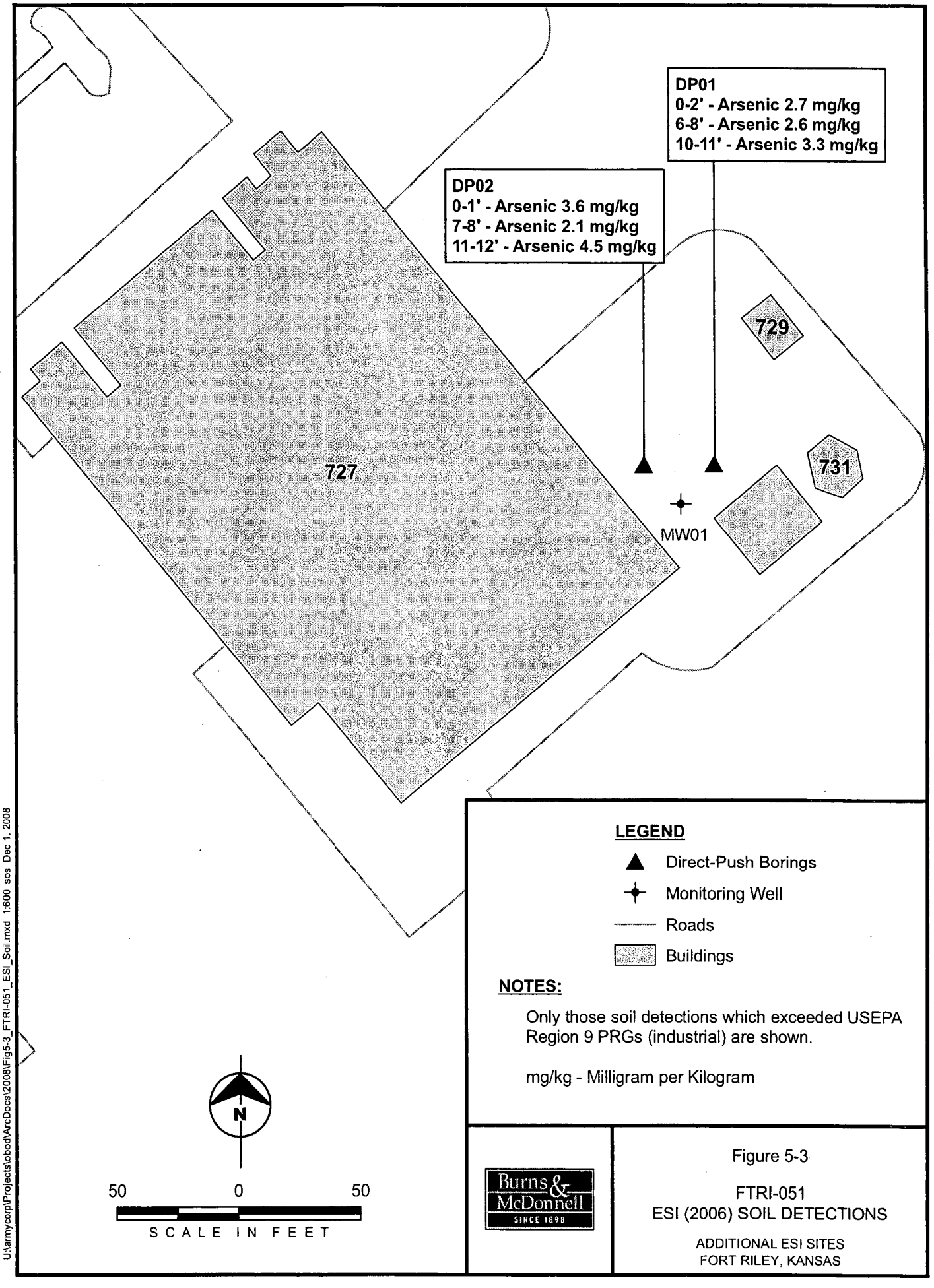
NOTE: Figure from Draft Final Site Investigation Report for "Other Sites" at Fort Riley, Kansas (LBA, 1995)

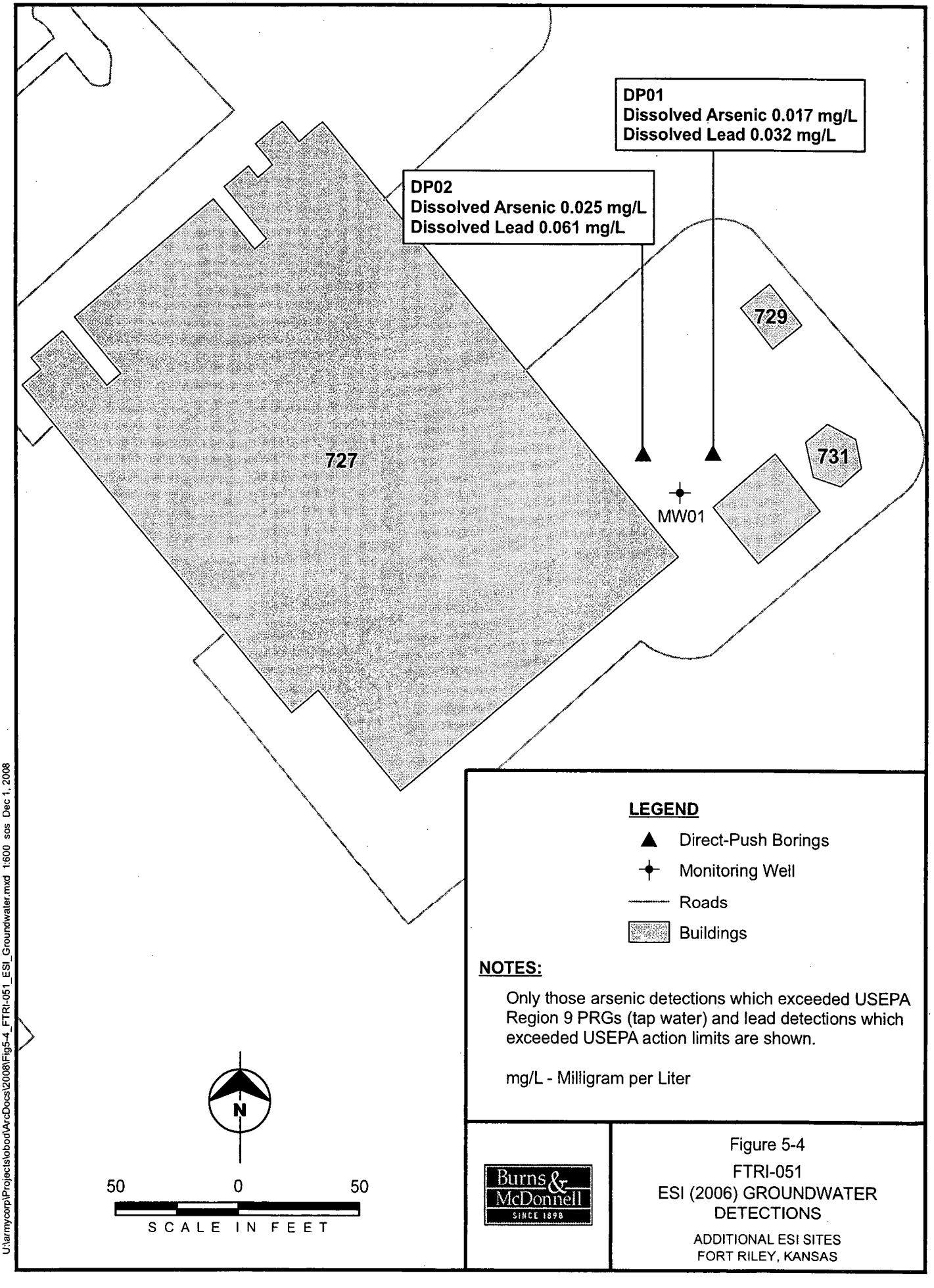
Burns & McDonnell SINCE 1898

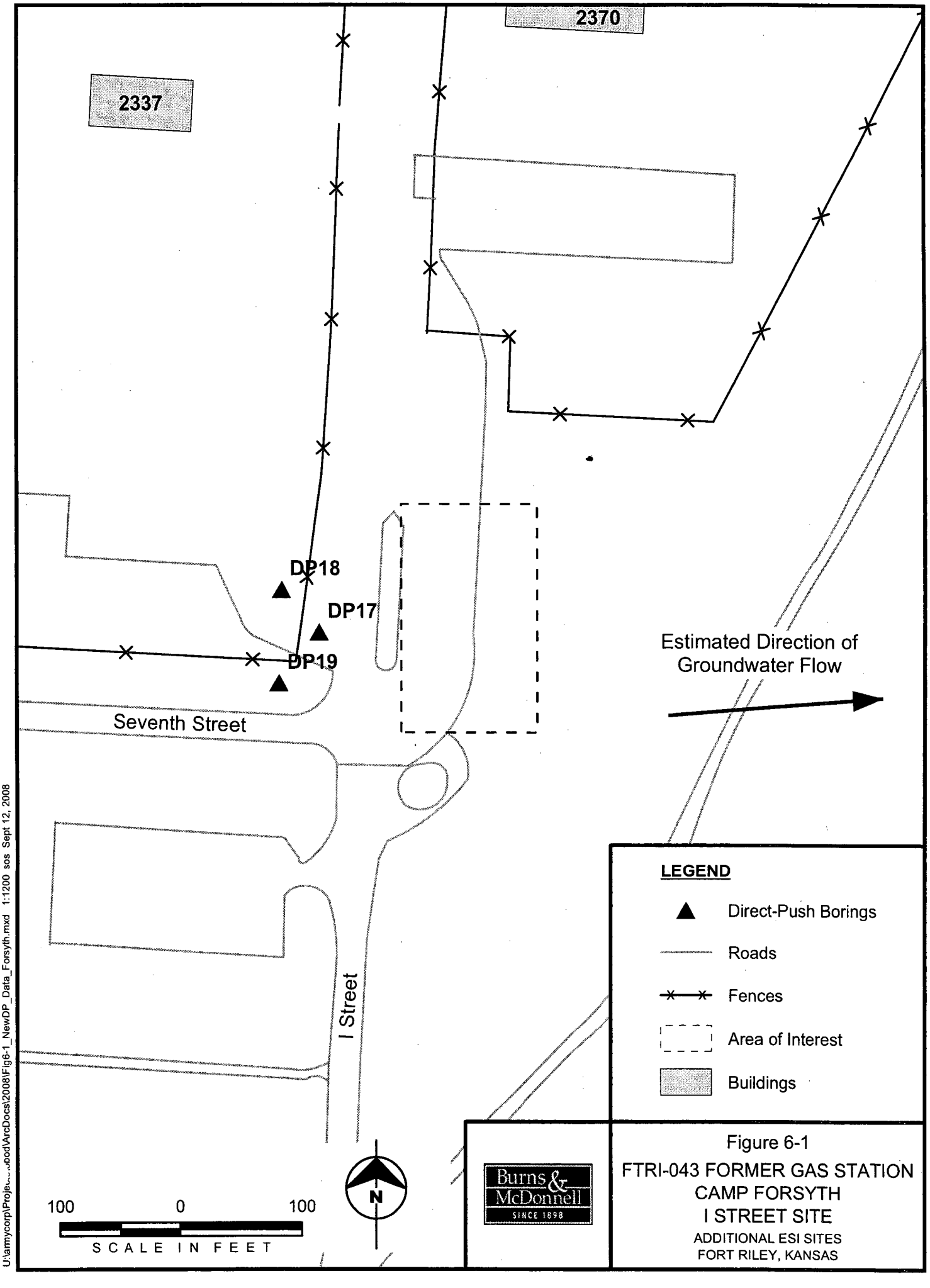
Figure 5-2

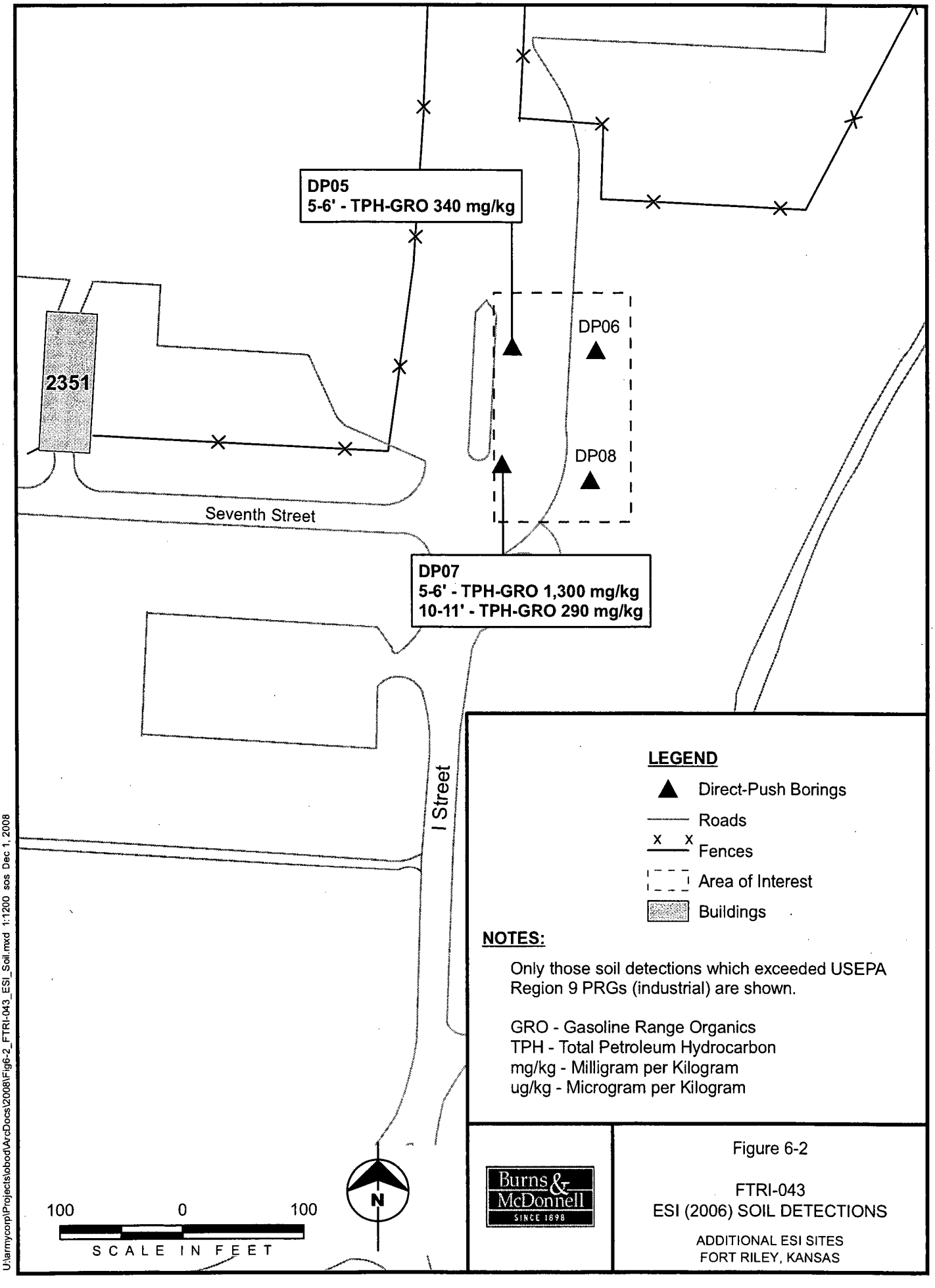
FTRI-051 SAMPLING LOCATIONS & SOIL GAS RESULTS (LBA, 1995)

ADDITIONAL ESI SITES
FORT RILEY, KANSAS


DP01
0-2' - Arsenic 2.7 mg/kg
6-8' - Arsenic 2.6 mg/kg
10-11' - Arsenic 3.3 mg/kg
DP02
0-1' - Arsenic 3.6 mg/kg
7-8' - Arsenic 2.1 mg/kg
11-12' - Arsenic 4.5 mg/kg
729
727
731
MW01
LEGEND
Direct-Push Borings
Monitoring Well
Roads
Buildings
NOTES:
Only those soil detections which exceeded USEPA Region 9 PRGs (industrial) are shown.
mg/kg - Milligram per Kilogram
N
50
0
50
SCALE IN FEET
Burns & McDonnell
SINCE 1898
Figure 5-3
FTRI-051
ESI (2006) SOIL DETECTIONS
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projects\obod\ArcDocs\2008\Fig5-3_FTRI-051_ESI_Soil.mxd 1:600 sos Dec 1, 2008


DP01
Dissolved Arsenic 0.017 mg/L
Dissolved Lead 0.032 mg/L
DP02
Dissolved Arsenic 0.025 mg/L
Dissolved Lead 0.061 mg/L
729
731
727
MW01
LEGEND
Direct-Push Borings
Monitoring Well
Roads
Buildings
NOTES:
Only those arsenic detections which exceeded USEPA Region 9 PRGs (tap water) and lead detections which exceeded USEPA action limits are shown.
mg/L - Milligram per Liter
N
50
0
50
SCALE IN FEET
Burns & McDonnell
SINCE 1898
Figure 5-4
FTRI-051
ESI (2006) GROUNDWATER DETECTIONS
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projects\obod\ArcDocs\2008\Fig5-4_FTRI-051_ESI_Groundwater.mxd 1:600 sos Dec 1, 2008


2370
2337
DP18
DP17
DP19
Seventh Street
I Street
Estimated Direction of Groundwater Flow
LEGEND
Direct-Push Borings
Roads
Fences
Area of Interest
Buildings
100
0
100
SCALE IN FEET
N
Burns & McDonnell
SINCE 1898
Figure 6-1
FTRI-043 FORMER GAS STATION
CAMP FORSYTH
I STREET SITE
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Proje...\ood\ArcDocs\2008\Fig6-1_NewDP_Data_Forsyth.mxd 1:1200 sos Sept 12, 2008


DP05
5-6' - TPH-GRO 340 mg/kg
DP06
DP08
2351
Seventh Street
DP07
5-6' - TPH-GRO 1,300 mg/kg
10-11' - TPH-GRO 290 mg/kg
I Street
LEGEND
Direct-Push Borings
Roads
Fences
Area of Interest
Buildings
NOTES:
Only those soil detections which exceeded USEPA Region 9 PRGs (industrial) are shown.
GRO - Gasoline Range Organics
TPH - Total Petroleum Hydrocarbon
mg/kg - Milligram per Kilogram
ug/kg - Microgram per Kilogram
N
100 0 100
SCALE IN FEET
Burns & McDonnell
SINCE 1898
Figure 6-2
FTRI-043
ESI (2006) SOIL DETECTIONS
ADDITIONAL ESI SITES
FORT RILEY, KANSAS
U:\armycorp\Projects\obod\ArcDocs\2008\Fig6-2_FTRI-043_ESI_Soil.mxd 1:1200 sos Dec 1, 2008

Appendix A
Survey Data

2319 N. Jackson, PO Box 1304
Junction City, Kansas 66441
www.kveng.com

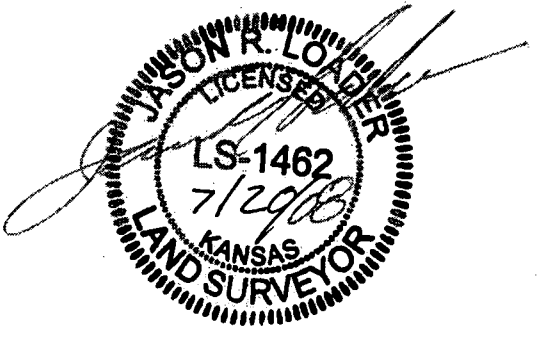
Tel: 785-762-5040
Fax: 785-762-7744
E-mail: JC@kveng.com

KAW VALLEY ENGINEERING, INC.

ESI Monitor Wells
Various Sites
Ft. Riley, KS
KVE #A08S4041

Horizontal Datum: Utmzone 14 NAD1983 US Feet
Vertical Datum: NAVD1988 US Feet

Northing	Easting	Elevation	Desc.
14,199,539.4830	2,272,415.1660	1,127.6170	DP BLDG 615
14,199,568.5660	2,272,412.1000	1,128.4320	DP BLDG 615
14,199,589.7720	2,272,412.6760	1,128.3840	DP BLDG 615
14,199,605.3560	2,272,412.1890	1,128.8670	DP BLDG 615
14,199,602.5490	2,272,376.1190	1,131.4900	DP BLDG 615
14,199,575.4140	2,272,367.4500	1,131.6460	DP BLDG 615
14,205,979.9050	2,285,153.0530	1,047.7950	DP10 BLDG 1605
14,206,116.1810	2,285,325.5130	1,048.5920	DP12 BLDG 1605
14,206,144.3370	2,285,309.7910	1,049.1420	DP11 BLDG 1605
14,206,822.0990	2,286,577.4270	1,051.9560	DP01 BLDG 1693
14,206,827.4450	2,286,610.3210	1,051.4720	DP02 BLDG 1693
14,206,786.9830	2,286,637.7870	1,051.2630	DP03 BLDG 1693
14,206,769.6690	2,286,651.8000	1,051.2930	DP04 BLDG 1693
14,206,736.9140	2,286,667.7820	1,051.2060	DP05 BLDG 1693
14,206,712.2610	2,286,678.0660	1,051.1190	DP06 BLDG 1693
14,206,686.2640	2,286,652.7390	1,051.4460	DP07 BLDG 1693
14,206,656.7770	2,286,613.3070	1,051.0910	DP08 BLDG 1693
14,206,705.5150	2,286,558.8070	1,050.8390	DP09 BLDG 1693
14,206,774.4480	2,286,538.1620	1,051.5140	DP10 BLDG 1693
14,190,219.4030	2,274,329.1410	1,061.7200	DP03 BLDG 727
14,190,148.4190	2,274,382.9690	1,062.0250	DP05 BLDG 727
14,190,205.6350	2,274,394.3310	1,061.1210	DP04 BLDG 727
14,189,877.1450	2,277,608.4310	1,058.8490	DP01 BLDG 892
14,193,563.8290	2,271,937.5820	1,088.1110	DP01 BLDG 343
14,192,135.7340	2,258,080.0000	1,067.9750	DP19 FORSYTH
14,192,177.1660	2,258,112.9790	1,067.4180	DP17 FORSYTH
14,192,211.5450	2,258,082.2980	1,068.3140	DP18 FORSYTH



Appendix B
Boring Logs

Boring Log
PCB Storage Building 343 (FTRI-007)

HTW DRILLING LOG

HOLE NO. FTRI-007 SB01

1. COMPANY NAME: Burns & McDonnell	2. DRILLING SUBCONTRACTOR: EPS
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley
5. NAME OF DRILLER: Blaze Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' Macrocore	8. HOLE LOCATION: NA
	9. SURFACE ELEVATION: NA
	10. DATE STARTED: 6/23/08 — 11. DATE COMPLETED: 6/23/08
12. OVERBURDEN THICKNESS: 5'	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	—	—	2 PCB	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	No	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Gravel	0	3.3/4	SB01 0.0.5		
	1	SILT, dark grayish brown 4/2 10YR damp, soft, non plastic	0				
	2		0				
	3		0				
	4		0			0929	
	5	Bottom of Hole	0	0.8/1	SB02 4.5-5	0938	

FORM MRK JUN 89 55 | PROJECT 48544 | HOLE NO. FTRI-007 SB01

Boring Log
Fire Training Area Facility 892 (FTRI-018)

HTW DRILLING LOG

HOLE NO. FTRI-018 DP01

1. COMPANY NAME: Burns + McDonnell	2. DRILLING SUBCONTRACTOR: EPS	SHEET 1 OF 1 SHEETS
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley	
5. NAME OF DRILLER: Blaze Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA	
	9. SURFACE ELEVATION: NA	
	10. DATE STARTED: 6/24/08	11. DATE COMPLETED: 6/24/08
12. OVERBURDEN THICKNESS: 12'	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	# 3	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	No	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Topsoil w/grass + roots			SB01 0-0.5		
		CLAY w/silt, very dark grayish brown 3/2 10YR, damp, soft, medium plastic	0	3.7/4			
	1						
		SILT brown 4/3 10YR, damp soft, highly plastic	0				
	2						
	3		0				
	4		0				0843
		SILT, brown 4/3 10YR, moist, soft, medium plastic	0	3.6/4			
	5						

HTW DRILLING LOG

HOLE NO. FTRI-018 DP01

PROJECT 48544

INSPECTOR

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME AS Above					
	6		0		SB02 6-7		
	7		0				
	8		0				0953
			0	3.8/4			
	9						
	10		0				
	11	SAND, brown 7/2 10YR, moist loose, fine-medium grained poorly graded	0		SB03 11-12		
	12		0				0903
		Bottom of hole					

PROJECT 48544

HOLE NO. FTRI-018 DP01

051601
Form MRK-55-2

Boring Logs
Furniture Repair Shop Building 1605 (FTRI-041)

HTW DRILLING LOG

HOLE NO. FTRI-041 / DP10

1. COMPANY NAME: Burns & McDonnell	2. DRILLING SUBCONTRACTOR: EPS
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley
5. NAME OF DRILLER: Blake Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA
	9. SURFACE ELEVATION: NA
	10. DATE STARTED: 6/23/08 — 11. DATE COMPLETED: 6/23/08
12. OVERBURDEN THICKNESS: 12	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 12	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	3	3	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	bentonite	ND	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Topsoil; grass & roots					
		CLAY trace ~~silt~~ silt, dark brown 3/3 10YR, damp, medium medium plastic	0	3.8/4	SB01 1-2		
	1						
	2		0				
	3	SILT w/clay, dark grayish brown 4/2 10YR, damp, medium medium plastic	0				
	4		0				1617
				3.6/4			
	5		0				

HTW DRILLING LOG

HOLE NO. FTRI-041 DP10

PROJECT 48544

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME As Above			SB02 5-7		
	6		0				
	7		0				
	8		0				1458
	9	SILT w/sand, brown 4/3 10YR damp, soft, non plastic, fine grained	0	3.8/4			
	10		0				
	11		0				
	12	SAND, yellowish brown 5/4 10YR, moist, loose, fine - medium grained, poorly graded	0		SB03 11-12		1707
	13	Bottom of Hole					
	14						

HTW DRILLING LOG

HOLE NO. FTRI-041 DP11

1. COMPANY NAME: Burns & McDonnell	2. DRILLING SUBCONTRACTOR: EPS	SHEET 1 OF 2 SHEETS
3. PROJECT: ~~Blaze~~ 48544 ESI Addendum	4. LOCATION: Fort Riley	
5. NAME OF DRILLER: Blaze Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA	
	9. SURFACE ELEVATION: NA	
	10. DATE STARTED: 6/24/08	11. DATE COMPLETED: 6/24/08
12. OVERBURDEN THICKNESS: 12	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	3	3	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	No	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Topsoil grass w/roots					
		CLAY, trace silt, dary brown 3/3 10YR, damp, medium medium plastic	0	3.6/4	SB01 1-2		
	1						
			0				
	2						
			0				
	3	SILT w/clay, dark grayish brown 4/2 10YR, damp, medium medium plastic					
			0				1140
	4						
				3.9/4			
	5		0				

HTW DRILLING LOG

HOLE NO. FTRI-041 DP11

PROJECT 48544

INSPECTOR

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	SAME As Above	0				
	7		0		SB02 7-8		
	8		C				1152
	9	SILT w/sand, brown 4/3 10YR damp, soft, non plastic Fine grained	0	3.8 / 4			
	10		C				
	11	SAND, yellowish brown 5/4 10YR, moist, loose, fine medium grained, poorly graded	0		SB03 11-12		
	12		0				1158
		Bottom of Hole					

HTW DRILLING LOG

HOLE NO. FTRI-041 DP12

1. COMPANY NAME: Burns & McDonnell	2. DRILLING SUBCONTRACTOR: EPS
SHEET 1 OF 2 SHEETS	
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley
5. NAME OF DRILLER: Blaze Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA
	9. SURFACE ELEVATION: NA
	10. DATE STARTED: 6/24/08 — 11. DATE COMPLETED: 6/24/08
12. OVERBURDEN THICKNESS: 12	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 12	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	3	3	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	NO	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Topsoil, grass + roots			SB01 0-1		
	1	CLAY, trace silt, dark brown 3/3 10YR, damp, soft, medium plastic	0	3.8/4			
	2		0				
	3		0				
	4	SILT, w/clay, dark grayish brown 4/2 10YR, damp, medium, medium plastic	0				1043
	5		0	2.7/4	SB02 4-5		

HTW DRILLING LOG

HOLE NO. FTRI-041 DP12

PROJECT 48544

INSPECTOR

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME AS Above					
	6		0				
	7		0				
	8		0				1053
		SILT w/ sand, brown 4/3 10YR damp, soft, nonplastic fine grained		3.5/4			
	9		0				
	10		0		SB03 10-11		
	11		0				
		SAND, yellowish brown 5/4 10YR moist, loose, fine-medium grained, poorly graded					
	12		0				1057
		Bottom of Hole					

Boring Logs
Camp Forsyth I Street Site (FTRI-043)

HTW DRILLING LOG

HOLE NO. FTRI-043 DP17

1. COMPANY NAME: Burns & McDonnell	2. DRILLING SUBCONTRACTOR: EPS
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley
5. NAME OF DRILLER: Blaze Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA
	9. SURFACE ELEVATION: NA
	10. DATE STARTED: 6/23/08 — 11. DATE COMPLETED: 6/23/08
12. OVERBURDEN THICKNESS: 12	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 12	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	B 3	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	NO	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Concrete					
		Gravel & sand fill					
	1	CLAY w/silt, brown 4/3 10YR, soft, damp, trace Plastic	0	3.1 / 3.7	SB01 1-2		
	2		0				
	3		0				
	4		0				1458
	5	SILT, brown 5/3 10YR, soft, damp, non plastic, trace sand	0	3.8 / 4			

HTW DRILLING LOG

HOLE NO. FTRI-043 DP17

PROJECT 48544

INSPECTOR

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME AS Above					
	6	SAND brown, 5/3 10YR, damp Medium, fine grained	0		SB02 6-7		
	7		0				
	8		0				1503
	9		0	4.0 / 4.0			
	10		0				
	11	SAND light brownish gray 6/2 10YR, moist, dense, fine - medium grained	0		SB03 11-12		
	12		0				1512
		Bottom of Hole					

PROJECT 48544

HOLE NO. FTRI-043 DP17

051601
Form MRK-55-2

HTW DRILLING LOG

HOLE NO. FTRI-043 DP18

1. COMPANY NAME: Burns & McDonnell	2. DRILLING SUBCONTRACTOR: EPS	SHEET 1 OF 2 SHEETS
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley	
AME OF DRILLER: Blaze Martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA	
	9. SURFACE ELEVATION: NA	
	10. DATE STARTED: 6/23/08	11. DATE COMPLETED: 6/23/08
12. OVERBURDEN THICKNESS: 12	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	3	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	No	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Concrete					
		Gravel + sand fill					
	1	CLAY w/ silt, brown 4/3 10YR, damp, soft, trace plastic	0	3.6 / 3.7	SB01 1-2		
	2		0				
	3		0				
	4		0				1536
	5	SILT, Brown 3/3 10YR, damp soft, trace plastic, trace sand	0	3.7 / 4			

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET OF
48544		FTR1-043 DP18	2 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	SAME As Above	0				
	7	SAND, brown 5/3 10YR. damp, medium, fine grained	0		SB02 7-8		
	8		0				1542
	9		0	3.4/4	SB03 8-9		
	10		0				
	11	SAND, light brownish gray 6/2 10YR, moist, dence fine-medium grained	0				
	12		0				1553
		Bottom of Hole					

HTW DRILLING LOG

HOLE NO. FTRI-043 DP19

1. COMPANY NAME: Burns + McDonnell	2. DRILLING SUBCONTRACTOR: EPS
3. PROJECT: 48544 ESI Addendum	4. LOCATION: Fort Riley
NAME OF DRILLER: Blaze martin	6. MANUFACTURER'S DESIGNATION OF DRILL: Geoprobe 5400
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 4' macrocore	8. HOLE LOCATION: NA
	9. SURFACE ELEVATION: NA
	10. DATE STARTED: 6/23/08 — 11. DATE COMPLETED: 6/23/08
12. OVERBURDEN THICKNESS: 12	15. DEPTH GROUNDWATER ENCOUNTERED: NA
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 12	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	NA	NA	NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	3	—	—	—	—	

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
	Bentonite	NO	NA	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Topsoil, grass & roots w/silt					
	1	CLAY, brown 4/3 10YR, soft damp, non plastic	0	3.7/4	SB01 1-2		
	2		0				
	3		0				
	4		0				1428
	5	SILT, brown 5/3 10YR, soft, damp, non plastic, trace sand	0	3.8/4			

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.	SHEET
48544		FTRI-043 DP19	2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		SAME As Above					
	6	SAND brown 5/3 10YR, damp, medium, fine grained	0				
					SB02 6-7		
	7		0				
	8		0				1433
				3.2/4			
	9		0				
	10		0				
		SAND, light brownish gray 6/2 10YR, dence, moist, fine grained			SB03 10-11		
	11		0				
	12		0				1448
		Bottom of Hole					

PROJECT	HOLE NO.
48544	FTRI-043 DP19

051601
Form MRK-55-2

Subject: Draft ESI Addendum Reports
Expanded Site Investigation
Fort Riley, Kansas

Date: October 28, 2008
Reviewer: T. R. Shepherd, CENWK-EC-EF

No.	Page	Section	Comment:	Response:
Comments				
1.	General		Duplicate samples are a Quality Control tool that should not appear in a report. The standard practice is to report the higher of the two values as representative of the sampling location. Redraft the data tables with one result for the duplicate samples. Note that a duplicate result is used in the text on page 6-2. This should be changed as above.	**Concur.** Tables and text will be modified to reflect the higher of the two values.
2.	3-4	3.2	When data from the QA laboratory and the primary lab are inconsistent assume the higher of the two results is correct unless the data was rejected. Redraft the text to indicate that TVPH was above the KPSRL in the second boring.	**Concur.**
3.	6-2	6.3	The correct figure for DP05 – DP08 is 6.2.	**Noted.** Yes, Figure 6.2 is referenced on Line 26 of Page 6-2. This figure presents the soil detections for DP05 – DP08. No changes will be made to the text.

End of Comment and Responses

Subject: Draft ESI Addendum Reports
Expanded Site Investigation
Fort Riley, Kansas

Date: October 6, 2008
Reviewer: Dick Shields, Fort Riley IRP

No.	Page	Section	Comment:	Response:
ESI				
1.	1-4	Line 30	I know that it is considered correct, but I would prefer method vs methodology.	**Concur.**
2.	3-1	Line 22	The Kansas River alluvial aquifer is not used by Fort Riley. The well at MAAF is a non-potable supply for fire fighting.	**Noted.** The last line of this paragraph will be removed from the text.
3.	3-2	Line 18	I would prefer.....The well located at MAAF is a non-potable source for fire fighting. I got this information from the Water Program Manager.	**Concur.**
4.	5-1	Line 21	Please insert non-potable between back-up and supply.	**Concur.**
1693				
1.	2-1	Lines 25 & 26	I would suggest inserting a hyphen between five ft & four inch.	**Concur.**
2.	2-3	Line 19	GS/DS should be DS/GS.	**Concur.**
3.		Figure 2-4	I would ask that the word arsenic be in bold in the text note or included in the title block.	**Concur.**
4.		General	With regard to the closure recommendation, which I think is well stated and appropriate, I wondered if we should have some sort of caveat that upon demolition of the building the contents of the 2 infiltration pits be removed & tested prior to disposal. Perhaps we should insert an institutional control in the Real Property Master Plan to address this point if it is considered necessary.	**Comment Withdrawn.**

End of Comment and Responses

Subject: Draft ESI Addendum Report
Expanded Site Investigation
Fort Riley, Kansas

Date: October 22, 2008
Reviewer: Travis Daneke, KDHE

No.	Page	Section	Comment:	Response:
Specific Comments				
1.	2-1	2.2	The last sentence of the first paragraph states that Fort Riley conducted removal action on stained soils that were tested to be non-PCB contaminated. Please provide the contaminant(s) of concern, as well as concentrations, that triggered the removal action of the stained soil. Further more, the first paragraph uses *oil stains*, whereas the second paragraph addresses it as *stained soils*. Please correct this discrepancy.	**Noted.** The contaminants of concern were PCBs. However, as the text states in Line 26, the soils tested were not contaminated with PCBs. Therefore, there is no reason to present concentrations for non-detect data. **Concur.** The term *stained soil* will be used in the text rather than *oil stains*.
2.	2-2	2.3	The last sentence of the second paragraph is repeated in the first sentence of the third paragraph. Please remove the repeated sentence.	**Concur.** The first sentence of the third paragraph of Section 2.3 will be deleted from the text.
3.	2-2	2.4	Line 26 on this page states that several drill holes were advanced into the concrete floor. Please provide the number of drill holes as well as the configuration.	**Noted.** These holes were drilled into the concrete using a hand drill and a masonry bit. The objective was to generate a sufficient volume of sample (concrete dust) for the analytical lab (however, it would be treated as a single concrete sample). A record was not kept of the number of holes drilled or the configuration of the holes.
4.	3-6	3.5	The last sentence on this page states that there are no CERCLA contaminants present at this site. Due to the lack of water in Monitoring Well 892-99-02, and subsequent lack of groundwater sample, the contents of this well are unknown. Please reword the last sentence to state that there are no known CERCLA contaminants present at this site.	**Concur.** 1,2-DCA was detected in the groundwater sample collected from MW 892-99-02 during the 1999 field investigation (Page 3-4, Lines 4-10). The last line of the 3rd bullet on Page 3-6 will be deleted from the text.
5.	6-1	6.1	The last sentence of the first paragraph of this section states that the Kansas River is formed over one mile below the Site. Please replace *below* with *south of* for accuracy.	**Concur.** However, the confluence of the Republican and Smoky Hill Rivers is actually about one mile ***east*** of the site. The text will be modified to read, "....a little over one mile downgradient (east) of the Site (LBA, 1993)."

Date: October 22, 2008
Reviewer: Travis Daneke, KDHE

No.	Page	Section	Comment:	Response:
6.	6-3	6.4	Direct-push borings D-17, D-18, and D-19 were installed to the west of DP-5 and DP-7, which is up gradient. Please provide the rationale for sampling up gradient from the area of concern.	**Noted.** KDHE (Leo Henning) requested that sampling be conducted to the west of the site in order to confirm that a 'clean line' existed. This request was made during the Aug 16, 2007 comment response meeting with KDHE and USEPA.

End of Comment and Responses

Burns & McDonnell
SINCE 1898

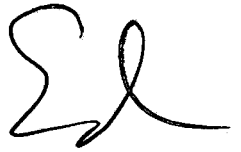
www.burnsmcd.com

12/15/08

Dick,

This is a copy of the original transmittal letter. I should have the rest of this to you by Friday, if not sooner.

Call me with questions.



CLIENTS
SOLUTIONS
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ONE TEAM

Environmental Solutions — Making Our Clients Successful

Burns & McDonnell
SINCE 1898

December 10, 2008

Directorate of Public Works
Environmental Division
ATTN: IMNW-RLY-PWE (Shields)
407 Pershing Court
Fort Riley, KS 66442

Draft Final ESI Reports
Expanded Site Investigation (Multiple Sites)
Fort Riley, Kansas
BMcD Project No. 48544
Contract No. W912DQ-06-D-0006

Dr. Shields:

Please find enclosed three copies each of the following draft final reports for the above referenced site:

- ESI Addendum Report
- Building 1693 Report

Also included are three CDs with PDF copies of these reports, copies of comment responses, and a copy of the distribution list for these documents.

If you have any questions, please call me at (816) 822-3595.

Sincerely,

E. D. Lindgren
Project Manager

EDL/shields.doc

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