

Remedial Investigation / Feasibility Study Work Plan – Final Revision 2.0

Hardesty Federal Complex
607 Hardesty Avenue
Kansas City, Jackson County, Missouri

March 13, 2013
Terracon Project No. 02107147

Prepared for:

General Services Administration
Kansas City, Missouri

Prepared by:

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TABLE OF CONTENTS

1.0	INTRODUCTION AND BACKGROUND	1
1.1	Objectives	2
1.2	Document Organization	2
2.0	PHYSICAL SETTING	3
2.1	Site Location and Description	3
2.2	Geology	3
2.2.1	Regional Geology	3
2.2.2	Site Geology & Soils	4
2.3	Hydrogeology Setting	4
2.3.1	Regional Hydrogeology.....	4
2.3.2	Site Hydrogeology.....	5
2.4	Climatology	6
2.5	Water Supply and Usage	6
2.5.1	On-Site	6
2.5.2	Off-Site	7
3.0	SITE HISTORY BACKGROUND.....	7
3.1	Site Ownership	7
3.2	Deed Restrictions	8
3.3	Site Operational History	9
3.4	Previous Environmental Investigations.....	9
3.4.1	Defense Environmental Restoration Program Inventory Project Report, 1987.	10
3.4.2	Phase I ESA, August 1999.	10
3.4.3	Phase II Environmental Audit, November 1999.....	11
3.4.4	Former Building 4 UST Closure Assessment Report, June 2000	12
3.4.5	Former USTs Site Characterization Report, June 2001.	13
3.4.6	Ground Penetrating Radar (GPR) Survey, November 2001.	14
3.4.7	Heating Oil USTs Site Characterization Report, November 2001.....	14
3.4.8	Former USTs Site Characterization Report Addendum, November 2001..	14
3.4.9	Preliminary Assessment, November 2002.....	16
3.4.10	Site Inspection, November 2002.....	21
3.4.11	Environmental Site Investigation (ESA), November 2003.	23
3.4.12	On-Site Groundwater Investigation Report, August 2003.	23
3.4.13	Off-Site Groundwater Investigation Report, September 2003.	24
3.4.14	Off-Site Groundwater Investigation Report, July 2004.	24
3.4.15	Limited Soils Investigation Report, July 2007.	25
3.4.16	Environmental Assessment and Low Level PCB Remediation Report, July 2007.	26
3.4.17	Site Summary, November 2008.....	26
3.4.18	Off-Site Well Installation and Groundwater Sampling, Jan. 2011.....	27
3.4.19	March 2011 Groundwater Sampling, June 2011	28
3.4.20	July 2011 Groundwater Sampling, September 2011	29
3.4.21	Revised Cleanup of Firing Range Report, May 2012	29
3.4.22	Regulated Tanks Site Characterization Report, May 2012	30

TABLE OF CONTENTS (cont.)

4.0	INITIAL EVALUATION	31
4.1	Preliminary Site Conceptual Model.....	31
4.2	Current Facility Layout	32
4.3	Identified Areas of Potential Concerns.....	34
4.3.1	Items Site Wide or in Multiple Locations.....	34
4.3.2	Items around Building 3 and Building 3A.....	36
4.3.3	Items around Building 4	39
4.3.4	Items around Building 5	40
4.3.5	Items around Building 6	40
4.3.6	Items around Building 9	43
4.3.7	Items around Building 11	44
4.3.8	Items around Building 13	46
4.3.9	Items around Building 19	46
4.3.10	Items around Building 20	46
5.0	RI/FS WORK PLAN APPROACH	48
5.1	Objectives of the RI/FS Data Collection	48
5.2	Data Quality Objectives	50
6.0	REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA COLLECTION TASKS	53
7.0	SITE CHARACTERIZATION AND OTHER REMEDIAL INVESTIGATION PRODUCTS ...	53
8.0	HUMAN HEALTH RISK ASSESSMENT	54
8.1	Introduction	54
8.2	Human Health Risk Assessment Methodology.....	54
8.2.1	Data Collection and Evaluation.....	55
8.2.2	Exposure Assessment	57
8.2.2.1	Receptors and Pathways to be Evaluated.....	57
8.2.2.2	Exposure Point Concentrations	58
8.2.2.3	Estimating Chemical Intake	59
8.2.2.3.1	Ingestion	59
8.2.2.3.2	Inhalation	59
8.2.2.3.3	Dermal Absorption	62
8.2.3	Toxicity Assessment	63
8.2.4	Risk Characterization.....	65
8.2.5	Uncertainty Analysis	66
8.2.6	Preliminary Remediation Goals	66
9.0	REMEDIAL INVESTIGATION PRODUCTS	67
9.1	Treatability Studies	67
9.2	Remedial Investigation Report	67
10.0	FEASIBILITY STUDY	68
10.1	Development and Screening of Alternatives.....	68
10.2	Detailed Analysis of Alternatives.....	68
10.3	RI/FS Report	69
11.0	PROJECT ORGANIZATION	69
11.1	Project Personnel and Coordination	69
11.2	Project Schedule	71
12.0	REFERENCES	71

TABLE OF CONTENTS (cont.)

EXHIBITS

Exhibit 1	Site Location and Topographic Map
Exhibit 2	Facility Complex

TABLES

Table 1	Preliminary Site Conceptual Model
Table 2	Identified Potential Concerns
Table 3	Summary of Human Exposure Assumptions
Table 4	Project Personnel

APPENDIX A – PREVIOUS INVESTIGATION SUPPORTING DOCUMENTATION

A.1 –	1999 Phase II (Terracon)
A.2 –	CAPE Investigations
A.3 –	Miscellaneous historical maps and data from Preliminary Assessment (Terracon)
A.4 –	Miscellaneous historical maps and data from Site Investigation (Terracon)
A.5 –	August 2003 On-site Groundwater Investigation Report (Terracon)
A.6 –	September 2003 Off-site Groundwater Investigation Report (Terracon)
A.7 –	July 2004 Off-site Groundwater Report Investigation Report (Burns & McDonnell)
A.8 –	Limited Soils Investigation (SCS Engineers)
A.9 –	2010 Groundwater Sampling Report (Terracon)
A.10 –	March 2011 Groundwater Sampling Report (Terracon)
A.11 –	July 2011 Groundwater Sampling Report (Terracon)
A.12 –	Cleanup of Firing Range (Terracon)

APPENDIX B – Supporting Documentation

Quitclaim Deed
Additional Historical Aerial Photographs
Historical Topographic Maps
MEGA Information

The following documents will be provided under separate cover to the RI/FS Work Plan.

Sampling and Analysis Plan

Quality Assurance Project Plan

Health and Safety Plan

Community Relations Plan

DESCRIPTION OF ACRONYMS AND MEASUREMENTS

ACM	Asbestos-Containing Material
AST	Aboveground Storage Tank
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
COCs	Contaminants of Concern
COPC	Chemicals of Potential Concern
CRP	Community Relations Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
CWA	Clean Water Act
DCE	Dichloroethene
DCA	Dichloroethane
DRO	Diesel Range Organics
DOD	Department of Defense
DOT	Department of Transportation
DQO	Data Quality Objective
EC	Exposure Concentration
EPCs	Exposure Point Concentrations
ERA	Expedited Response Action
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
F	Fahrenheit
FS	Feasibility Study
FSP	Field Sampling Plan
GIS	Geographical Information System
GPR	Ground Penetrating Radar
GRO	Gasoline Range Organics
GSA	General Services Administration
HHRA	Human Health Risk Assessment
kg	kilogram
HSP	Health and Safety Plan
L	Liter
LBP	Lead-Based Paint
LUST	Leaking Underground Storage Tank
m	meters
MCL	Maximum Contaminant Level
MDNR	Missouri Department of Natural Resources
mg	Milligrams
NELAP	National Environmental Laboratory Accreditation Program
ORO	Oil Range Organics
OSHA	Occupational Health and Safety Administration
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PCA	Tetrachloroethene
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
ppm	Parts per Million
PRG	Preliminary Remediation Goal

PRP	Potentially Responsible Party
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAGs	Risk Assessment Guidance for Superfund
RfD	Reference Dose
RI/FS	Remedial Investigation / Feasibility Study
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RSLs	Regional Screening Levels
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SOP	Standard Operating Procedure
SVOC	Semi-volatile Organic Compound
TCA	Trichloroethane
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
US EPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WP	Work Plan

REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN
FINAL REVISION 2.0
HARDESTY FEDERAL COMPLEX
607 HARDESTY AVENUE
KANSAS CITY, JACKSON COUNTY, MISSOURI

March 13, 2013
Terracon Project No. 02107147

1.0 INTRODUCTION AND BACKGROUND

Hardesty Federal Complex (Site) is a former commercial/industrial property located east of downtown Kansas City, Missouri. The Site, formerly the Kansas City Quartermaster Depot, is currently owned by Hardesty Renaissance Economic Development Corporation. The General Services Administration (GSA) previously owned the property and is responsible for addressing environmental related problems resulting from the past operations. The GSA has retained Terracon Consultants, Inc. (Terracon) to address the impact associated with past operations at this Site. Previous investigations associated with this site have revealed soil and groundwater impact associated with the unregulated underground storage tanks (USTs) and an area of trichloroethylene (TCE) impact from past operations. During the recent sale of the property, the Hardesty Renaissance Economic Development Corporation was made aware that there are known environmental impacts at the Site. Some of these known issues as well as land use restrictions due to these issues have been documented in the property deed.

The Missouri Department of Natural Resources (MDNR) Federal Facilities Section is the lead technical agency for this Site. The Site has transferred between the MDNR Federal Facilities and MDNR Brownfield Voluntary Cleanup Program (B/VCP), including the most recent change back to MDNR Federal Facilities Section in 2011. The MDNR Storage Tank Section is responsible for the regulated underground storage tanks (USTs); the regulated USTs will be addressed through the Missouri Risk Based Corrective Action (MRBCA) process with oversight and direction from the Tanks Section.

Terracon has prepared this Remedial Investigation/Feasibility Study (RI/FS) Work Plan (WP) in response to MDNRs request to characterize the nature and extent of risks associated with the Site. This RI/FS WP has been prepared consistent with the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final* (USEPA, 1988).

This RI/FS WP includes the five main elements (introduction, site background and physical setting, initial evaluation, work plan rationale, and RI/FS tasks). The sampling analysis plan (SAP), quality assurance project plan (QAPP), health and safety plan (HSP), and community relations plan (CRP) will be prepared as separate documents. The RI/FS WP documents the

decisions and evaluation made during the scoping process and presents anticipated future tasks.

1.1 Objectives

The following is an overview of the RI/FS objectives for the Hardesty Federal Complex Site:

- Complete investigations to characterize the site, determine the nature and extent and fate and transport of identified contamination, and develop a baseline human health risk assessment for receptor pathways. If needed, determine and evaluate alternatives for remedial action (if any) to prevent, mitigate or otherwise respond to or remedy any release or threatened release of hazardous substances, pollutants, or contaminants at or from the site.
- Complete detailed analysis for selection of an appropriate remedy in the Proposed Plan (PP).

Objectives associated with the individual RI/FS tasks are discussed in the appropriate Sections within this WP.

1.2 Document Organization

This WP outlines the tasks to be conducted during the RI/FS process. This WP will be used as a planning document and outlines the preliminary descriptions of the tasks that are needed to complete the RI/FS. As the RI/FS process progresses and a better understanding of the site is gained, these task descriptions will be refined.

The following additional documents will be used to support the RI process:

- Sampling and Analysis Plan (SAP);
- Quality Assurance Project Plan (QAPP);
- Health and Safety Plan (HSP); and
- Community Relations Plan (CRP).

The SAP states the project specific field sampling requirements, sample collection methodology and analytical laboratory methods and procedures required to collect necessary data to meet data quality objectives for site characterization.

The QAPP describes the policy, organization, functional activities, and quality assurance and quality control protocols necessary to achieve Data Quality Objectives (DQO's) dictated by the intended use of the data.

The HSP supports the field effort and address site specific health and safety issues. This plan includes maps and a detailed site description, results of previous sampling activities, and applicable field reports.

The CRP documents the community relations history and the issues of community concern.

2.0 PHYSICAL SETTING

2.1 Site Location and Description

The Site is east of downtown Kansas City, Missouri. The Hardesty Federal Complex is located just southeast of the southeast corner of E. Independence Avenue and Hardesty Avenue and continues southeast to railroad tracks. The Kansas City, Missouri website parcel information lists the Hardesty Federal Complex with an address of 607 Hardesty Avenue. Exhibit 1 provides a topographic map illustrating the general location and Exhibit 2 provides a diagram illustrating Hardesty Federal Complex. Appendix B provides a copy of the historical topographic maps.

The subject site occupies approximately 18 acres of primarily commercial and light industrial land. The site is currently developed with multiple buildings. The surrounding area generally consists of mixed commercial, light industrial, and residential land use.

As noted in Exhibit 2, the following seven buildings are currently located on the Hardesty Federal Complex: Buildings 3 (including Building 3A), 6, 7, 9, 10, 11, and 13 (each of the buildings were numbered by the GSA). These buildings are currently unoccupied.

The perimeter of the property is fenced by a seven-foot chain-link fence with a locked entrance gate across the access driveway to the facility from Hardesty Avenue. A secondary entrance to the site from Independence Avenue is also gated and locked. Virtually all of the site is covered with buildings or paved areas, with the exception of a small landscaped/grass-covered area between Buildings 6 and 9.

2.2 Geology

2.2.1 Regional Geology

Jackson County is located near the middle of an approximate 150-mile wide, north-south trending band of Pennsylvanian Age rocks that is located in western Missouri and eastern Kansas (State of Missouri, Division of Geological Survey and Water Resources, November 1965). Generally, the rock beds exhibit a subtle prevailing dip to the west-northwest. A prominent section of Pennsylvanian rock strata is well-exposed in Kansas City, Missouri, in the bluffs along the Missouri River. The region is underlain by rock units of the Pennsylvanian System and the Missourian Series (Kansas City Group and Pleasanton Group) in the Time

Stratigraphic Unit age classification (MDNR, Missouri Geological Survey, 1979). Alternating layers of shales and limestone, with an occasional sandstone layer, are common in the Kansas City Group. Alternating layers of shale and sandstone, with an occasional coal seam and limestone layer, are present in the Pleasanton Group.

The 1894 topographic map indicates a tributary was present on the southeast side of the railroad tracks that adjoin the site to the southeast. This tributary was no longer present on the 1940 map; however, a depression is identified in this area. Copies of the historical topographic maps are provided in Appendix B.

2.2.2 Site Geology & Soils

During past investigations on the Site, Terracon has encountered clays with silts followed by silts that extend to varying depths up to 55 feet bgs. Sand has been encountered at depths of 50 to 60 feet below ground surface (bgs). Rubble fill and debris has been encountered in several soil borings advanced as part of the previous investigation activities.

The soil at the Site is classified as the Urban Land, upland with 5 to 9 percent slopes (Natural Resources Conservation Service, September 1984). Generally, more than 85% of the surface is covered by asphalt, concrete, buildings or other impervious material. Examples include the following: parking lots, shopping and business centers, railroad yards, and industrial areas. The largest portion of this unit is the Kansas City central business district. These areas are on upland landscapes, the majority of which have undergone cut and fill excavating to reshape the landforms. According to the soil survey, identification of the soil types is not practical because of the lack of accessibility and the extreme variability of the soils; however, past investigations have encountered clays and silts with the on-site soils.

The exact depth to bedrock on the site is suspected to be variable and is not known at this time. During a previous on-site investigation, one soil boring at monitoring well CMW-1 was advanced to a depth of 90 feet in an attempt to hit bedrock; however, bedrock was not encountered in this location (monitoring well CMW-1 is located directly north of Building 6, along the north property boundary). Bedrock in the area to the northeast is generally encountered at depths ranging from 23 to 68 feet below ground surface (bgs) (monitoring wells located approximately 0.20 miles to 0.50 miles northeast of the Site), as encountered during Terracon's off-site monitoring well installations.

2.3 Hydrogeology Setting

2.3.1 Regional Hydrogeology

Jackson County is located in the Saline Groundwater Province. In the upland areas above the alluvial valleys of the Missouri River, the Blue River, and the Little Blue River, the

unconsolidated sediment is typically deficient of groundwater. Additionally, some unconfined aquifers are present at the interface of glacial outwash and underlying shales; however the quality and quantity of the aquifer is not adequate for drinking water purposes. Almost 1/3 of the State of Missouri is underlain by bedrock aquifers that contain saline water. Saline water is groundwater that contains 1,000 parts per million (ppm) or more of dissolved solids. Total dissolved solids in this region can exceed 20,000 ppm. The county is underlain by bedrock aquifers at depths of 250 to 400 feet that contain saline water which coincide with the presence of Pennsylvanian rocks. Total thickness of the aquifer ranges from 1,200 to more than 4,000 feet. Because Jackson County is located in the Saline Groundwater Province, the main domestic water supply is from the alluvium of the Missouri River. Some of the localities obtain groundwater from other lesser rivers that flow into the Missouri River or from surface impoundments within the localized watershed. Wells completed in the Missouri River alluvium can produce water discharge rates in excess of 1,000 gallons per minute. Discharge rates of 1,000 gallons per minute typically result in drawdowns of 20 feet or more. Although many smaller towns use water from the alluvium and glacial deposits, cities of 1,000 or more typically depend on surface water from rivers or impoundments. The water reserves of the Missouri River have proven to be in larger supply than demand, as the municipalities located near the river in the region have not had to explore for other water sources.

The topography in area of the Site is characterized by deposits of loess with moderate slopes. Within a half mile area to the west, northwest, and north of the site, the topography moderately slopes to the southeast. Directly south and east of the site is a moderately flat drainage way. The drainage way slopes slightly to Blue River, approximately 0.85 miles northeast of the Site. The area around the site is considered urban land with high surface water runoff. Exhibit 1 provides topographic map illustrating the Site and surrounding areas.

2.3.2 Site Hydrogeology

Various on-site groundwater investigations have been conducted over the years with twenty-six on-site and off-site monitoring wells associated with this facility. During 2011, shallow or perched groundwater was encountered on-site at various depths generally ranging from 11 to 21 feet bgs; the general flow for both shallow and deep groundwater was generally in an easterly direction. The deep groundwater generally had similar characteristics (depths and flow direction) to the shallow groundwater. The 2011 shallow and deep groundwater flow diagrams with the on-site and off-site monitoring wells are included in the supporting documentation provided as Appendix A (A.9, A.10, and A.11).

The 1996 United States Geological Society (USGS) Kansas City, Missouri-Kansas Quadrangle map indicates the site gently slopes to the southeast and has two on-site depressions. One depression is located on the northeast portion of the site and the other is on the south-central portion of the site. During site development, it is believed that fill material was placed on the eastern portion of the site to raise this area to a similar elevation as the western portion of the site; however, no specific information related to on-site grading operations or fill placement has

been found in the previous reports or investigations but it is assumed there have been fill placement on different portions of the site. The area along the eastern half of the north property boundary slopes steeply towards Independence Avenue and the area along the southeastern property boundary slopes steeply towards the railroad track. Topographic surveys completed by Lovelace & Associates in 2010 and 2012 indicates the ground surface around the on-site monitoring wells vary from 784 feet (at monitoring well CMW-3 far east on-site well) to 790 feet (at monitoring well MW-9 far west on-site well). The site consists of mostly impermeable surfaces with most surface runoff entering the storm water system.

2.4 Climatology

Jackson County is characterized by a mild, temperate climate. Summers are warm and humid, with daily average temperatures reaching 78° Fahrenheit (F) or higher. The winter months are generally mild with daily average temperatures of 32° F. Mean annual precipitation is 38 inches. (Terracon, November 2002, *Preliminary Assessment Report*)

2.5 Water Supply and Usage

2.5.1 On-Site

A water well survey was conducted to locate water wells on the site. The Missouri Environmental Geology Atlas (MEGA) Geographic Information System (GIS) database 2007, published by the MDNR's Geological Survey and Resource Assessment division (GSRAD) was reviewed to identify if there are any registered water wells associated with the site. According to the MEGA database, there are 10 monitoring wells (identified as MW-1 thru MW-10) on the site. During past investigations conducted in 2003 and 2012, 10 additional monitoring wells installed to evaluate the on-site groundwater in the vicinity and east of Building 6 (shallow and deep cluster monitoring wells identified as CMW-1 thru CMW-5) and six additional monitoring wells installed around the regulated UST area (identified as MW-11 thru MW-16).

No additional on-site wells (present or past) have been identified through site reconnaissances, review of available past reports, or the MEGA database.

The site's Quitclaim Deed finalized in September 13, 2011 indicated there are several land use restrictions on the site. These restrictions include "groundwater use restrictions". The groundwater use restrictions states the following:

"Grantee covenants and agrees for itself, its successors and assigns, and every successor-in-interest to the Property, or part thereof, that it shall not construct or permit to be constructed any well, and shall not extract, utilize, consume or permit to be extracted, any water from the aquifer below the surfaces of the ground within the boundary of the Property for the purpose of human consumption, or other use, unless such groundwater has been tested and found to meet applicable standards for human consumption, or such other use, and such owner or occupant shall first have obtained written approval of GSA and the appropriate agencies of the State of Missouri. The costs associated with obtaining use of such water, included but not

limited to, the costs of permits, studies, analysis, or remediation, shall be the sole responsibility of the Grantee, its successors and assigns, or any successor-in-interest to the Property, without cost whatsoever to the Grantor."

The Hardesty Federal Complex is connected with the City of Kansas City, Missouri Water Services Department; however, at this time, the site currently is unoccupied and not utilizing water.

A copy of the properties Quitclaim Deed is provided in Appendix B.

2.5.2 Off-Site

A water well survey was conducted to locate public and private water supply wells within a one-mile radius of the site. The MEGA database was reviewed to identify wells located within the above-specified search radius.

The MEGA data did not identify industrial, or agricultural use wells located within a one-mile radius from the site. One domestic well located approximately 3,600 feet northeast of the site and multiple monitoring wells, abandoned wells, and wells (identified as exploratory or boreholes) were identified within the one-mile search radius. No public wells were identified. The information obtained from MEGA (is included in Appendix B.

The City of Kansas City, Missouri Water Services Department provides water to the area surrounding the Site. According to the Water Services Water Quality 2010 Report, Kansas City obtains its water from the Missouri River (City of Kansas City, Missouri Water Services, 2010).

There are no known activity use limitations (AULs) associated with groundwater use in the area, however, the property deed restricts the use of groundwater on the site.

3.0 SITE HISTORY BACKGROUND

3.1 Site Ownership

The Kansas City Quartermaster Depot was located at the site from 1940 to 1953. In 1960, the site transferred ownership from the Department of Defense to the GSA (2001, *PA Report* [Reference 45]). GSA owned the site from 1960 until September 2011, at which time the property was transferred to Hardesty Renaissance Economic Development Corporation, a Missouri non-profit corporation through a Quitclaim Deed. Section 3.3 provides a summary of the site occupants and history. A copy of the Quitclaim Deed for the Site is provided in Appendix B.

3.2 Deed Restrictions

The property Quitclaim Deed finalized September 13, 2011 documented several land use restrictions associated with the site. The restrictions are:

- groundwater use restrictions;
- non-residential use restrictions; and
- ground disturbance restriction.

The groundwater use section of the deed states the following:

"it shall not construct or permit to be constructed any well, and shall not extract, utilize, consume or permit to be extracted, any water from the aquifer below the surfaces of the ground within the boundary of the Property for the purpose of human consumption, or other use, unless such groundwater has been tested and found to meet applicable standards for human consumption, or such other use, and such owner or occupant shall first have obtained written approval of GSA and the appropriate agencies of the State of Missouri."

The non-residential use restriction section of the deed states the following:

"Property shall be limited to nonresidential industrial uses except for any office or similar use incidental to industrial use if such incidental use is permitted by applicable regulatory authorities without further environmental remediation beyond that required for industrial use. Prohibited residential uses include, but are not limited to, any child care, pre-school, playground, and any form of housing."

The ground disturbance restriction section of the deed states the following:

"Property shall be limited by restricting the ability to disturb contaminated soil or conduct excavation activities involving such contaminated soil, without obtaining the prior approval of MDNR."

Several clauses were noted within the Quitclaim deed as an institutional control established to protect human health and the environment associated with the indoor air exposure pathway evaluation for Buildings 6 and 9. This includes that if there is use involving the indoor occupancy, an indoor air exposure pathway evaluation for Building 6 and 9 must be completed. The Grantee (current owner) is required to obtain written permission from the regulatory authorities for uses.

The current owner was informed that the Property structures (Hardesty Federal Complex) may contain asbestos containing materials (ACM) and lead-based paint in the Quitclaim deed. Additionally, the Grantee was notified that the Property may contain the presence of pesticides that have been applied in the management of the property and that subsurface structures are susceptible to flooding.

A copy of the Quitclaim Deed for the Site is provided in Appendix B.

3.3 Site Operational History

Based on information obtained from historic Sanborn fire insurance maps, the western portion of the site was previously a cultivated field in 1909. By 1920, Buildings 1, 2, and 3 were constructed on the northwest corner of the site. Buildings 1 and 2 are now part of the northwestern-adjointing property, which is the current-day self-storage facility. Building 3 was identified as an independent electric power facility supporting Buildings 1 and 2.

In 1940, the federal government purchased the site, which included Buildings 1, 2, and 3. The site was used as the Kansas City Quartermaster Depot during World War II. The Quartermaster Depot officially opened on December 4, 1940. The function of the Quartermaster Depot was to purchase, store, and issue Quartermaster supplies for posts, camps, and stations in Kansas, Missouri, Arkansas, Nebraska, Oklahoma, Wyoming, South Dakota, and Utah. Part of the mission of the Quartermaster Depot was to receive and store protective and impermeable clothing, laundry and dry-cleaning supplies, inks, lithographic chemicals, petroleum products, petroleum handling equipment; reclaim petroleum containers; impregnate clothing to ward off effects of gas attacks; and procure graphic arts operating supplies and chemicals.

Between 1940 and 1943, 15 additional buildings, for a total of 18 structures, were constructed at the site. Two other buildings were constructed at the site after 1943. The site structures were identified as Buildings 1 through 20. The site was transferred to the GSA on October 1, 1960. Buildings 1 and 2 were sold to Megaspace, Ltd. in 1980, and are no longer considered part of the Hardesty Federal Complex or the Site. Buildings 4, 5, 8, 12, 14, 15, 16, 17, 18, 19, and 20 were demolished in the 1970's and 1980's. Various government agencies have used the site buildings for storage from 1960 until the early 2000's. Agencies utilizing buildings at the Site have included the Army Mapping Department, National Weather Service, Federal Aviation Administration (FAA), U.S. Marines, Department of Energy (DOE), Federal Emergency Management Agency (FEMA), U.S. Army Corps of Engineers (USACE), and the U.S. Postal Service.

A copy of historical aerial photographs showing the site from 1940 to 2009 provided by Historical Information Gatherers, Inc. (HIG) is provided in Appendix B. Exhibit 2 is a diagram illustrating the location of the current and former building locations. Additional historical aerial photographs and historical Sanborn maps are provided in Appendix A.3.

3.4 Previous Environmental Investigations

Since 1997, several investigations have been conducted to evaluate environmental conditions associated with the Site. These investigations have included but are not limited to the following: Phase I Environmental Site Assessments (ESAs), a Preliminary Assessment (PA), a Site Inspection (SI), Underground Storage Tank (UST) removals, and on-site/off-site soil and groundwater investigations. Additionally, several remedial alternative evaluations have been

completed; these evaluations along with additional remedial alternatives will be evaluated and reviewed during the FS phase.

Summaries of the previous environmental reports are provided in Sections 3.4.1 thru 3.4.21. Each of the Sections provides a summary or statements from the previous reports. In some instances, follow-up investigations (later discussed in their appropriate Sections) revealed additional information that may have changed some of the findings and conclusions with the initial reports. The Subsections in Section 4.3 discuss in detail the items of concern identified in the past reports; some additional information is provided in their appropriate Sections.

3.4.1 Defense Environmental Restoration Program Inventory Project Report, 1987.

On June 11, 1987, representatives of the Kansas City District performed a site visit and visual field inventory of the Kansas City Records Center (i.e. Hardesty Federal Complex) and prepared the Defense Environmental Restoration Program (DERP) Inventory Project Report (DERP, 1987). The site survey summary sheet indicated the site was recommended for inspection because of the vacant buildings and associated debris problem. Upon further site survey, debris was not found to be of major concern. However, it was noted that asbestos had been used throughout for insulating purposes.

3.4.2 Phase I ESA, August 1999.

In August 1999, Terracon completed a *Phase I ESA Report* on the Hardesty Federal Center. Several recognized environmental conditions (RECs) and potential concerns for the subject site were identified. This Phase I ESA was performed in general compliance with ASTM E 1527-97. The following RECs or potential concerns were identified with the site:

- Potentially hazardous materials in the on-site buildings. Materials observed included a wide range of items that would typically be found at a large commercial facility, (i.e. paints, hydraulic oils, cleaning products, compressed gases, foam packing materials, lubricants, and many other materials).
- Former or present underground storage tanks on the site. This included USTs in the following areas: around Buildings 3 and 3A (includes the area north of former Building 15), east of Building 7, area of former Building 4, and east of former Building 20. Additionally, the report noted tanks south of Building 6.
- Resource Conservation and Recovery Act (RCRA) Large Quantity Generator (LQG) listing of the site. This was associated with the Federal Aviation Administration Staging.
- USTs on adjoining property. The referenced USTs were reported at the Amoco facility located north of the site, directly across Independence Avenue. The report noted that these USTs may be considered an area of potential environmental concern due to their proximity to the subject site, however, there was no evidence to indicate that this facility adversely impacted the site.

- Off-site Leaking Underground Storage Tank (LUST). The Walgreens property, northwest of the site and across Independence Avenue is listed as a LUST facility. Reportedly, several USTs were removed from this property. This property reportedly may be considered an area of potential environmental concern due to their proximity to the subject site, however, there was no evidence to indicate that this facility adversely impacted the site.
- Surface Staining and Odors. Oil staining was observed on the ground surface surrounding a former oil pump in the basement of Building 3 and a slight odor of film developing chemicals and staining was observed in the basin in the film processing room on the first floor of Building 11. It should be noted that the “ground surface” was used as a general term and not specific to the type of material. Generally, the building floor surfaces are concrete.
- Smokestack Ash. Ash was observed in the ash clean-out room under the smokestack in the basement of Building 3. Reportedly, the boilers in Building 3 were previously operated with coal and fuel oil.
- Previous Use. Building 6 was used as a clothing impregnation plant. Two former storage tanks, a former recovery tank, a former cooling tower, and two former pump houses were located in the grassy area between Buildings 6 and 9. Additionally, there was a former paint house, Building 5, which was assumed to store and use paint in this structure.

Other issues that were identified with the site included a firing range in the basement of Building 9 and the past agricultural usage of the site. The report noted the concern of utilizing lead bullets within the firing range. Historical fire insurance maps indicated that the previous use of the site was a cultivated field. The report noted that this historic use may have included possible use of pesticides and/or herbicides from when the site was identified as a ‘cultivated field’.

3.4.3 Phase II Environmental Audit, November 1999.

In November 1999, Terracon completed *Phase II Environmental Audit* for the Hardesty Federal Center. Terracon collected and arranged for analysis of samples from the following areas:

- Basin of the film processing room on the first floor of Building 11. One single grab surface sample was analyzed for corrosivity and silver. The sample was not corrosive and silver was not detected above the reporting limit of 1.002 milligrams per kilogram (mg/kg).
- Oil pump area in the basement of Building 3. Terracon collected a single grab surface sample off of the floor and had it analyzed for polychlorinated biphenyls (PCBs). PCBs were not detected above the reporting limit of 0.198 mg/kg.
- Ash clean-out room beneath the stack in the basement of Building 3. Terracon collected a single grab sample of the ash and analyzed the sample for Toxicity Characteristic

Leaching Procedure (TCLP) metals. Results showed lead had a concentration of 7.0 milligrams per liter (mg/L); above the regulatory limit of 5.0 mg/L; therefore, the sample would be characterized as hazardous waste. The other reported metals were below the regulatory limits.

A copy of this report is provided as in Appendix A.1.

3.4.4 Former Building 4 UST Closure Assessment Report, June 2000

Following an investigation triggered by the 1999 Phase I ESA (see Section 3.4.2), GSA discovered the location of three USTs in October 1999. This was an area where a former vehicle maintenance building (former Building 4) and a fueling station were located.

The regulated USTs in this area included two 1,000-gallon and one 560-gallon steel USTs appearing to have previously contained gasoline. The installation date(s) of these USTs was not known; however, at the time of the UST removal, they had been out of service for at least 10 years (prior to approximately 1990).

CAPE Environmental Management, Inc. (CAPE) completed *Former Building 4 UST Closure Assessment Report* for the USTs that were located in the area of former Building 4.

During the UST removal in 2000, it was reported that approximately 2,600 cubic yards of petroleum contaminated soil was removed from a “350-square foot” area surrounding the USTs. The steel USTs were observed to be in a severely deteriorated condition. The observed petroleum release was reported to MDNR Environmental Emergency Response Unit. In the immediate vicinity of the former tank locations, soils were excavated to a depth of 25-35 feet bgs. The western half of the excavation extended to approximately 19 feet bgs. The native soils encountered were primarily silty clays. Excavation activities were discontinued due to utility lines present on the north and west sides of the excavation. The excavation was “backfilled with clean fill obtained from an offsite source. Some concrete construction debris was placed in the southwest corner of the excavation at a depth of 17-19 feet bgs. The final 8 inches of surface cover was comprised of ¾ inch crushed limestone.” No additional information was provided regarding the backfill material.

The summary of the report included the following:

- confirmation soil samples collected at the base of the excavation indicated that no residual soil contamination is present at depth within the footprint of the excavation; residual soil contamination is evident on the north, east, and south walls of the excavation;
- PID readings of 459 and 469 parts per million were identified in soil borings P-1 at 14-15 feet bgs (20 feet north of the excavation) and P-3 at 32 to 36 feet bgs (30 feet east of the excavation);

- field screening indicated residual soil contamination appeared to extend horizontally beyond the excavation footprint in the north and east directions; and
- analytical results of the water sample collected at soil boring P-1 indicated a contaminated perched water layer within a pea gravel unit at 14 to 15 feet bgs.

These three former USTs are regulated by the MDNR Tanks Section. No reference to any tank coatings was made within the reports.

3.4.5 Former USTs Site Characterization Report, June 2001.

CAPE completed *Former USTs Site Characterization Report* a site characterizations for the USTs located in the area of Buildings 3A and 4. This included the regulated and non-regulated USTs. A *Draft Former USTs Site Characterization Report* dated April 2001 (provided in the PA, Reference 24) included an investigation for an additional two USTs, one in the vicinity of Building 3 and one in the vicinity of Building 20. The final report does not discuss the omission of sampling information around these two USTs. These “final” reports indicate that it is for the site characterizations for Building 3A and/or 4 but does not mention Building 3 or building 20. Data excerpts associated with the two omitted USTs from of the draft reports is provided in Appendix A-2 (figures and tables).

Site characterization field activities were conducted in late 2000. The objectives for this characterization were to adequately define the horizontal and vertical extent of the contamination with the former USTs at former Building 4 and Building 3A. These USTs included the following:

- two 23,000-gallon USTs located east of Building 3A (removed circa 1988), reportedly containing fuel oil;
- one 178,000-gallon UST located southeast of Building 3A (abandoned in place) reportedly containing fuel oil;
- one 2,000-gallon UST located northeast of Building 3A (abandoned in place reportedly containing fuel oil);
- two 1,000-gallon USTs located around former Building 4; and
- one 560-gallon USTs located around former Building 4 (removed by CAPE in 2000).

The field activities included field screening and collection of soil samples in the suspect areas. Fifteen soil borings were installed in the area of the Building 3A USTs and 23 soil borings in the area of former Building 4 USTs. Four monitoring wells were installed in each area (monitoring wells MW-1 thru MW-4 in the area of Building 4 and monitoring wells MW-5 thru MW-8 in the area of Building 3A). Additionally, one background monitoring well (monitoring well MW-9) was installed up-gradient. Laboratory analytical results of the soil and groundwater samples indicated detectable concentrations of gasoline range hydrocarbons (GRH), benzene, toluene,

ethylbenzene, xylenes, and diesel fuel above the laboratory reporting limits. During these activities, separate phase hydrocarbons were observed in monitoring well MW-7.

As noted in the draft report, field activities associated with the 1,000-gallon UST abandoned in place on the west side of Building 3 included four soil borings (SB24 through SB26 and SB44) were installed to depths ranging from 20 to 24 feet bgs. The field screening data collected from the suspect UST location did not identify contamination. Additionally, the four soil samples collected analyzed by Iowa Methods OA1 and OA2 indicated analytes were not detected.

As noted in the draft report, field activities associated with the 1,500-gallon UST that was removed circa 1988 on the east side of Building 20 included four soil borings (SB45 through SB48). The field screening data collected from the suspect UST location did not identify contamination. Additionally, the four soil samples collected analyzed by Iowa Methods OA1 and OA2 indicated analytes were not detected.

3.4.6 Ground Penetrating Radar (GPR) Survey, November 2001.

A GPR survey letter report dated November 27, 2001 by George Butler Associates, Inc. was prepared for CAPE. This GPR survey was completed on the west, north, east, and southeast sides of Buildings 3 and 3A. This letter report stated “There were no locations where USTs or possible USTs were detected.” However, the letter continued by stating there were two locations that were “suspected as containing abandoned underground tanks”; these locations were on the southwest corner of Building 3 and the northeast corner of Building 3A. The copy of the report provided by GSA was not a complete copy; no text, figures, or photos were available for review.

3.4.7 Heating Oil USTs Site Characterization Report, November 2001.

The *Heating Oil USTs Site Characterization Report* dated November 2001, prepared by CAPE, includes the information that was previously included in the Former USTs Site Characterization report. This report does not include the majority of the data associated with the regulated USTs (UST’s around Building 4).

3.4.8 Former USTs Site Characterization Report Addendum, November 2001.

The *Former USTs Site Characterization Report Addendum* dated November 2001, prepared by CAPE represents the findings of the recommended additional investigation to delineate the groundwater contamination and the additional investigation to delineate the extent of free product near Building 3A. Separate phase hydrocarbons (SPH) were observed in monitoring well MW-7; it was reported to be highly viscous and black in color. Twelve additional soil borings were advanced and an additional monitoring well was installed (monitoring MW-10) this area.

During the investigation activities, free product was observed in multiple soil borings (boring logs descriptors include “visible product” and “black nodules of free product”). No additional information related to the product was available in the report. Based on this data, the estimated extent of free product at this site has been determined (however, investigation was limited beneath the existing structures). Results of the soil and groundwater samples show that contamination in the soil and groundwater has been horizontally delineated. The Draft Remedial Action Plan prepared by CAPE dated March 2002 prepared for the unregulated USTs near Building 3A indicated the soils were impacted in an approximate area of 5,500-square feet, extends from approximately 4 feet bgs to a maximum of 24 feet bgs where free product and groundwater were encountered, and an estimated volume of approximately 3,600 cubic yards of impacted soil is present.

The figures and data tables with information from the 2001 CAPE Site Characterizations (discussed in Sections 3.4.5, 3.4.7, and 3.4.8) were merged together and provided in the Draft Remedial Action Plan (RAP) dated March 2002. A copy of the information is provided in Appendix A.2.

Appendix A.2 provides the following supporting documentation obtained during the 2002 Draft RAP and 2001 CAPE Site Characterizations:

- *Figure 3 Building 3A soil boring map*, illustrating the locations of soil borings;
- *Figure 4 Building 3A soil contaminant concentration map* with the various chemicals of concern (COCs) analyzed during this investigation;
- *Figure 5 Building 3A well location map*;
- *Figure 6 Building 3A groundwater contaminant concentration map and contamination plume*;
- *Table 1*, a summary of soil analytical results;
- *Table 2*, a summary of groundwater results;
- *Figure 4 Building 3, 3A, and 20 soil boring map* (similar to the other Figure 3 in this Appendix); this has been included to show the information that was omitted from the final reports; and
- *Table 1*, a summary of soil analytical results from soil borings advanced in the vicinity of Building 3 and Building 3A (data that was omitted from the final report, which was not provided on the other Table 1 in this Appendix).

3.4.9 Preliminary Assessment, November 2002.

Terracon completed a *Preliminary Assessment* (PA) Report for the Site in November 2002. This document was prepared for use by GSA in evaluating environmental conditions of the property relative to future transfer of this federal property.

The PA Report provided an operational history (see Section 3.3) and a summary of historical Site waste characteristics. Various potential wastes associated with this facility were identified and discussed in the PA Report. The following is a summary of the potential wastes associated with each building:

- Building No. 3 and 3A. Building 3 is a one-story mechanical building with a basement constructed in 1920 covering approximately 18,098 square feet. Building 3A is a one-story building with sheet metal sides and an apparent wood floor. Items noted in Building 3 included underground coal storage, a concrete oil basin, former use as a train shed and welding shop, boilers previously powered with fuel oil but converted to natural gas, and boilers previously powered with coal. Documentation provided by the GSA that indicated the presence of a transformer in the basement of Building 3 with polychlorinated biphenyl (PCB), however, the transformer was not observed during the PA site visit. An ash clean-out room containing ash from the former stack at Building 3 was observed in the basement of Building 3.

The ash was self-contained within the clean-out room so that a release of the ash to physical or environmental receptors was unlikely. One sample collected and analyzed for TCLP during the Phase II Environmental Audit (see Section 3.4.3) identified the sample of ash having a lead concentration of 7.0 mg/L, exceeding the regulatory limit for lead at 5.0 mg/L. Three additional samples of the ash were collected by GSA on February 18, 2000 (as documented on a chain-of-custody (COC) with a QuanTEM Laboratories report dated February 22, 2000). The COC indicated that the samples were “Fly ash from stack” with locations “just inside door”, “center of stack floor”, and “scraping from stack wall”. Concentrations were 1.01 mg/l, 0.181 mg/l, and 0.397 mg/l, which are below the TCLP lead regulatory limit of 5.0 mg/l.

- Building 4. This building is no longer present but was identified as a former garage.
- Building 5. This building is no longer present but was a former paint house.
- Building 6. This building is a two story warehouse building (no basement) constructed in 1941 covering approximately 56,000 square feet. This building was originally constructed as a clothing treatment/renovation plant as part of the Chemical Warfare Service Project, operated by the Chemical Warfare Service. The purpose of the project was to treat new Army uniforms with “Impregnate I” to make them gas-resistant against chemicals such

as “mustard gas.” Old uniforms were to be laundered and then treated with “Impregnate I”. The clothing renovation plant was in operation until August 10, 1945. The *Cultural Resources Assessment* (Three Gables Preservation, 1999) provided some additional information, noted as follows:

“The chemicals which were used to form “Impregnate I” were kept in tanks outside the building. The chemicals were mixed, then pumped through pipelines into the second floor of the building. The clothes were washed in the chemical mixture in machines on the second floor. After washing, they were drained upstairs, with an attempt to recover the chemicals during drainage. The clothes were then sent below to dry in clothes dryers. In the same building, they were spread on tables, folded, and packed for shipping. Soon after the Clothing Renovation Plant began operations, it was noticed that a rash of illnesses were occurring among employees. The operating officer notified his superiors, and soon thereafter a medical department was initiated. Better safety procedures were implemented and experimentation with the chemicals led to a lower concentration.”

Waste characteristics, if any, associated with the clothing treatment/renovation plant could not be documented or verified during the preparation of PA. However, the *Cultural Resources Assessment* report indicated that the uniforms were drained, after being washed, in an attempt to recover the chemicals used in the impregnation process. At the end of World War II, many of the records from the war were destroyed as part of demobilization activities. As a result, records concerning the ingredients of “Impregnate I” and any waste characteristics or disposal practices were not readily available.

FAA occupancy of Building 6 began in 1969 as an FAA warehouse for electronic equipment and for electronic equipment assembly. Printed circuit boards were manufactured at Building 6, with welding and spray painting activities. Waste characteristics associated with the FAA use of Building 6 included the storage of used wet nickel-cadmium batteries. Batteries removed from service were temporarily stored at the FAA staging area, prior to a one-time removal action by Phillip Services, Inc. of Columbia, Illinois, for disposal at Solvent Recovery Corporation (SRC) in Kansas City, Missouri. Approximately 2,740 pounds of waste batteries identified as D002 (corrosive) and D006 (cadmium) hazardous waste were removed from the site on April 2, 1998, and disposed of at SRC on May 1, 1998. This one-time removal action resulted in a listing of the facility as a RCRA LQG of hazardous wastes (production of at least 1000 kilogram per month of non-acutely hazardous waste or 1 kilogram per month of acutely hazardous waste).

Waste characteristics associated with the FAA use of Building 6 also included waste paint filters generated from the paint booth. The filters in the exhaust vent collected overspray from spray cans. These filters were changed a few times a year and disposed of in a dumpster for removal by Deffenbaugh to a sanitary landfill. A Notice of Violation (#4974) was issued by the MDNR Kansas City Regional Office on March 16, 2001, as discussed in MDNR’s March 2, 2001, Compliance Evaluation Inspection Report, concerning the failure to determine if the waste paint filters were hazardous wastes.

Subsequent sampling and laboratory analytical results, as discussed in an FAA letter received by the MDNR April 23, 2001, indicated that the spent paint waste filters were not hazardous. An MDNR letter dated May 18, 2001, stated that the Notice of Violation (#4974) had been satisfactorily addressed.

- Building 7. Building 7 is an approximately 8,970 square feet (sq. ft.) one story storage building constructed in the 1940's. This building was previously occupied by the U.S. Army Corps of Engineers for the storage of electronic equipment and was previously used as electrical and plumbing shops.
- Building 8. This building is no longer present and its function is undetermined.
- Building 9. Building 9 is an approximately 178,379 sq. ft. two story warehouse building (with a basement) constructed in 1942. It was noted that some ACM materials may be present associated with this building. A firing range, with a small bullet stop and a sand trap, was identified in the basement of this building. Spent shell casings were observed within the sand in the bullet stop. The sand was self-contained within the bullet stop in the indoor firing range. The sand and associated firing range has since been removed.
- Building 10. Building 10 is an approximately 92,728 sq. ft. two story warehouse building with a basement constructed in 1942. Transformers containing PCBs fluid were observed and/or identified.
- Building 11. This building is an approximately 216,992 sq. ft. two story warehouse/office building with a basement constructed in 1942. The Army "Home Town News" was produced in this building. Analytical results of a grab sample collected from a film processing basin indicated that the material was not corrosive and did not contain silver. Notifications of Regulated Waste Activity, dated May 18, 1994 and July 22, 1994 listed lead as temporarily being disposed at Building 11, Door 4 and was listed as a RCRA small quantity generator (SQG).
- Building 12. This building is no longer present but has been listed as being associated with a 150,000-gallon (gal) (same UST as the 178,000gal) underground concrete fuel oil tank. This tank is discussed with the USTs associated with Buildings No. 3 and 3A.
- Building 13. This building is an approximately 200 sq. ft. one story transformer building constructed in the 1940's. This substation provided electrical power from Kansas City Power and Light (KCP&L) and distributed the power to each of the buildings on that site.
- Building 14. This building is no longer present but was a former pump house building between Buildings 6 and 9.

- Buildings 15, 16, 17, 18, 19, and 20. These buildings have been removed. The function of these buildings was mostly undetermined. Building 19 was a warehouse structure and Building 20 was garage storage.

- Area of Buildings 9, 10, and 11. “Four fingers of a creek” previously traversed the area of Buildings 9, 10, and 11 prior to construction. The four fingers of the creek were approximately 28 to 30 feet deep and were previously used as a dump. “Objectionable material” (materials not otherwise described) was reportedly removed and the area was backfilled prior to construction of Buildings 9, 10, and 11. Maps or diagrams depicting the location of previous tributaries on site, or identification or descriptions of the “objectionable material,” were not discovered during the preparation of the PA report.

- Grassy area between Buildings 6 and 9. A cooling tower, two pump houses, two storage tanks, and a recovery tank were formerly located between Buildings 6 and 9. One of the pump houses was identified as Building 14. Two or three open concrete below grade rooms may have been formerly located in the grassy area to the south of Building 6. These rooms were reportedly used to hold the tanks containing the “Impregnate I” and were reportedly filled with sand several years ago. Two pits and tank support structures were reportedly located in this area, presumably associated with tanks containing clothing treatment/renovation chemicals (possibly “Impregnate I”). A December 1979 site diagram indicated an existing concrete pit, 33 feet long, 14 feet wide, and 5 feet 8 inches deep, was located in the current-day grassy area along the southern exterior side of Building 6. The site diagram indicated that the floor in this pit was to be broken through in four places for drainage, that the existing concrete tank supports were to remain, and that the pit was to be filled. The pit was reportedly filled with sand or soil. Another existing concrete pit, 14 feet long, 14 feet wide, and 3 feet deep, was located approximately 40 feet south of Building 6. Copies of the diagrams indicating the floor of the pit was broken and filled with sand were not able to be located during the review of the PA.

- Open Storage Area. According to the *Cultural Resources Assessment* (Three Gables Preservation, 1999), materials were previously stored on wood and metal pallets which apparently did not prevent contact of the stored items with the ground. “Various plans indicate that 5 gallon water cans, “GI cans”, and insecticide were among the items kept in the open storage” A specific location of the insecticide storage was not noted on the within the report. Indications of releases or staining were not observed in the open storage area during the November 28, 2001 PA reconnaissance.

- Asbestos-Containing Materials. According to an Asbestos Inventory Report for the Federal Center, Buildings 3, 6, 7, 9, 10, 11, and 13 provided by GSA, an asbestos

inspection was conducted by Professional Industrial Hygiene Services on December 15, 1992. Various ACMs were identified in the on-site buildings.

- **Underground Storage Tanks and Petroleum Products.** The following are the reported USTs at the site:
 - One 1,000-gallon diesel UST was abandoned in place west of Building 3;
 - Two 23,000-gallon heating oil USTs were removed from the area east of Building 3A in circa 1988 (approximately the location of former Building 15);
 - One 178,000-gallon heating oil UST was abandoned in place southeast of Building 3A (approximately the location of former Building 12);
 - One 2,000-gallon fuel oil UST was abandoned in place northeast of Building 3A;
 - Two 1,000-gallon and one 560-gallon gasoline USTs were removed west of former Building 4 in 2000; and,
 - One 1,500-gallon fuel oil UST was removed east of former Building 20 in 1988.

The USTs have previously been discussed in Sections 3.4.4 thru 3.4.8.

Several other items of potential concern were identified during the review of the PA report for the preparation of this RI/FS WP. Rail spurs were present across the facility. A cooling tower was identified by Building 9. Building 19 reportedly had a “tank.” A spill of 78 one-gallon containers of paint thinner to the soil was reported, however a location could not be determined. These items are discussed further in Section 4.3.

Appendix A.3 provides the following supporting documentation obtained from the PA:

- Historical aerial photographs (PA/SI Reference 50);
- Sanborn maps (PA/SI Reference 6);
- Results of GSA’s sampling of the ash (further discussed in Section 4.3.2, under discussion of Item 3.1 – Smokestack Ash) with analytical from Quantem Laboratories (PA/SI Reference 10);
- A portion of the GSA Master Plan (provided by GSA, PA/SI Reference 20) illustrating the location of the USTs;
- A portion of the GSA Demolition Plan (provided by GSA, PA/SI Reference 12) illustrating the location of the tank associated with Building 19 (further discussed in Section 4.3.9, under discussion of Item 19.1 – Tank);
- A portion of the General Layout Plan (provided in the *Completion Report Covering Construction and Completion of Clothing Renovating Plant at Kansas City Quartermaster Depot*, PA/SI Reference 11) illustrating the items and usage on the south side of Building 6;

- The Reservation Layout Plan (provided in the *Completion Report Covering Construction and Completion of Clothing Renovating Plant at Kansas City Quartermaster Depot*, PA/SI Reference 11) illustrating the location of Building 5; and
- The Plot Plan of the Kansas City Quartermaster Depot (provided in the *Cultural Resources Assessment*, PA/SI Reference 45) illustrating the locations of former on-site railroad spurs.

3.4.10 Site Inspection, November 2002.

Terracon completed a *Site Inspection (SI)* Report for the Site in November 2002. This document was prepared for use by GSA in evaluating environmental conditions of the property relative to future transfer of this federal property. The objectives of the SI were to collect analytical data to identify hazardous substances, determine whether hazardous substances were released to the environment, and whether the substances impacted human health and the environment.

During the SI, several samples were collected to determine if materials observed were hazardous. The following samples were collected and analyzed:

- Four sand samples were collected from the bullet stop in the firing range located in the basement of Building 9. According to laboratory analytical results analyzed for TCLP lead, TCLP lead was detected in the sand samples at concentrations ranging from 554 mg/l to 610 mg/l, which is considered a characteristic hazardous waste.
- Eight dust wipe samples were collected from the floor and walls of the firing range located in the basement of Building 9. According to laboratory analytical results, lead was detected in the dust wipe samples collected from the floor at concentrations ranging from 2,400 micrograms per square foot ($\mu\text{g}/\text{ft}^2$) to 92,000 $\mu\text{g}/\text{ft}^2$.
- Three confirmation ash samples were collected from the smokestack ash clean-out room located in the basement of Building 3. According to laboratory analytical results, arsenic, barium, cadmium, chromium, mercury, selenium, and/or silver were not detected above the laboratory reporting limits for any of the ash samples and the field blank. Laboratory analytical results indicated that lead was detected in one of the ash samples at 0.830 mg/l. Based on these analytical results of the ash samples analyzed for TCLP, the ash is not considered a hazardous substance.

The soil and groundwater investigation was completed in 2002 during three different field mobilizations (February, June/July, and October).

In February 2002, Terracon used a direct push Geoprobe[®] System to advance sampling probes into the subsurface at five locations at the site, Boring-1B (background), Boring-2, Boring-3, Boring-4, and Boring-5. Borings 2 thru 5 were advanced between Buildings 6 and 9. Five groundwater samples were collected (one background sample [GW-1B], two samples from

borings B-2 and B-5 [GW-2 and GW-5], one duplicate sample [GW-6D], and a trip blank [GW-8T]). Unfiltered groundwater samples were collected from the probes using a Screen Point-15 stainless steel sampler. Groundwater was not immediately available at Boring-1B and Boring 5; however, after allowing to recharge overnight, there was sufficient groundwater for sampling.

During the June and July 2002 investigation, Terracon advanced probes to install temporary sampling points (one-inch diameter PVC with a 20 foot 0.01-slot screen). The samples were collected approximately one month after advancement to allow for sufficient recharge. Groundwater samples analyzed for RCRA 8 metals were field filtered using a 0.45 micron filter. A total of nine groundwater samples were collected in June 2002 (one background sample [GW-1], two samples from the temporary monitoring wells [GW-3 and GW-5], three samples from the existing monitoring wells [CAPE MW-4, CAPE MW-6, and CAPE MW-X], one duplicate sample [FD-GW-3], one trip blank [TB], and one field blank [FB]). A total of seven groundwater samples were collected in July 2002 (one background sample [GW-1], three samples from temporary monitoring wells [GW-4, GW-8, and GW-9], one duplicate sample [FD-GW-9], one trip blank [TB], and one field blank [FB]). Sufficient groundwater for sampling was not available in several of the other temporary monitoring wells that were installed during this investigation.

In October 2002, Terracon advanced probes to install temporary sampling points (one-inch diameter PVC with a 20 foot 0.01-slot screen). A total of 20 groundwater samples were collected in October 2002 (seventeen from temporary monitoring wells GW-10 thru GW-26, one duplicate sample [GW-23D], one trip blank [TB], and one field blank [FB-19]). Groundwater was encountered and collected from each location. These locations were sampled approximately 24 to 48 hours after advancement to allow for sufficient recharge of groundwater for sampling.

The laboratory analytical results of the soil and groundwater sampling completed as part of this investigation revealed that chlorinated VOCs and RCRA metals (arsenic, barium, chromium, and lead) were detected. The highest groundwater VOC concentrations were detected in the grass-covered area between Buildings 6 and 9 and towards the northeast, east, and southeast of the grass-covered area. Additionally, the concentrations indicated that contaminants have reached the boundary of the site and may extend to the north and east.

Appendix A.4 provides the following supporting documentation obtained from the SI:

- Figures 6 and 7 provides probe locations;
- Figures 8 thru 12 provide the groundwater PCA, TCA, PCE, TCE, and DCE analytical results above action levels compared during the SI;
- Table 1 provides a summary of the sampling event, including the location of the borings;
- Tables providing the soil and groundwater analytical data (data compiled from Tables 5 thru 10 provided in the SI report);
- Figure 5 shows the ash sample locations; and
- Table 4 provides the analytical results for the ash samples.

3.4.11 Environmental Site Investigation (ESA), November 2003.

SCS Engineers' (SCS) completed an *Environmental Site Investigation (ESI) Report* for the site in November 2003. The site reconnaissance was for obvious or suspected hazardous substance contamination, such as stained floors, abandoned equipment, fill ports or vent pipes for USTs. Numerous small spills associated with PCB containing oil-filled electrical equipment were identified and remediation activities were completed to address areas where impacts exceeded the 10 mg/kg PCB standard. There are additional small spills of various solids and liquids (sampling of these areas confirmed these spill areas do not pose a threat to health or environment). Several containers of unknown substances were found and SCS performed sampling and disposal activities associated with these unknown substances.

3.4.12 On-Site Groundwater Investigation Report, August 2003.

Terracon completed an *On-Site Groundwater Investigation Report* dated August 2003 for the site. This investigation was completed in response to the PA / SI results. In June 2003, a total of five well clusters (one shallow and one deep monitoring well at each location) were installed on-site to evaluate the lateral and vertical extent of chlorinated VOC (CVOCs) impact to on-site groundwater. In an attempt to encounter bedrock, one monitoring well (CMW-1D) was advanced to 90 feet bgs; however, bedrock was not encountered.

Terracon collected, preserved, and submitted 10 soil samples (soil samples from one representative soil boring from each cluster and one duplicate soil sample) and 13 groundwater samples (one groundwater sample from each of the 12 monitoring wells and one duplicate for analysis). In addition to these samples, two trip blanks, one rinsate sample, and one field blank was also collected and analyzed. The depths of the soil samples varied in each boring and are provided on Table 3 in Appendix A.5.

The CVOCs detected at the site are dense nonaqueous phase liquids (DNAPLs). These DNAPLs have a higher density than water and will tend to sink through the aquifer over time as well as spread horizontally. In analyzing the concentrations detected across the site, it is apparent that the CVOCs detected in groundwater are following a known breakdown pathway for the VOCs present [PCA (and possibly PCE) → TCE/TCA → cis/trans 1, 2-DCE → vinyl chloride]. Additionally, it appeared that the CVOCs were migrating to the deep aquifer as evidenced by the TCE concentrations at CMW-2 and CMW-3 of 0.218 mg/L and 0.411 mg/L, respectively.

Appendix A.5 provides the following supporting documentation obtained from the on-site groundwater investigation:

- Figure 2, illustrating the monitoring well locations;
- Table 3, a summary of soil analytical data (column on table indicates which CMW the samples were collected from); and
- Table 4, a summary of groundwater analytical data.

3.4.13 Off-Site Groundwater Investigation Report, September 2003.

Terracon completed an *Off-Site Groundwater Investigation Report* dated September 2003 for the site. This investigation was completed in response to the PA/SI results and the on-site groundwater investigation completed August 2003. The purpose of the site investigation activities was to assess the potential lateral and vertical extent of chlorinated VOC impact to off-site groundwater. Seven borings, for the collection of groundwater, were advanced in the area north and northeast of the site. A Screen Point-15 stainless steel sampler was used to collect groundwater samples.

Groundwater collected from deeper zones within the aquifer, from samples B-1 and B-2, had higher detected CVOC concentrations than shallower groundwater samples from B-4 and B-5. TCE was detected in samples B-1, B-2, and B-4 at concentrations ranging from 0.0662 mg/L to 0.229 mg/L.

Appendix A.6 provides the following supporting documentation obtained from the off-site groundwater investigation:

- Figure 2, showing the site relative to the off-site sampling locations;
- Figure 3, showing the sample intervals and the off-site TCE concentration map; and
- Table 1, a summary of the off-site groundwater analytical data.

3.4.14 Off-Site Groundwater Investigation Report, July 2004.

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) completed an *Off-Site Groundwater Investigation Report* dated July 2004. The overall purpose of this off-site investigation was to evaluate the potential presence of impacted offsite groundwater that may be associated with former on-site activities. This field investigation focused on areas to the north and east where previous investigations identified off-site groundwater contamination and where contaminants were likely to migrate.

A total of 16 direct push borings were completed with only nine locations accumulating enough groundwater to be sampled. Samples were reportedly collected from two distinct depth intervals (a shallow and deep intervals, with varying depths; depths reported on Table 1 of Appendix A.7), where possible, to determine vertical distribution of potential groundwater contamination. Two soil gas samples from deep and shallow depths at each location were collected from two

locations from the northeast corner of the Site. On-site analysis was completed by Environmental Priority Service, Inc. (EPS) with split samples submitted to an off-site laboratory.

Additionally, one bulk soil sample was collected at a location north of Building 1 from the 8 to 12 foot interval and analyzed for geotechnical soil characteristics. The bulk soil sample was submitted for off-site laboratory analysis for water content, total organic carbon, and dry bulk density.

No VOC detections were identified in the four soil gas samples. The report states an isolated area of TCE contamination exists within the groundwater northeast of the Site; however groundwater samples collected to the east of the Site did not identify any TCE contamination.

Site-specific target levels (SSTLs) were developed during this investigation. The risk evaluation included the follow steps: identification of chemicals of potential concern (COPCs), toxicity assessment, exposure assessment, development of SSTLs, and comparison of Site analytical to be calculated SSTLs. The overall maximum and shallow maximum concentrations were below the calculated SSTL for each chemical.

Appendix A.7 provides the following supporting documentation obtained from the second off-site groundwater investigation:

- Figure 2, a boring location map illustrating the borings relative to the site and off-site streets; and
- Table 1, the field analysis of the groundwater results;
- Table 2, the laboratory analysis of the groundwater results; and
- Tables 3 thru 12, various tables with SSTL calculations.

3.4.15 Limited Soils Investigation Report, July 2007.

SCS completed a *Limited Soils Investigation Report* dated July 2007 for the site. The purpose of this investigation was to identify possible contaminant impact in near-surface soils sourced from past operation of the clothing impregnation facility that was formerly located in Building 6.

Twelve soil borings were advanced east and south of Building 6 to a maximum depth of approximately 6 feet bgs. Various VOCs were detected in the soil samples collected and analyzed for VOCs. TPH-DRO was detected in a couple of the soil samples (analyzed only in the area of fill material). The conclusions stated that it appeared the shallow soils in the area of Building 6 have been impacted with trace concentrations of VOCs and TPH-DRO. The historical operation of the clothing impregnation facility within Building 6 appears to be the most likely source of these contaminants in the shallow soils, intermediate soils, and groundwater at the Site.

Appendix A.8 provides the following supporting documentation obtained from the limited soils investigation:

- A figure outlining the soil boring locations in reference to Building 6 and Building 9; and
- A table summarizing the soil analytical data obtained from the laboratory analytical report.

3.4.16 Environmental Assessment and Low Level PCB Remediation Report, July 2007.

SCS completed an *Environmental Assessment and Low Level PCB Remediation Report* dated July 2007 for the site. This assessment was in response to dielectric oil releases caused by acts of vandalism. GSA authorized SCS to remediate identified dielectric oil spills; remove remaining free-flowing dielectric oil from the transformers and switches; clean the floor drain and line from Building 13 to the first down-gradient manhole; and close three floor drains within Building 10 and Building 13. Remediation was completed in October 2006. The report noted that “small quantities of residual dielectric fluids that could not be effectively drained and, therefore, remain in the transformers in these buildings, contain less than 50 ppm PCBs.”

3.4.17 Site Summary, November 2008.

SCS completed a *Site Summary Report* dated November 2008 for the Site to identify data gaps and make recommendations regarding future environmental actions at the Site. SCS reviewed various documents made available by GSA. As a result of their review, the following determinations were made regarding contamination at the Site:

- ACM has been identified in every building.
- PCBs identified in electrical equipment have been remediated as a result of several cleanup efforts.
- Two 23,000-gallon fuel oil USTs were removed and one 178,000-gallon fuel oil tank was closed in place around 1988 in the area of Building 3A. Soil contamination with total petroleum hydrocarbons (TPH) diesel range organics (DRO) was subsequently identified from 4 feet to 24 feet bgs over a 5,500 square foot area near Building 3A. Free product is present, with the upper depth ranging from 8 to 18 feet bgs and a thickness of approximately 5 feet. Contaminated groundwater from these sources was encountered below 24 feet bgs and was horizontally delineated within the property boundaries.
- Two 1,000-gallon and one 560-gallon gasoline USTs were removed in the area of Building 4 with soil and groundwater contamination.
- Ash under the stack is not a RCRA hazardous waste based on TCLP testing for lead.

- Corrosive material and silver were not detected in the former film processing area in Building 11.
- Lead is present on surfaces in the indoor firing range and was detected above the toxicity limit in sand remaining in the range.
- The source of the CVOCs is believed to be former storage tanks near Building 6. However, concentrations of CVOCs detected in subsurface soil samples (B5) near the presumed source area were not indicative of a source. On the basis of On-site Groundwater Investigation (August 2003), concentrations of CVOCs were generally higher in groundwater samples from the shallow wells close to the presumed source area (CMW-5S/5D and CMW-4S/4D). However, in wells further from the presumed source area, concentrations of CVOCs were generally higher in the groundwater samples from the deep wells (CMW-1S/1D, CMW-2S/2D, and CMW-3S/3D).
- Chlorinated VOCs are present in groundwater. Groundwater is not used as a drinking water source in the area, and a risk evaluation based on vapor intrusion indicated that the concentrations detected in groundwater (on and off site) were below site specific target levels (SSTLs).
- Three remedial action plans were developed for the Site. These included the USTs for Building 3A and 4, the indoor firing range, and the groundwater contaminated with chlorinated VOCs.

3.4.18 Off-Site Well Installation and Groundwater Sampling, Jan. 2011

Terracon completed an *Off-Site Well Installation and Groundwater Sampling Report* dated January 11, 2011 for the site; monitoring wells were installed September 2010 and sampling was completed October 2010. This investigation was completed to further evaluate off-site groundwater quality based on the 2004 Burns and McDonnell off-site groundwater results and establish potential baseline data for future plume stability evaluations and effectiveness of on-site remedial activities.

During this investigation, six permanent groundwater monitoring well clusters (shallow and deep) were installed to evaluate off-site groundwater quality (CMW-6 thru CMW-11). Locations CMW-9 and CMW-11 consisted of only one well. The off-site deep groundwater monitoring wells were set on bedrock at depths ranging from 23 feet bgs to 68. The on-site and off-site cluster monitoring wells (CMW-1 thru CMW-11) and monitoring wells MW-6 and "MW-X" (same as monitoring well MW-10) groundwater were sampled in October 2011 and analyzed for 1,1-dichloroethene (DCE), 1,1,2,2-tetrachloroethane (PCA), tetrachloroethene (PCE), 1,1,2-trichloroethane (TCA), trichloroethylene (TCE), and vinyl chloride (VC). The general flow for both shallow and deep groundwater was generally in an easterly direction.

CVOCs were detected in all groundwater samples analyzed with the exception of samples from monitoring wells CMW-6D, CMW-7S, and CMW-11. The highest concentrations of TCE and

PCE were detected in monitoring well CMW-5S at concentration of 294 mg/L and 7.85 mg/L, respectively. The range of TCE detections were reported as 0.0013 mg/L to 294 mg/L. The CVOCs were only slightly detected in the up-gradient wells relative to monitoring well CMW-5 and was not detected in the furthest down-gradient monitoring well CMW-11.

Appendix A.9 provides the following supporting documentation obtained from the groundwater sampling completed in October 2010:

- Exhibits 3 and 4 provide groundwater flow diagrams with the monitoring well locations identified;
- Exhibits 5 and 6 provide TCE isoconcentration maps;
- Exhibits 7 and 8 provide PCE isoconcentration maps; and
- Tables 2 and 3 provide a summary of the on-site groundwater analytical data for this investigation.

3.4.19 March 2011 Groundwater Sampling, June 2011

Terracon completed a groundwater sampling event in March 2011 and reported results in the *March 2011 Groundwater Sampling Report* dated June 10, 2011. This investigation was completed to further evaluate on-site and off-site groundwater quality and establish potential baseline data for future plume stability evaluations and effectiveness of on-site remedial activities.

Groundwater sampling activities included sampling of the on-site monitoring wells associated with the UST area around former Building 4 and Building 3A and the on-site and off-site monitoring wells associated with the CVOCs impact area.

Laboratory analytical results of the groundwater samples from the on-site monitoring wells associated with the UST area do not reveal concentrations of COCs (Missouri Risk-Based Corrective Action [MRBCA] volatiles and oxygenations, TPH diesel range organics (DRO) and TPH oil range organics (ORO), Polycyclic Aromatic Hydrocarbons (PAHs), and lead) above laboratory detection limits with the exception of results at monitoring wells MW-5 and CMW-5S. Slight concentrations of TPH-DRO, benzene, ethylbenzene, and anthracene were detected in MW-5. Monitoring well CMW-5S had concentrations of TPH gasoline range organic (GRO) and naphthalene. The laboratory results for the CVOCs impact area were similar to the October 2010 sampling event. Detected concentrations of the CVOCs ranged from 0.0018 mg/L to 350 mg/L.

Appendix A.10 provides the following supporting documentation obtained from the groundwater sampling conducted in March 2011:

- Exhibits 3 and 4 provide groundwater flow diagrams with the monitoring well locations identified;
- Exhibit 5 provides a DRO isoconcentration map;
- Exhibits 6 and 7 provide TCE isoconcentration maps;
- Exhibits 8 and 9 provide PCE isoconcentration maps; and
- Tables 4A, 4B, 4C provide a summary of the on-site groundwater for the area of the USTs around Building 3A and Building 4;
- Tables 5A and 5B provide a summary of the analytical results for the TCE area impact with the on-site and off-site groundwater.

3.4.20 July 2011 Groundwater Sampling, September 2011

Terracon completed a groundwater sampling event in July 2011 and reported results in the *July 2011 Groundwater Sampling Report* dated September 13, 2011. This investigation was completed to further evaluate on-site groundwater quality and establish potential baseline data for future plume stability evaluations and effectiveness of on-site remedial activities. Groundwater sampling activities included sampling of the on-site monitoring wells associated within the UST area around former Building 4 and Building 3A and the on-site monitoring wells associated with the TCE impact area. Additionally, monitoring wells MW-4, MW-5, MW-6, CMW-4S, CMW-4D, CMW-5S, and CMW-5D were sampled for geochemical parameters.

Laboratory analytical results of the groundwater samples from on-site monitoring wells were similar to the March 2011 sampling event. Detected concentrations of the CVOCs ranged from 0.001 mg/L to 192 mg/L.

Appendix A.11 provides the following supporting documentation obtained from the groundwater sampling conducted in July 2011:

- Exhibits 3 and 4 provide groundwater flow diagrams with the monitoring well locations identified;
- Exhibit 5 provides a DRO isoconcentration map;
- Exhibits 6 and 7 provide TCE isoconcentration maps;
- Exhibits 8 and 9 provide PCE isoconcentration maps;
- Tables 4A, 4B, 4C provide a summary of the on-site groundwater chemical analysis; and
- Table 5 provides a summary of the geochemical parameter analysis.

3.4.21 Revised Cleanup of Firing Range Report, May 2012

Terracon completed *Revised Cleanup of Firing Range Report* dated May 1, 2012 for the site. During the 2002 Site Investigation (see Section 3.4.10), the firing range located in the southwest

corner of Building 9 was investigated. The following is a summary provided in this report that was taken from the Site Investigation Report.

A small bullet stop consisting of an angled metal backstop and a sand trap was observed at the base of the firing range in Building 9. What appeared to be spent shell casings were observed within the sand in the bullet stop. The approximate size of the bullet stop was measured during sampling activities to be approximately 18.5 feet long, 5.5 feet wide, and 2 feet deep. The entire contents of the bullet stop appeared to consist of sand, with wood pallets and boards covering the top of the bullet stop. Based on these dimensions, the bullet stop appears to consist of approximately 7.54 cubic yards of sand. The bullet stop appeared to be in good condition with no major breaks or cracks observed along the front of the stop. The sides and the rear of the bullet stop sand trap appeared to abut the south, east, and west walls of the firing range. The approximate dimensions of the floor of the firing range are 18.5 feet wide and 91.8 feet long from the entrance to the front of the base of the bullet stop. The approximate dimensions of the two walls of the firing range are 97.3 feet long (to the rear of the bullet stop) and 25 feet tall.

Previous investigations identified the firing range having elevated concentrations of lead dust on the walls and floor and sand that was characterized as hazardous waste. This cleanup was completed to remove the hazardous materials and to clean up the firing range. Effectiveness of final cleanup was determined through surface wipe sampling. Surface concentrations of lead after cleanup did not exceed 200 $\mu\text{g}/\text{ft}^2$. This level was based upon an OSHA compliance instruction (CPL 2-2.58) for the construction industry, which provides a level of acceptable lead loading for non-lead work areas.

During this cleanup, the materials within the firing range were removed (i.e. sand, backstop, wood debris, etc.). The ceilings, walls, and floors were then cleaned and then later painted. Nine final wipe clearance samples were collected throughout the former firing range. The laboratory analysis indicates that lead was not detected at concentrations above the laboratory detection limit; therefore, below the clearance criteria of 200 $\mu\text{g}/\text{ft}^2$. During this investigation, sand was discovered in a cavity behind a wood wall located on the east wall, near the southern end of the firing range. A sample of this material was collected and analyzed for TCLP metals by EPA Method 6010/7470 and total lead by EPA Method 6010B. The laboratory analysis indicates that TCLP metals were not detected at concentrations above the laboratory detection limit. Total lead was detected at a concentration of 5.2 mg/kg.

Appendix A.12 provides the following supporting documentation obtained from the *Revised Cleanup of Firing Range Report*:

- Exhibit 3 – Sample Location Diagram
- Table 1 – Analytical Result - East Sand Wall
- Table 2 – Analytical Results - Final Clearance Samples

3.4.22 Regulated Tanks Site Characterization Report, May 2012

Terracon completed the *Regulated Tanks Site Characterization Report* dated May 13, 2012 for the site and submitted the report to the MDNR Tanks Section for review. The site

characterization was to evaluate soil and groundwater impacts associated with the regulated USTs (area of former Building 4). Although, this portion of the site is being addressed by the MDNR Tanks Section, a brief summary of the findings and recommendations is provided in this Section.

The following activities were associated with the site characterization: GPR survey and utility assessment; 26 soil borings with 35 soil samples submitted for laboratory analysis; 1 geotechnical boring (one sample from the vadose and saturated zones); installation of 6 new monitoring wells (MW-11 thru MW-16); groundwater sampling of 9 monitoring wells; and abandonment of damaged monitoring well MW-1.

The on-site soil and groundwater has been delineated to non-residential land use (established in the MRBCA Process for Petroleum Storage Tanks Guidance dated January 2004). Additionally, there are no soil or groundwater concentrations exceeding applicable Tier 1 Risk-Based Target Levels (RBTLs) for Soil Type 2 non-residential land use.

The following recommendations were noted within this report:

- The soil and groundwater have been delineated in the area of the regulated USTs, therefore, there is no further soil or groundwater sampling recommended.
- As the maximum soil and groundwater concentrations do not exceed applicable pathway specific RBTLs for non-residential land use, no Tier Risk Assessment is recommended.
- As concentrations exceed residential RBTLs, the site usage needs to remain as non-residential. The Quitclaim Deed already in place documents the land use is to remain for non-residential purposes only; therefore, no other activity use limitations are required.
- As concentrations in the groundwater exceed default target levels (DTLs), groundwater use should be restricted. The Quitclaim deed currently restricts groundwater use at the site.
- Based on site data and existing AULs, Terracon recommends the regulated tanks area be closed.

4.0 INITIAL EVALUATION

4.1 Preliminary Site Conceptual Model

During the RI/FS scoping process, a preliminary site conceptual model was developed. To develop this preliminary site conceptual model, information on the chemicals present, pathways, and receptors at the site were used to evaluate potential risks to human health and the

environment. When developing the preliminary site conceptual model, the following was considered:

- known and suspected sources of contamination;
- types of contaminants and affected media;
- known and potential routes of migration; and
- known or potential human environmental receptors.

The preliminary site conceptual model developed for this RI/FS took into consideration the lack of ecological receptors for the Site. The preliminary site conceptual model is provided as Table 1.

4.2 Current Facility Layout

The site is currently developed with eight buildings (Buildings 3, 3A, 6, 7, 9, 10, 11, and 13) as shown on Exhibit 2. The buildings are located on the central and west portion of the site. The eastern portion of the site is a vacant area with mostly old, broken concrete. The majority of the site is covered with concrete and drive areas. The following provides a brief summary about the current buildings.

Building 3 Layout

Building 3 is located on the northwest portion of the site. This building was the previous power plant for the facility. Reportedly, there are steam tunnels that lead from this building to other on-site buildings. The exterior building walls are of brick and cinder block construction. Buildings 3 and 3A combined total approximately 18,098 sq. ft. Terracon conducted a limited walkthrough of Building 3 in April 2012. Due to safety issues (deteriorating structure) and access restrictions (water in the basement), the walkthrough was limited. However, the following is a summary of the observations made in Building 3.

- Boilers and associated equipment are still present in the east and west portions of the building.
- The eastern portion of the main of the building is open from the ground level to the basement. The bottom of this room currently has approximately 3 ft. of water in it and was between 15 and 20 feet below ground surface.
- The floor of the western portion of the building is at a sub-basement level (i.e. the floor is sitting approximately 5 to 8 ft. below ground level) with only one building level in this portion of the building.
- The small addition connected to the south side of Building 3 was observed to be divided into two different sections. The eastern portion included a small room at ground level; a void space appeared to be directly beneath the room (unable to be fully seen to

determine the extent of it). The western portion of this addition was an open room from the ground level to a basement level; water was observed in the bottom of this room.

- The base of a former smokestack was observed associated with this building. Observations associated with the former smokestack and ash room are discussed in Section 4.3.2.

Building 3A

Building 3A is located immediately east of Building 3. This building is constructed with tin siding. The floor at the ground level appeared to be constructed of wood. Inside Building 3, Terracon noted several doors located in the basement along the eastern walls. These doors appeared to be leading to beneath Building 3A.

Building 6

Building 6 is an approximately 56,000-sq.ft. two-story warehouse building constructed on a concrete slab (no basement is present). The building's exterior walls are of transite panel construction.

Building 7

Building 7 is an approximately 8,970-sq. ft. one-story storage building constructed on a concrete slab. A crawl space with a concrete foundation is present beneath this building. The building's exterior walls are of transite panel construction.

Building 9

Building 9 is an approximately 178,379-sq. ft. two-story warehouse building with a basement consisting of. The basement floor is approximately 15 feet below the exterior ground surface. The building's exterior walls are of brick construction with some transite panels. A large tunnel is present leading from the basement of Building 9 into Building 10. In late 2011 when Terracon was inside Building 9, the basement in the northern portion of the building had water intrusion with puddles of standing water on the floor.

Building 10

Building 10 is a two-story warehouse building with a basement consisting of approximately 92,728-sq. ft. The basement floor is approximately 15 feet below the exterior ground surface. The building's exterior walls are of brick construction with some transite panels. A large tunnel is present leading from the basement of this building into Building 9

Building 11

Building 11 is an approximately 216,992-sq. ft. two-story warehouse/office building with a basement. The building's exterior walls are of brick construction and a large tunnel is present leading from the basement of this building into Building 10.

Building 13

Building 13 is an approximately 200 sq. ft. one-story substation transformer building. The floor of this building is located several feet below the surrounding ground surface. It is not known if this building is currently accessible and the condition of the inside of the building is unknown.

4.3 Identified Areas of Potential Concerns

During the preparation this RI/FS WP, the previous reports were reviewed to identify areas of potential concerns. The potential concerns identified during this review are summarized and listed in Table 2. The information discussed associated with each of the Items in Sections 4.3.1 thru 4.3.10 was obtained from the previous reports. For summary information related to referenced previous reports, refer to Sections 3.4.1 thru 3.4.22.

The potential items or areas of concern associated with the site are broken down into subsets for discussion. They are first broken into “areas” and then into “items”. Primarily, areas of the site include the other site items (items in multiple locations across the site) or are based on the building number. This is for ease of location and based on concerns with activities at these buildings.

Each potential concern was identified as an “Item”. The potential concern with things that were site wide or had multiple locations are identified as Item S1 thru S4 (i.e. Item S3 corresponds to “rail spurs”, which are found in multiple areas across the site). The remaining potential concerns are listed as “Item” followed by a number with a decimal; the number corresponds to the building number associated with the concern and the decimal number represents the separate potential concerns with that building (i.e. Item 9.2, the 9 corresponds to Building 9 and the “.2” corresponds to the second item associated with Building 9).

4.3.1 Other Site Items or in Multiple Locations

Item S1 – Former Creek Area, Buildings 9, 10, & 11

A former creek dump that was reported in the areas of Buildings 9, 10, and 11 was identified during the review of the *Cultural Resources Assessment* dated 1999 by Three Gables Preservation (2001, Terracon—*Preliminary Assessment Report* [page 8, Reference 45]). Reportedly “Four fingers of a creek” previously traversed this area prior to construction for Buildings 9, 10 and 11. The four fingers of the creek were approximately 28 to 30 feet deep and were previously used as a dump. “Objectionable material” (materials were not otherwise described) was removed and the area was backfilled prior to construction.” No additional information was provided in the PA report or Reference 45. Additionally, historical aerial photographs¹ (earliest one reviewed was from 1940), historic topographic maps² (earliest one

¹ Historic aerial photographs are provided in Appendix A.3 and Appendix B.

² Historic topographic maps are provided in Appendix B.

with a small scale was 1935), and historic fire insurance maps³, do not show obvious signs of the four fingers of a creek in the area of Buildings 9, 10, and 11. The 1940 historical aerial photograph showed some trees on the southern portion of the site and on the eastern portion of the site; a creek appears to be possible in the trees on the eastern portion of the site.

Due to the materials being removed prior to construction of the buildings, soil and groundwater sampling is not provided associated with this Item. A series of soil borings have been advanced north of Building 10 (during the Regulated Tanks investigation) and are proposed during the site characterization between Buildings 9, 10, and 11 for other items.

Item S2 – Open Storage Area, Insecticide Storage

Insecticide storage was identified during the review of the *Cultural Resources Assessment* dated 1999 (2001, Three Gables Preservation – *Preliminary Assessment Report* [page 11, Reference 45]). The *Cultural Resources Assessment* stated “Various plans indicate that 5 gallon water cans, GI cans, and insecticide were among the items kept in the open storage.” The assessment did not mention a more specific location of the insecticide storage. One plan was provided in the *Cultural Resources Assessment* but it did not appear to note the location of the insecticide storage, however, the plan was in poor condition.

No soil or groundwater analytical testing for insecticides has been completed in the open storage area. Additional sampling is proposed associated with this Item and discussed in the SAP (provided as a separate document).

Item S3 – Rail Spurs, Various Locations Across the Site

Historically, there were multiple railroad spurs across the site. Historical fire insurance maps⁴, the Reservation Layout Plan⁵, and The Plot Plan of the Kansas City Quartermaster Depot⁶ show past locations of on-site railroad spurs. The aerial photographs⁷ show the locations of possible former railroad spurs on the east portion of the site.

During the recent site characterization associated with the regulated tanks (2012, *Regulated Tanks Site Characterization Report*, [Appendix C, soil boring logs]), rubble fill was encountered in the surface and upper subsurface soils in the area the regulated USTs. The rubble fill was encountered in the area of the former buildings and former railroad spur area. Black cinders were observed in this material. Additionally, the ground penetrating radar survey (GPR) completed in the area of the regulated USTs noted that the railroad spurs on the east and west side of the regulated USTs were still present.

³ Historic fire insurance maps are provided in Appendix A.3.

⁴ Sanborn maps (PA/SI Reference 6) provided in Appendix A.3.

⁵ Reservation Layout Plan (PA/SI Reference 11) is provided in Appendix A.3.

⁶ The Plot Plan of the Kansas City Quartermaster Depot (PA/SI Reference 45) is provided in Appendix A.3.

⁷ Historic aerial photographs are provided in Appendix A.3 and Appendix B.

Sampling has not been completed directly associated with the railroad spurs. Additional sampling is proposed associated with Item S4 and discussed in the SAP (provided as a separate document).

Item S4 – Paint Thinner Spill, Unknown Location

A spill of 78 one-gallon containers was reported at 619 Hardesty Avenue on May 1, 1987 (2001, Terracon – *Preliminary Assessment Report* [page 21, References 22 & 35]). The PA report stated the Building number for the 619 Hardesty Avenue address was unable to be determined. The PA continued to say “No other records of this spill or information regarding the specific location of this spill were available from the GSA or MDNR for review.”

As a specific location for this spill is unable to be determined, no biased sampling has been conducted. However, various VOC related sampling has been completed across the site and will be completed during the RI process; the proposed sampling is discussed in the SAP.

4.3.2 Items around Building 3 and Building 3A

Item 3.1 – Smokestack Ash

A 12-story brick smokestack was observed associated with Building 3 to the north (2001, Terracon – *Preliminary Assessment Report* [page 5]). During the PA/SI, an ash clean-out room, containing ash, was observed in the basement associated with the smokestack. Several years ago, the top of the smokestack was decommissioned and demolished. Currently, the smokestack remains to the height of a typical single-story structure on the north side of Building 3. The remaining stack has not been determined to be safe to enter. If the ash is present, it is under bricks and rubble at the base of the former stack as the stack has since been removed with some debris left at the base of the stack. The basement area of Building 3 is also currently full of water.

The entrance to the smokestack appeared to be through the basement. During a brief building walkthrough in April 2012, Terracon was unable to access the basement in Building 3. The basement of Building 3 was inaccessible due to approximately 3 feet of water throughout it. A limited view from a catwalk in Building 3 into what was believed to be the smokestack room revealed what appeared to be cinderblocks and bricks in the area of the smokestack. Due to the water in the basement and the limited view, Terracon was unable to confirm this to be the smokestack area. During a phone interview on May 1, 2012 with Mr. Dan McEntee, former Hardesty Federal Complex property manager, Mr. McEntee stated that the smokestack was decommissioned due to safety issues. To Mr. McEntee’s knowledge, most of the smokestack material was removed but he assumed there was debris remaining as a portion of the smokestack was still present. Mr. McEntee stated that he did not recall if that the ash in the bottom of the smokestack was removed prior to decommissioning of the smokestack.

Based on review of the past information, several sampling events have been conducted associated with the ash sampling. The following provides a summary of the three sampling events:

- In 1999, Terracon collected one grab sample of the ash to determine the characteristics of the ash (1999, Terracon – *Phase II Environmental Audit*⁸). This sample was analyzed for TCLP metals. The results of the single grab sample of the ash indicated that lead was detected at a concentration of 7.0 mg/L, which is a level that would be classified as hazardous. All other TCLP metals were below the reporting limits.
- On February 22, 2000, three samples were collected by GSA. TCLP concentrations in these samples were at levels below the regulatory limit, with concentrations of 1.01 mg/l, 0.181 mg/l, and 0.397 mg/l (2001, Terracon – *Preliminary Assessment Report* [reference 10⁹]).
- In February 2002, three confirmation ash samples were collected by Terracon (2002, Terracon – *Site Investigation*¹⁰). Laboratory analytical results indicated that lead was detected in one of the ash samples at 0.830 mg/l; the other two samples and a field blank were not reported above the reporting limit.

The laboratory reports did not show that total metals were analyzed in these samples. The initial sample that had an elevated TCLP lead result was reported as a “grab” sample; the six follow-up samples all had low or non-detect TCLP results, below the classification of a hazardous material. The ash material is not considered a characteristically hazardous material. Additional investigation or sampling has been requested by the MDNR. Proposed sampling is discussed in the SAP.

Item 3.2 – UST

The GSA Master Plan¹¹ (2001, Terracon – *Preliminary Assessment Report*, [Reference 20]) indicated an “abandoned 1,000-gallon underground diesel fuel oil tank” located on the west side of the southwest corner of Building 3. In 2000/2001 CAPE completed an investigation around this UST (2001, *Draft Former USTs Site Characterization Report*).

The CAPE report indicates this UST was abandoned in place. Four soil borings (SB24 through SB26 and SB44) were installed to depths ranging from 20 to 24 ft. bgs in 2000. Three soil borings were advanced on the north, south, and west side of the estimated location of the abandoned 1,000-gallon UST¹². An additional boring was advanced on the north side of the northwest corner of Building 3. The UST appeared to be located in close proximity to Building 3. The depths of the samples collected for analytical testing were 4 to 8 feet and 12 to

⁸ A copy of the *Phase II Environmental Audit* (PA/SI Reference 9) is provided in Appendix A.1.

⁹ A copy of the GSA sampling results (PA/SI Reference 10) is provided in Appendix A.3.

¹⁰ A copy of Figure 5 (Ash Sampling Locations) and Table 4 (Analytical Results for Ash Samples) from the SI Report is provided in Appendix A.4.

¹¹ A portion of the GSA Master Plan (PA/SI Reference 20) illustrating the UST near Building 3 is provided in Appendix A.3.

¹² Figure 4 (associated soil boring map) and applicable Table 1 Soil Analytical Results (Draft Former USTs Site Characterization Report) are provided in Appendix A.2.

16 feet. The field screening data collected from the suspect UST location did not identify detectable concentrations of chemicals of concern. Additionally, the four soil samples were analyzed by Iowa Methods OA1 and OA2 and no analytes were detected.

This UST was discussed in the draft report dated April 2001 (*Preliminary Assessment Report* [reference 24]) but does not appear to be referenced in the final characterization reports (*Former USTs Site Characterization Report* dated June 2001, *Heating Oil USTs Site Characterization Report* dated November 2001, to *Former USTs Site Characterization Report Addendum* dated November 2001). The final reports do not discuss the omission of this information. These “final” reports indicate that it is for the site characterizations for Building 3A and/or 4 but does not mention Building 3.

Based on the screening results from the soil borings, limited additional investigation associated with this UST is required to verify the screening and sampling results from the CAPE investigations; the proposed limited additional sampling is discussed in the SAP.

Item 3.3, Item 3.4, Item 3.5 – USTs

The GSA Master Plan¹³ (2001, Terracon – *Preliminary Assessment Report*, [Reference 20]), identified four USTs around Building 3A. In the past, these four USTs have been grouped together, therefore, these USTs will remain grouped together for the continued discussion and proposed investigation. The following USTs in the area of Building 3A were identified on the GSA Master Plan:

- “Abandoned 2,000 gallon underground fuel tank” located directly north of Building 3A.
- “2-23,500 gallon underground storage tanks w/5’ earth cover” located directly east of Building 3A. The two USTs were laying parallel to each other, in an east/west orientation.
- “150,000 gallon underground fuel oil tank, concrete construction w/shallow earth cover (do not apply concentrated loads of loads over 200 lbs. over tank)” located southeast of Building 3A. This tank was orientated in a north/south direction and immediately south of the west end of the two 23,500 gallon USTs.

There are slight discrepancies of the sizes and contents of these former USTs in the past reports. CAPE (2001, CAPE – *Former USTs Site Characterization Report*) provided the following information associated with these USTs:

- “One 2,000 gallon UST (fuel oil) was located at the northeast corner of Building 3A. This UST was abandoned in place.
- Two 23,000 gallon USTs (heating oil) formerly located in the grassy area east of Building 3A. These USTs were removed in circa 1988.
- One 178,000 gallon UST (heating oil) was located southeast of Building 3A. This UST was abandoned in-place.”

¹³ A portion of the GSA Master Plan (PA/SI Reference 20) illustrating the UST locations around Building 3A is provided in Appendix A.3.

Also, it should be noted that the first CAPE report stated the 178,000-gallon UST was reportedly removed in 1988 and evidence of fuel oil release was observed at the time of removal and was remediated by over-excavation; however, based on other comments, this UST appears to have been abandoned in place. This comment and over-excavation may refer to the two 23,000-gallon USTs.

Past investigations in the early 2000's from this area have included *Former Building USTs Site Characterization Report* dated June 2001, *Heating Oil USTs Site Characterization Report* dated November 2001, and *Former USTs Site Characterization Report Addendum* dated November 2001, all prepared by CAPE. The soil and groundwater sampling completed during these investigations are summarized in Sections 3.4.5 through 3.4.8; a summary of the results¹⁴ from those investigations can be found in those Sections.

In July 2011, Terracon completed a groundwater sampling event (2011, Terracon – *July 2011 Groundwater Sampling Report*) that included in the sampling of several monitoring wells in this area. The monitoring wells located around the unregulated USTs include MW-4, MW-5, MW-6, MW-7, MW-8, and MW-10. Slight concentrations of TPH-DRO, benzene, ethylbenzene, and anthracene were detected in MW-5. Monitoring well CMW-5S, located down-gradient of the regulated USTs had concentrations of TPH-GRO and naphthalene (these petroleum concentrations may or may not be related to the fuel oil USTs located around Building 3A). The groundwater sampling completed during this investigation is summarized in Section 3.4.20.

Additional sampling is proposed with these unregulated USTs and discussed in the SAP.

4.3.3 Items around Building 4

Item 4.1 – Garage

Building 4 was a garage (2001, Terracon – *Preliminary Assessment Report* [page 10, Reference 11]). This building was labeled as a “GAR.” on the Reservation Layout Plan¹⁵. No evaluation regarding the actual use of this building as a garage has been completed. There are USTs (see Item 4.2 below) associated with this area; petroleum impact with the USTs has been documented.

Most of the area where Building 4 was located was excavated during the removal of the regulated USTs (see Section 3.4.4). The excavations extended to a depth of 25 to 35 feet bgs). Additionally, this area was recently investigated during the Regulated Tanks Site Characterization (see Section 3.4.22).

As most of the area around former Building 4 was excavated during the UST removal (see Section 3.4.4) and previously investigated during the Regulated Tanks Site Characterization, no

¹⁴ A copy of the pertinent figures and tables with the investigation data collected during CAPE's investigation is provided in Appendix A.2.

¹⁵ A copy of the Reservation Layout Plan (PA/SI Reference 11) illustrating the location of Building 5 (paint house) is provided in Appendix A.3.

soil sampling is required. The groundwater sampling conducted during the Regulated Tanks Site Characterization in this area did not include other COPCs, therefore, additional groundwater sampling in this area is proposed with this Item and discussed in the SAP.

Item 4.2 – USTs

The GSA Master Plan¹⁶ (2001, Terracon – *Preliminary Assessment Report*, [Reference 20]) identified one 560-gallon gasoline tank and two 1,000-gallon gasoline tanks located between Building 7 and Building 10 (area of former Building 4).

Past investigations in this area have included *Former Building 4 UST Closure Assessment Report* dated June 2000 and *Former Building USTs Site Characterization Report* dated June 2001 prepared by CAPE for GSA. Terracon recently completed a Site Characterization Report to further evaluate these USTs (see Section 3.4.22).

These three USTs are considered regulated USTs by the MDNR. All regulated USTs within the State of Missouri are handled through the MDNR Tanks Section. Therefore, this Item of concern is being addressed separately through the MDNR Tanks Section.

4.3.4 Items around Building 5

Item 5.1 – Paint House

Building 5 was a paint house (2001, Terracon – *Preliminary Assessment Report* [page 10, Reference 11]). No additional information was provided within the text of the PA report. No evaluation regarding the use of this building as a “paint house” has been completed. This building was labeled as a paint house on the Reservation Layout Plan¹⁷. Building 5 appears to be located near the northern portion of current-day Building 10 potentially near the tunnel between Buildings 9 and 10.

Additional sampling is proposed with this Item and is discussed in the SAP.

4.3.5 Items around Building 6

Item 6.1 – Painting Activities

Spray painting activities (along with welding) were associated with the circuit board manufacturing completed in Building 6 (2001, Terracon – *Preliminary Assessment Report* [page 7]). A table listing the potential sources of concern within the PA report (2001, *Preliminary Assessment Report* [page 23]) identified “painting activities” associated with Building 6. The reference or justification is listed as “possible area of disposal between Buildings 6 and 9).”

¹⁶ A portion of the GSA Master Plan (PA/SI Reference 11) illustrating the UST locations around Building 3A is provided in Appendix A.3.

¹⁷ A copy of the Reservation Layout Plan (PA/SI Reference 11) illustrating the location of Building 5 (paint house) is provided in Appendix A.3.

During the SI investigation, VOC sampling of the soil and groundwater was completed in this area. Impact was found in the groundwater but it was contributed to the TCE release from the use of Impregnant I.

Additional sampling is proposed with this Item and is discussed in the SAP.

Item 6.2 – Circuit Board Manufacturing

Circuit board manufacturing activities were completed in Building 6 (2001, Terracon – *Preliminary Assessment Report* [page 7]). FAA occupancy of Building 6 began in 1969 as an FAA warehouse for electronic equipment and for electronic equipment assembly. The PA report referenced Terracon’s 1999 Phase I ESA and stated that “printed circuit boards were manufactured at Building 6, with welding and spray painting activities”. The spray painting activities are discussed under Item 6.1 above. A table listing the potential sources of concern within the PA report (2001, *Preliminary Assessment Report* [page 23]) identified “circuit board manufacturing” associated with Building 6 with a “possible area of disposal between Buildings 6 and 9.”

RCRA metals were sampled in the area Building 6 and 9 during the SI. Previous soil and groundwater samples were collected in this area for RCRA 8 metals. The soil samples were collected at depth, 12 to 16 feet bgs. The analytical results indicated that RCRA 8 metals were within expected ranges of naturally occurring concentrations. There were reported RCRA 8 metal concentrations in the groundwater. The initial groundwater samples were likely unfiltered. In the follow-up samples, the groundwater reportedly was filtered prior to analyzing but some concentrations were still detected.

Additional sampling is proposed with this Item and is discussed in the SAP.

Item 6.3 – Clothing Treatment/Renovation Plant

Building 6 was originally constructed as a clothing treatment/renovation plant as part of the Chemical Warfare Service Project (2001, *Preliminary Assessment Report* [page 6]). This building was built in 1941 and the clothing renovation plant remained in operation until August 10, 1945. The purpose of the project was to treat new Army uniforms with “Impregnant I” to make them gas-resistant against chemicals such as “mustard gas.” Old uniforms were to be laundered and then treated with “Impregnant I” (2001, *Preliminary Assessment Report* [References 11 and 45]). The *Cultural Resources Assessment* (2001, *Preliminary Assessment Report* [reference 45]) prepared for the site provided the following information:

“The chemicals which were used to form “Impregnate I” were kept in tanks outside the building. The chemicals were mixed, then pumped through pipelines into the second floor of the building. The clothes were washed in the chemical mixture in machines on the second floor. After washing, they were drained upstairs, with an attempt to recover the chemicals during drainage. The clothes were then sent below to dry in clothes dryers. In the same building, they were spread on tables, folded, and packed for shipping. Soon after the Clothing Renovation Plant began operations, it was noticed that a rash of illnesses were occurring among employees. The operating officer notified his superiors, and soon thereafter a medical department

was initiated. Better safety procedures were implemented and experimentation with the chemicals led to a lower concentration.”

The following additional information was provided within the PA Report regarding the associated use of the clothing renovation plant in and around Building 6 (2001, *Preliminary Assessment Report* [page 6-7]):

“The following additional structures associated with the clothing treatment/renovation plant were formerly located south of Building 6, in an area currently grass-covered: a cooling tower, two pump houses, two storage tanks, and a recovery tank (Reference 11¹⁸). One of the pump houses was identified as Building 14 in a diagram dated December 1979 (Reference 12). Information obtained from a Phase I Environmental Site Assessment (ESA) of the Hardesty Federal Center, prepared by Terracon, dated August 19, 1999, indicated that two or three open concrete below grade rooms may have been formerly located in the grassy area to the south of Building 6 (Reference 8). These rooms were reportedly used to hold the tanks containing the “Impregnate I” and were reportedly filled with sand several years ago (Reference 8). What appeared to be objects (possibly holding tanks/structures associated with the former clothing treatment process) were evident in 1961, 1967, 1973, and 1980 aerial photographs of the site (Reference 50).

According to the December 1979 site diagram, two pits and tank support structures were located in the current-day grassy area between Buildings 6 and 9, presumably associated with tanks containing clothing treatment/renovation chemicals (possibly “Impregnate I”). According to the December 1979 site diagram, an existing concrete pit, 33 feet long, 14 feet wide, and 5 feet 8 inches deep, was located in the current-day grassy area along the southern exterior side of Building 6. The site diagram indicated that the floor in this pit was to be broken through in four places for drainage, that the existing concrete tank supports were to remain, and that the pit was to be filled. The pit was filled with sand or soil according to interviewee information obtained from Terracon’s Phase I ESA report dated August 19, 1999 (Reference 8). Another existing concrete pit, 14 feet long, 14 feet wide, and 3 feet deep, was located approximately 40 feet south of Building 6 in the current-day grassy area. The site diagram indicated that the walls and pedestals of this pit were to be demolished to 2 feet below finish grade. The site diagram also indicated that five concrete tank supports were to be demolished to 2 feet below finish grade and that the slab was to be broken at five locations. These tank supports were depicted along the southern exterior wall of Building 6 (Reference 12). Depressions observed in the ground surface in this area during the Terracon site visits in 1999 and 2001 appear to correspond to locations on site diagrams showing the recovery tank and holding tank structures associated with the clothing treatment/renovation activities (Reference 4).

Waste characteristics, if any, associated with the clothing treatment/renovation plant could not be documented or verified during the preparation of this PA. However, the Cultural Resources Assessment report indicated that the uniforms were drained, after being washed, in an attempt to recover the chemicals used in the impregnation process. At the end of World War II, many of the records from the war were destroyed as part of demobilization activities (Reference 45). As a result, records concerning the ingredients of “Impregnate I” and any waste characteristics or disposal practices were not readily available. The potential exists that a possible release of CERCLA hazardous substances to soil and/or shallow groundwater from the former chemical holding tank pits may have occurred, based on a lack of supporting documentation to prove otherwise.”

During the Site Investigation, chlorinated VOCs (such as PCA, PCE, TCA, TCE, and cis-DCE) were detected in the groundwater at the site in concentrations (2002, Terracon – *Site*

¹⁸ A portion of the General Layout (PA/SI Reference 12) illustrating the area south of Building 6 is provided in Appendix A.3.

Investigation, [page 19]). The SI indicated that the horizontal extent of the VOCs in the groundwater is toward the north, northeast, east, and southeast of the area formerly associated with the storage of clothing treatment/renovation chemicals. The results of the SI prompted several additional on-site and off-site soil and groundwater investigations. These investigations have been summarized in Sections 3.4.12, 3.4.13, 3.4.14, 3.4.15, 3.4.18, 3.4.19, and 3.4.20; various diagrams outlining the sampling locations and data tables have been included in the appropriate appendices in Appendix A.

Monitoring wells CMW-5S (shallow well) and CMW-5D (deep well) have the highest concentrations of chlorinated VOCs. These investigations have identified that chlorinated VOCs are migrating off-site to the northeast. The shallow soils (2007, SCS – *Limited Soils Investigation*, 2007) revealed the shallow soils in the area of Building 6 have been impacted with trace concentrations of VOCs and TPH-DRO with the source likely being the clothing treatment/renovation plant.

Most of the historical Geoprobe soil and groundwater analytical data is old and can only be used for screening purposes. Further on-site soil and groundwater data is required. Additional sampling is proposed associated with this Item and is discussed in the SAP.

Item 6.4 – Cooling Tower

A cooling tower was reportedly present on the south side of Building 6 (2001, Terracon – *Preliminary Assessment Report* [page 6, Reference 12]). This cooling tower is shown on the General – Layout Plan¹⁹. Additional information, including the age and length of time the cooling tower was utilized was not provided within the report.

A few soil samples were collected from the area of these cooling towers and analyzed for RCRA 8 metals; however, these samples were collected from soils at depth (12 to 16 feet bgs). The analytical results indicated that RCRA 8 metals were within expected ranges of naturally occurring concentrations.

Additional sampling is proposed in this area and is discussed in the SAP.

4.3.6 Items around Building 9

Item 9.1 – Firing Range

A former firing range was previously located in the basement of Building 9 (2001, *Preliminary Assessment Report* [page 9]). Previous sampling indicated the sand trap contained spent shell casings; past sampling classified this material as hazardous. Terracon completed a cleanup of this firing range, documented in *Revised Cleanup of Firing Range Report*²⁰ dated May 1, 2012 (see Section 3.4.21 for additional details). The materials within the firing range were removed

¹⁹ A portion of the General Layout (PA/SI Reference 12) illustrating the area south of Building 6 is provided in Appendix A.3.

²⁰ Appendix A.11 includes a Sample Location Diagram and associated tables from the *Revised Cleanup of Firing Range Report*.

(i.e. sand, backstop, wood debris, etc.). The ceilings, walls, and floors were then cleaned and painted. The laboratory analysis of the final wipe samples indicates that lead was not detected at concentrations above the laboratory detection limit.

Based on the results of the *Revised Cleanup of Firing Range Report*, no additional sampling is required associated with this Item.

Item 9.2 – Cooling Tower

The GSA Master Plan²¹ (2001, Terracon – *Preliminary Assessment Report*, [Reference 20]) indicated a “cooling tower” located on the east side of Building 9, directly south of the north building wing.

Past sampling or investigations associated with this cooling tower were not identified. Sampling is proposed associated with this Item and is discussed in the SAP.

4.3.7 Items around Building 11

Item 11.1 – Film Processing

A film processing room was on the first floor of Building 11 (1999, Terracon – *Phase I ESA Report*, [page 10-11]). The 1999 Phase I ESA (see Section 3.4.2) included the following information about the photo processing room and associated equipment:

“Potential contamination indicators observed in Building No. 11 on the subject site during the visual survey were noted as: staining in a basin in the film processing room on the first floor, and a slight odor of film developing chemicals in the film processing room on the first floor.”

“A former chemical feed pump observed in the photo processing room on the first floor in Building No. 11...Mr. Peoples (maintenance technician with GSA) stated that the former chemical feed pump in the photo processing room on the first floor in Building No. 11 formerly pumped photo developing chemicals, formerly stored in the basement, up to the photo processing room. According to Mr. Peoples, the pump pipes and pump mechanism have been removed.”

Terracon’s 1999 Phase I ESA provided a discussion of “contamination indicators” that were noted during the site reconnaissance. Other than the staining in the basin and a slight odor of film developing chemicals in the film processing room on the first floor, no other contamination indicators were reported in Building 11.

In November 1999, Terracon completed *Phase II Environmental Audit* for the Hardesty Federal Center and collected and arranged for analysis of samples from the basin of the film processing room on the first floor of Building 11. A grab sample was collected from the basin in this room and had it analyzed for corrosivity by Method 1110 and silver by Method 6010B. The sample

²¹A portion of the GSA Master Plan (PA/SI Reference 20) illustrating the location of the cooling tower is provided in Appendix A.3.

was reported as not corrosive and silver was not detected above the reporting limit of 1.002 mg/kg²².

Based on the results of this sampling, additional investigation associated with this Item is not required.

Item 11.2 – Production of Newspaper

The Army “Home Town News” was produced in Building 11 (2001, Terracon – *Preliminary Assessment Report* [page 10/Reference 45]). No additional information regarding the associated processes with the “Home Town News” was provided in the PA Report or the associated reference.

During the RI/FS Scoping process, more information associated with the Army Home Town News was gathered. The abstract for A Study of the Army Hometown News²³ (Sevilla & Hiatt, 1977) stated the following:

“The Army Hometown News Center (AHTNC) was established in 1951. It is a centralized processing point for news items about an individual from the unit/post to the news media servicing that individual's home area. The mission of the AHTNC is to improve, supervise and control the flow of informational material to hometown news media. It is designed to receive, evaluate, and edit all hometown news and feature stories in order to obtain the maximum hometown interest and to insure that each release is appropriate as to style and content. It receives hometown news from all Army units worldwide and handles the time-consuming details required for each hometown news story, e.g., writing, duplication, media selection, addressing and mailing. The work of the AHTNC is based on the assumptions that hometown news material fills a real need to inform the people back home of the accomplishments of a local soldier, and that timely, newsworthy, well written releases will be printed by the hometown newspapers. This study was designed to: (1) Determine if the number of news and photo stories used by civilian newspapers is an acceptable level of return in relation to the cost of releasing the material; (2) Evaluate, by means of a telephone survey, readership reaction to hometown news releases; and (3) Provide recommendations of the most cost effective means of providing the service after exploring and comparing alternative methods with those used by the AHTNC.”

The Department of the Army Pamphlet 360-3, Army Public Affairs, Army Hometown News Program²⁴ (Army, 1984) was also reviewed. This pamphlet was a guide for public affairs specialists, supervisors, and officers who administered their unit and command hometown news programs. The following was noted in the pamphlet specifically related to the Army Hometown News Center in Kansas City:

“Originally established as the Army Hometown News Center in Kansas City, Missouri, in 1951, the Army center was combined with a similar Air Force function in October, 1980, at Kelly Air Force Base in San Antonio, Texas. The Army and Air Force Hometown News Directorate is now a two-Service function that operates within the AFSINC at Kelly Air Force Base. The consolidated directorate was established to provide the most economical production and distribution of information about Army and Air Force members to their hometown news media. Thousands of newspapers, radio stations, and television stations throughout

²² A copy of the Phase II Environmental Audit is provided in Appendix A.1.

²³ See http://books.google.com/books/about/A_Study_of_the_Army_Hometown_News_Center.html?id=4Zr2NwAACAAJ

²⁴ See http://www.apd.army.mil/pdffiles/p360_3.pdf

the United States and its possessions have requested these releases. In some areas, hometown news releases represent the major source of information about Army activities.”

Based on this information, the Army Home Town News in Building 11 conducted office related operations with the preparation and coordinating of the Army Home Town News. Printing was completed by the individual towns and not at the site. Therefore, no sampling or additional investigation associated with this Item is required.

4.3.8 Items around Building 13

Item 13.1 – Transformer Building

Building 13 is one-story substation transformer building (2001, Terracon – *Preliminary Assessment Report* [page 10]) that was constructed on a concrete slab in the 1940's. This substation most recently provided electrical power form the Kansas City Power and Light (KCP&L) and distributed power to each of the on-site buildings. During the 2001 PA site reconnaissance, the interior of Building 13 was not accessible and therefore not observed during the PA reconnaissance. The PA report stated that information in Terracon's 1999 Phase I ESA reported that Terracon representatives had access to the interior of Building 13 during the 1999 site visit; reportedly, the transformers were labeled as non-PCB.

Information within the previous Phase I ESA or the PA reports did not indicate that PCB or other sampling had been completed associated with the previous use of this building as a substation. Sampling is proposed associated with this Item and is discussed in the SAP.

4.3.9 Items around Building 19

Item 19.1 – Tank

The GSA Public Buildings Service, Construction Management Division Region 6, Kansas City, Missouri "Demolition Plan" dated December 1979²⁵ included a note that stated "remove 6 foot diameter tank and fill hole" (2001, Terracon – *Preliminary Assessment Report* [Reference 12]). This statement had an arrow pointing to the east side of Building 19. No additional information regarding this tank was provided within the PA/SI Reports or following investigations. No soil or groundwater sampling has been completed in the area of Building 19.

Sampling is proposed associated with this Item and discussed in the SAP.

4.3.10 Items around Building 20

²⁵ A portion of the Demolition Plan (PA/SI Reference 12) is provided in Appendix A.3.

Item 20.1 – UST

The GSA Master Plan²⁶ (2001, Terracon – *Preliminary Assessment Report*, [Reference 20]) indicated an “abandoned 1,500-gallon underground fuel oil tank” located on the east side of the Building 20. According to the *CAPE Former USTs Site Characterization Draft Report* dated April 2001, this UST was reportedly removed in 1988. An installation date was not provided.

The Site Characterization²⁷ report indicated that four soil borings (SB45 through SB48) were installed to depths ranging from 20 to 24 feet bgs. Two soil borings were located on the north and south ends of the estimated location of the abandoned 1,500-gallon UST. The additional two borings were slightly further north and south of the UST. The depths of the samples collected for analytical testing were 12 to 16 feet and 16 to 20 feet. The field screening data collected from the suspect UST location did not identify detectable concentrations of chemicals of concern. Additionally, the four soil samples were analyzed by Iowa Methods OA1 and OA2 and no analytes were detected.

This UST was discussed in the draft report dated April 2001 (2001, Terracon – *Preliminary Assessment Report* [Reference 24]) but does not appear to be referenced in the final characterization report (*Former USTs Site Characterization Report* dated June 2001). The final report does not discuss the omission of this information. This “final” report indicates that it is for the site characterizations for Building 3A and/or 4 but does not mention Building 20. The abandoned 1,500-gallon UST is located on the east side of Building 20, which is why it may have been omitted.

Based on the screening results from the soil borings (no elevated PID readings or observations of impact) and analytical results (no detections above the laboratory detection limits) of four borings immediately next to the USTs, limited additional investigation associated with this UST is required to verify the screening and sampling results from the CAPE investigations; the proposed limited additional sampling is discussed in the SAP.

4.3.11 Building Related Items

There have been asbestos containing materials (ACM), lead-based paint (LBP), and transformers (possibly containing PCBs) identified throughout the on-site buildings. The current property owner is responsible for addressing items associated the buildings, therefore, ACM, LBP, and transformers are not being addressed in the RI/FS WP.

²⁶ A portion of the GSA Master Plan (PA/SI Reference 20) with the UST near Building 20 is provided in Appendix A.3.

²⁷ Figure 4 (associated soil boring map) and a portion of the Table 1 Soil Analytical Results are provided in Appendix A.2.

5.0 RI/FS WORK PLAN APPROACH

The RI and FS will be conducted concurrently and the data collected in the RI will guide the development of remedial alternatives in the FS. This RI/FS WP documents the decisions and evaluations made during the scoping process and presents anticipated future tasks.

This Section describes the approach for collecting data as part of the RI/FS. The following are discussed in this Section:

- Objectives of the RI sample collection through evaluation of the Data Quality Objectives (DQO's) and
- The data screening approach to support the HHRA.

5.1 Objectives of the RI/FS Data Collection

As stated in the RI/FS Guidance (USEPA, 1988), “the RI/FS must obtain data to define source areas of contamination, the potential pathways of migration, and the potential receptors and associated exposure pathways to the extent necessary to:

- Determine whether, or to what extent, a threat to human health or the environment exists;
- Develop and evaluate remedial alternatives (including the no-action alternative); and
- Support future enforcement or cost-recovery activities.

The major components of the field data collection activities are (USEPA, 1988) the following:

- Data on the physical characteristics of the area and surrounding areas should be collected to the extent necessary to define potential transport pathways and receptor populations and to develop sufficient engineering data for development and screening of remedial alternatives”;
- Define sources of contamination; and
- Characterize the nature and extent of contamination such that informed decisions can be made as to the level of risk presented by the site and the appropriate type(s) of remedial response.

To obtain the data and complete these components, the following tasks will be completed:

- Define physical characteristics of the area;
- Define characteristics or classifications of soil, groundwater, and soil gas, if necessary based on soil and groundwater data;

- Nature and extent of contamination (assist with developing informed decisions as to the level of risk of each Item of Concern, non-compliance with Applicable or Relevant and Appropriate Requirement (ARARs), and the appropriate type(s) of remedial response;
- Completion of a Baseline HHRA; and
- Evaluation of remedial alternatives for addressing unacceptable risks and ARARs.

After completing the work outlined in the SAP, a Preliminary Site Characterization Summary report will be completed as discussed in Section 7.0. This summary will provide a preliminary reference for developing the risk assessment, and evaluating the development and screening of remedial alternatives, and the refinement of COPCs to identify contaminants of concern (COCs).

The data obtained during the RI will be analyzed and evaluated to describe the following:

- The site's physical characteristics,
- Contaminant source characteristics;
- Nature and extent of contamination;
- Contaminant fate and transport; and
- Human health risk assessment

The evaluation will include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. A professional land surveyor will certify all survey locations.

Based on past site data and further evaluation of areas at the site (Section 3.4), potential release areas are limited as were the historic operations of the site. Therefore, judgmental sampling is the principle sampling methodology to be used during this RI. Significant prior knowledge of the site and contaminants present further justify judgmental (nonprobabilistic) sampling verses statistical sampling.

The site is located in the middle of the city with no surface water or sediment on or near the site. The PA discussed groundwater, surface water, soil, and air exposure pathways, or lack thereof. Therefore, as ecological habitat appears to be lacking, a qualitative ecological receptor assessment will be completed during the site characterization process rather than a quantitative assessment. This will include a description of the environmental setting, including habitat types, observed species and species likely to be present based on habitat types documented, and threatened, rare, and endangered species; and discussion of complete exposure pathways that might exist.

5.2 Data Quality Objectives

The seven-step DQO process, as described in USEPA guidance (USEPA, 2000), was used as the framework for designing this RI/FS for the Site. These DQOs will be updated as appropriate as the project progresses.

Step 1: State the Problem

The problem for the Hardesty Federal Complex can be summarized as follows: *Former activities at the facility have resulted in releases to the environment which may pose a threat to human health and the environment and non-compliance with ARARs, PRGs, or other health based criterion. Previous detections of VOCs and petroleum hydrocarbons and other potential COCs not yet sampled have produced uncertainty as to whether or not conditions at the Hardesty Federal Complex that present unacceptable risk to human health and the environment.*

The following text documents the process used to characterize the site such that informed decisions can be made as to the level of risk presented by the area, and the appropriate responses, and to identify which data are needed to efficiently meet the RI/FS objectives.

A Conceptual Site Model (CSM) has been developed showing the potential receptors/exposure scenarios in connection with the Site. The CSM will be carefully maintained and updated throughout the RI/FS. The CSM is provided as Table 1.

Several valuable resources were made available during the development of the RI/FS WP. The main resources were the previous investigations (discussed in Section 3.4). Additionally, historical aerial photographs, maps, and other resources (many provided in the previous reports and Appendix B) are available.

Primary areas of release include the former fuel oil storage in the vicinity of Building 3 and the former use and storage of solvent related chemicals in the area of Building 6.

Step 2: Identify the Decisions

The initial RI principle study questions can be phrased as follows: 1) *Could contamination at the Hardesty Federal Complex pose an unacceptable risk to human health or the environment or result in non-compliance with ARARs?* 2) *Where do the contaminant concentrations exceed ARARs and/or preliminary remediation goals (PRGs) for the site?*

Multiple decisions have been identified and can be stated as the following questions:

- What are the specific items that have contributed to the contamination?
- What is the nature and extent of contaminants and are pathways present by which constituents can be transported, and if so, what are the potential transport pathways?
- Are there locations where human receptors could reasonably be exposed to site-related constituents in a manner that could create unacceptable human health risk?

- If the above reveals the presence of unacceptable risk or non-compliance with ARARs, what actions are most appropriate?

The following alternative action could result from the resolution of the principal study questions:

- Recommend that portions of the site require no further evaluation; and
- Recommend that the portions of the site warrant consideration of further assessment or a possible response action.

When the principle study questions and the related multiple decisions were combined, the following five initial RI/FS decision statements were identified:

- Determine the boundaries and spatial characteristics of contamination;
- Determine which items represent a source of contamination;
- Determine the likely migration pathways by which the constituents from the sources identified above can be transported;
- Determine the locations where human receptors may be exposed to unacceptable concentrations of item related constituents; and
- Identify ARARs, and determine which constituent concentrations in environmental media are likely to pose an unacceptable risk to human health or the environment.

Step 3: Identify Inputs to the Decisions

Table 1 provides the CSM; Section 8.2.2.2 identifies the screening thresholds; and Section 8.2 provides the procedures for evaluation of site risk level and development of PRGs.

To resolve the decision statements developed in Step 2, the following information will be required:

- Concentrations of constituents in the soil and groundwater (new RI data);
- Groundwater, hydrogeological, and characterization data (new RI data);
- Establish background concentration values for soil and groundwater;
- Survey data for sample locations; and
- ARARs and PRGs.

Past investigation information and data will be used for general screening purposes and not for quantitative evaluation or assessment. This will be combined in the RI data and characterization findings. Potential ARAR identification will be based on EPA RSL's, and other screening sources identified in Section 8.2.2.2 for cleanup goals.

Step 4: Define the Study Boundaries

The horizontal and vertical spatial extent of the study boundaries will be the horizontal and vertical extent of the contamination. This includes the entire area of the site and possibly off-site groundwater impact based on potential impact to human health receptors.

The new property owners are evaluating the property for redevelopment. Their initial plans are to start with Building 11 as a "Food Hub" resulting in a number of organizations receiving, aggregating, storing, and delivering locally produced food in and out of this building. Remainder of redevelopment plans are preliminary but limited to commercial/industrial use.

The new owners are considering the feasibility of creating an "urban farm" at the site. Included with other uses under consideration for possible later development are: a multi-story car park (for site users and visitors); manufacturing units that engage in food related or green business; a specialty inter-modal transport hub; incubators related to food and green business; an international food exchange (or retail oriented Mercado); a data center; and a terminal for the possible Independence Avenue street car service. These are in no particular order of time or preference. Nor is the list complete or definitive.

Initial data collection activities are planned for government fiscal year 2013 with potential mitigation or cleanup of contamination in 2015.

Distinct areas of the site will be further evaluated/discussed based on distribution of site data as there are no clear cut areas for exposure point concentrations (EPCs) at this time.

Step 5: Develop Decision Rules

Previous data generally shows limited hot spots with potential migration of petroleum hydrocarbons and CVOCs. Therefore, maximum concentrations or Upper Confidence Levels (UCLs) will be used to evaluate COCs. As data evaluation progresses during the RI, decision rules may be further developed based on new site data. Decision rules are further defined in Section 8.2 of this work plan.

Step 6: Specify Limits on Decision Errors

Statistical options are premature because the CSM is in a preliminary form. The applicable guidance document for determining limits on decision errors (USEPA, 2000a) involves comparing a sample population to an action level.

Step 7: Optimize the Design for Obtaining Data

Based on past site data and further evaluation of areas at the site (Section 3.4), potential release areas are limited as were the historic operations of the site. Therefore, judgmental sampling is the principle sampling methodology to be used during this RI. Significant prior knowledge of the site and contaminants present further justify judgmental (nonprobabilistic) sampling verses statistical sampling.

The key elements of the initial RI optimal sampling design include:

- Additional sampling for each class of analytes where the maximum concentration from the RI exceeded a screening concentration, to characterize source, nature, and extent; and to evaluate migration pathways; and
- Additional sampling as required to complete decision statements. Primarily, additional sampling will be included if extent of concentrations are not defined within calculated cleanup goals or RSLs based on data collected and potential site clean scenarios.

While these are the key elements for the site investigation, other elements may need to be addressed in future investigations to meet requirements.

6.0 REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA COLLECTION TASKS

Data collection is proposed to evaluate areas of the site that need further characterization. The data collection activities are based on the analysis of data provided in Section 4.0 and the DQO described in Section 5.0. The specific sampling activities are outlined in the SAP, provided as a separate document. Some areas were previously investigated but the data is not validated and is to be used for screening purposes only. These areas are being resampled for confirmation and characterization purposes and some areas may not have been directly evaluated.

Table 2 outlines the areas and items that require investigation during the RI process.

7.0 SITE CHARACTERIZATION AND OTHER REMEDIAL INVESTIGATION PRODUCTS

The RI process will complete the site characterization. The following major components are part of the site characterization:

- Conducting field investigations;
- Analyzing field samples in the laboratory;
- Evaluating results of the data analysis to characterize nature and extent and fate and transport of COPCs and develop a baseline risk assessment; and
- Determine if the data is sufficient for developing and evaluating potential remedial alternatives.

Additionally, DQO's will be revised as appropriate based on an improved understanding of the site to facilitate a more efficient and accurate characterization of the site and, therefore, achieve reductions in time and cost.

Due to the complexity and length of the site characterization, there will be communication between Terracon, GSA, and MDNR regarding the progress of the site characterization. The US EPA will be provided copies of final reports and documents.

Following the initial field sampling and analysis, a summary of the site data will be prepared in a Preliminary Site Characterization Summary report. This summary will briefly review the analytical results to provide a comprehensive understanding of the nature and extent of the contamination. The preliminary report will include a summary of the field activities, field findings, field and laboratory methods, analytical results and preliminary screening of results to relevant regulatory limits, and appropriate site maps. This preliminary report will provide a preliminary reference for the development of the risk assessment, the development and screening of remedial alternatives, and the refinement and identification of ARARs. This information will subsequently be incorporated into the RI Report.

8.0 HUMAN HEALTH RISK ASSESSMENT

8.1 Introduction

This section presents a summary of the approach and methodology proposed for the development of the Baseline Human Health Risk Assessment (HHRA) for the Hardesty site. The overall purpose of the HHRA is to analyze the potential adverse effects on humans that may result, either now or in the future, from the presence of hazardous chemicals at the site or released from the site.

8.2 Human Health Risk Assessment Methodology

The HHRA will be developed utilizing the following principal guidance documents and databases:

- USEPA's *Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A)*. (1989)
- USEPA's *RAGS Part E, Supplemental Guidance for Dermal Risk Assessment* (2004)
- USEPA's *RAGS Part F, Supplemental Guidance for Inhalation Risk Assessment* (2009)
- USEPA's *RAGS Part B, Development of Risk-Based Preliminary Remediation Goals* (1991)
- USEPA's *Regional Screening Levels (RSLs)* (2012)
- USEPA's *Exposure Factors Handbook* (2011)

- USEPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (2002a)
- USEPA's on-line toxicity database, *Integrated Risk Information System (IRIS)* (2012)
- USEPA's *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (2002b)
- USEPA's *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposures to Carcinogens* (2005a)

Other USEPA guidance, technical directives, and memos, as well as pertinent guidance from the MDNR and Missouri Department of Health (DOH), will be used and referenced where appropriate.

Specific subtasks to be performed for this HHRA include:

- Data Collection and Evaluation
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Uncertainty Analysis
- Preliminary Remediation Goals

Subsections below summarize procedures and methodologies proposed to accomplish each of the subtasks listed above.

8.2.1 Data Collection and Evaluation

A general summary of the data evaluation procedures is provided below.

- a) On-site data (maximums for soil and maximum per well for groundwater) will be screened using UU/UE EPA RSLs and a table of these results will be provided as an appendix in the RI report. EPA RSLs do not provide screening values related to VI pathways. Therefore, EPA's vapor intrusion screening level (VISL) calculator will be used, using a Target risk of 1×10^{-6} . Note: subsurface soil screening levels are not provided related to the VI pathway in either of these references.
- b) On-site data will also be compared to industrial/commercial RSLs and VISL with a target risk of 1×10^{-5} .
- c) Off-site groundwater data will be screened for the residential scenario using the VISL with a target risk of 1×10^{-6} . Under the current EPA recommendations, the MCL for TCE is protective (for the ingestion pathway). EPA has still not provided further revised levels lending uncertainty in the evaluation of the TCE target groundwater concentration corresponding to target indoor air concentration.

- d) Non-detect results will be evaluated as provided in EPA's ProUCL. Will attempt to make sure the lab data is provided in an applicable format for ProUCL; 10U verses <10.
- e) Contaminants of potential concern (COPC) will be selected by screening maximum concentrations to the most conservative of the residential RSLs and VISLs.
- f) Chemical intakes will be calculated based on site concentrations to develop the list of Contaminants of Concern (COC) which will be moved to the cleanup feasibility study. A COC is a chemical that poses an unacceptable health risk, also known as a risk driver. A preliminary remediation goal (PRG) will be calculated for each COC that can be moved forward to the feasibility study.

Previously collected groundwater data collected from 2010 to present will be evaluated carefully as to its quality before consideration of its appropriateness for use in this HHRA. Data collected during the conduct of the RI, as described in earlier sections of this WP, will be evaluated, compiled, and validated for quality parameters prior to its use in the HHRA. Soil and groundwater are the primary media to be evaluated during this risk assessment. If determined to be necessary, based on preliminary findings, a vapor encroachment screening survey may be conducted to supplemental the data set available for evaluating all complete exposure pathways.

Chemical data will be summarized and tabulated to show pertinent sample statistics for each media, including: the data population distribution; the minimum, maximum, and mean concentrations; the appropriate upper confidence limit (UCL) about the mean; and frequency of detection. The USEPA software ProUCL version 4.1.00 (USEPA, 2011) will be utilized to determine the chemical data distributions and UCLs. Censored data (reported at concentrations below detection limits) will be evaluated as described in ProUCL.

COPCs are chemicals retained for quantitative evaluation as they may present health threats to receptors. COPCs will be selected using the screening criteria as described in RAGS Part A (USEPA, 1989), for all chemicals detected at least once. USEPA residential RSLs criteria will be used to screen for COPCs by comparing the maximum detected chemical concentrations to the most conservative of the cancer effects RSL, 1/10th the noncancer effects RSL, or the lowest of EPA's Protection of Groundwater SSLs, whichever value is less. An adjustment is made to the noncancer effects RSL to divide the value by 10 to account for the exposure to multiple chemicals (i.e., additivity). This screening approach ensures that a conservative approach to COPC selection has been performed.

To summarize, COPCs for soil will be derived by comparing the maximum soil chemical concentrations in soil to the lowest of the following screening levels, for each EA:

- Cancer-based residential EPA-RSLs
- 1/10th the value of the Noncancer-based residential EPA-RSLs, and
- The lowest of EPA's Protection of Groundwater SSLs.

To derive COPCs for groundwater, the lowest of the following screening levels will be compared to the maximum chemical concentrations detected at each well:

- MCLs
- Tap water RSLs
- VISL concentrations

Tables will be prepared for the HHRA which will include all chemical data statistical parameters, as well as the reason a chemical is either retained or excluded as a COPC.

8.2.2 Exposure Assessment

The objectives of the exposure assessment are to characterize potentially exposed human receptors at the Site, to identify actual or potential exposure pathways, and to quantify the potential exposure. The exposure assessment involves several elements, including:

- Identification of the potential receptors/exposure scenarios (as shown in the Conceptual Site Model [CSM])
- Identification of exposure routes (also in the CSM)
- Quantification of exposure point concentrations (EPCs)
- Identification of the exposure models and assumptions used to calculate daily intakes or doses

8.2.2.1 Receptors and Pathways to be Evaluated

The HHRA will focus on those receptors that are likely to be exposed to site soil and groundwater. This approach ensures that potential risks will be characterized and that all potential receptors will be adequately protected. Table 1 presents the CSM for the Hardesty Federal Complex Site, which depicts the path a contaminant follows from its release in the environment to intake by the receptor. The results of the CSM indicate which exposure pathways are complete and will be quantitatively evaluated, as discussed further below.

Receptors to be evaluated include Industrial/Commercial Workers, who may be exposed to contaminants in surface soil (0 - 1 ft.), and construction workers, who may be exposed to chemicals in soil from the soil surface to the depth of a typical building excavation (e.g., 0 to 10 ft. or deeper, as will be determined further during the field investigation). It is not likely that on-site receptors will include residents. A covenant to the property deed is already in place (Appendix B), which prohibits residential development at the Site; thus, evaluation of the on-site residential scenario is not warranted. In summary, Industrial/Commercial Workers will be evaluated for the following pathways of soil exposure:

- Soil ingestion
- Soil dermal contact

- Inhalation of soil particles
- Inhalation of volatile organic chemicals (VOCs) in ambient air

Groundwater will not be evaluated for potable usage for on-site workers; however, as VOCs are present in groundwater, and in some areas of the site groundwater is shallow enough that it may be encountered while excavating, the construction workers will be evaluated for direct contact with groundwater while excavating. Construction workers will also be evaluated for their potential to inhale vapors emanating from groundwater during excavation work. Industrial/commercial workers are not expected to perform any intrusive work on site; however, they may be exposed to VOCs in groundwater via the vapor intrusion pathway while working inside buildings on-site. In summary, workers will be evaluated for the following pathways of groundwater exposure:

- Dermal contact of groundwater while excavating (construction workers)
- Inhalation of VOCs from groundwater while excavating (construction workers)
- Inhalation of VOCs from groundwater while working indoors (industrial/commercial workers)

While it is not likely that future on-site land use will include a residential scenario, there is a possibility that residents in the vicinity of the site may be exposed to VOCs from contaminated groundwater that is moving off-site. Therefore, to be protective, risks from the potential inhalation of VOCs that may intrude into residential properties via the vapor intrusion pathway will be evaluated for off-site residents. The Johnson and Ettinger Model for Vapor Intrusion (as provided in USEPA, 2002b) will be utilized for this evaluation. Both adult and child off-site residents will be evaluated for the vapor intrusion pathway.

Use of the Johnson and Ettinger Model to evaluate the potential risks via the vapor intrusion pathway will include not only use of the groundwater module, but also the soil module. All volatile chemicals retained as COPCs in soil and groundwater, per the methodology as described in Section 8.2.1 above, will be input into the groundwater and soil modules of the Johnson and Ettinger Model to provide comprehensive quantitative risk estimates for vapor intrusion.

Exposure parameters and likely exposure frequencies and durations for the receptors and pathways to be evaluated in the HHRA are presented in Table 3.

Note that the HHRA will also screen data to unrestricted use scenarios, unrestricted use and unrestricted exposure (UU/UE) including potable groundwater use.

8.2.2.2 Exposure Point Concentrations

Soil sample analytical data will be segregated between surface soil and soils up to 10 feet in depth (or more, depending on the field investigation), as proposed above for the individual

receptors' likely exposure patterns. Soil exposure point concentrations (EPCs) for this HHRA will be the lesser value of the calculated UCL or the maximum concentration for the COPC in that media.

This site is relatively small, and likely exposure patterns for the site are such that a worker may be on-site, at any location, over the duration of exposure. However, distinct areas of the site will be further evaluated/segregated based on distribution of site data, and future site use (as more definitive plans are generated) as there are no clearly defined areas for distinct exposure point concentrations (EPCs) at this time.

8.2.2.3 Estimating Chemical Intake

Methodology proposed to estimate chemical intake and exposure are described further below.

8.2.2.3.1 Ingestion

Average daily chemical intake for the incidental ingestion of soil will be calculated by use of the following formula (USEPA, 1989):

$$DI_{\text{Ingestion}} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

$DI_{\text{Ingestion}}$ = average daily chemical intake via soil ingestion (mg/kg-day)

CS = chemical concentration in soil (mg/kg)

IR = ingestion rate (mg soil/day)

CF = conversion factor (10^{-6} kg/mg)

FI = fraction ingested from contaminated source (unitless)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg)

AT = averaging time (period over which exposure is averaged, days)

8.2.2.3.2 Inhalation

For the purposes of evaluating a receptor's exposure to chemicals in ambient air, as either volatiles or adsorbed to dust particles, the development of the exposure concentration (EC) in air, as recommended by USEPA's *RAGS Part F, Guidance for Inhalation Risk Assessment* (USEPA, 2009), must be performed. The EC is calculated by modeling the contaminant concentrations (CA) in air first, following the methodology presented in USEPA's *Soil Screening Guidance* (USEPA, 2002a). EC will be determined by using the following equation:

$$EC = \frac{CA \times ET \times EF \times ED}{AT}$$

where:

EC = exposure concentration ($\mu\text{g}/\text{m}^3$)

CA = chemical concentration in air ($\mu\text{g}/\text{m}^3$)

Remedial Investigation / Feasibility Study Work Plan

Hardesty Federal Complex ■ Kansas City, Missouri

March 13, 2013 ■ Terracon Project No. 02107147



- ET = exposure time (hours/day)
- EF = exposure frequency (days/year)
- ED = exposure duration (years)
- AT = averaging time (period over which exposure is averaged, days)

The chemical concentration in air (CA) term will be calculated as follows:

$$CA = CS \times [(1 / PEF) + (1 / VF)]$$

where:

PEF = Particle emission factor (m³/kg); 1.36E+09 m³/kg (default value) (USEPA, 2002a)

VF = Volatilization factor (m³/kg).

For the purposes of calculating chemical concentrations in air, USEPA's default PEF value of 1.36 x 10⁹ m³/kg will be used for industrial/commercial/ workers (USEPA, 2002a). The PEF for construction workers will be calculated separately to estimate inhalation risks associated with site-wide soil exposure associated with a half-acre grid, or as more appropriate given the final determination of an exposure area (EA). The construction worker PEFs are a sub-chronic PEFs and are calculated using the following equation (USEPA, 2002a):

$$PEF = Q/C_{SR} \times 1/F_D \times [T \times A_R / (556 \times (W/3)^{0.4} \times ((365-p) / 365) \times \sum VKT)]$$

where:

Q/C_{SR} = dispersion factor; inverse ratio of 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/m²-s per kg/m³) (equation shown below)

F_D = dispersion correction factor (unitless, 0.185)

T = total time over which construction occurs (s)

A_R = surface area of contaminated road segment (274.213 m²)

W = mean vehicle weight (tons)

p = number of days with at least 0.01 inches of precipitation (days/year)

∑VKT = sum of fleet vehicle kilometers traveled during the exposure duration (km)

The Q/C parameter, a dispersion factor, will vary depending on which various air dispersion modeling constants by virtue of the geographic or regional location in which the Site is located. Referring to the Appendix D, Exhibit D-1, of the *Soil Screening Guidance* (USEPA, 2002a), the Hardesty Complex Site, near Kansas City, Missouri, is found in Zone 5. The general formula to be used to calculate the Q/C parameters is described below.

$$Q/C = A \times \exp [((\ln A_{Site} - B)^2) / C]$$

where:

Remedial Investigation / Feasibility Study Work Plan

Hardesty Federal Complex ■ Kansas City, Missouri

March 13, 2013 ■ Terracon Project No. 02107147



A, B, C = constants (unitless), based on air dispersion modeling for Zone 5 (e.g., Lincoln, NE)

A_{Site} = areal extent of site surface soil contamination (acres)

The VF term will be calculated as follows for the Industrial/Commercial Worker scenario (USEPA, 2002a).

$$VF = \frac{Q/C_{\text{vol}} \times (3.14 \times D_A \times T)^{1/2} \times 10^{-4} \text{ (m}^2\text{/cm}^2\text{)}}{(2 \times \rho_b \times D_A)}$$

where:

Q/C_{vol} = dispersion factor, inverse of the ratio of the geometric mean air concentration to the volatilization flux at center of a square source ($\text{g/m}^2\text{-s}$ per kg/m^3)

D_A = apparent diffusivity; see equation below

T = exposure interval (s)

ρ_b = dry soil bulk density (g/cm^3)

$$D_A = \frac{[(\theta_a^{10/3} D_i H' + \theta_w^{10/3} D_w) / n^2]}{\rho_b K_d + \theta_w + \theta_a H'}$$

where:

θ_a = air-filled soil porosity ($L_{\text{air}}/L_{\text{soil}}$)

D_i = diffusivity in air (cm^2/s)

H' = dimensionless Henry's law constant

θ_w = water-filled soil porosity ($L_{\text{water}}/L_{\text{soil}}$)

D_w = diffusivity in water (cm^2/s)

n = total soil porosity ($L_{\text{pore}}/L_{\text{soil}}$)

K_d = soil-water partition coefficient (cm^3/g)

The VF term will be calculated as follows for constructions workers (as subchronic exposure due to an assumed one-year exposure duration) (USEPA, 2002a). Many of the terms are the same as for the industrial/commercial worker above, except as noted.

$$VF_{\text{SC}} = \frac{[(3.14 \times D_A \times T)^{1/2}]}{(2 \times \rho_b \times D_A)} \times 10^{-4} \text{ (m}^2\text{/cm}^2\text{)} \times Q/C_{\text{sa}} \times 1/F_D$$

where:

VF_{SC} = subchronic volatilization factor (m^3/kg)

Q/C_{sa} = dispersion factor, inverse of the ratio of the 1-h geometric mean air concentration to the volatilization flux at center of a square site ($\text{g/m}^2\text{-s}$ per kg/m^3)

F_D = dispersion correction factor (unitless)

Inhalation of VOCs while indoors, via the vapor intrusion pathway, will be evaluated for off-site residents and on-site industrial/commercial workers by following USEPA's vapor intrusion guidance (2002b). Screening of VOCs in groundwater will be performed first, to determine if VOC concentrations are present at sufficient concentrations to warrant quantification of the pathway. As described above in Section 8.2.1, the VISL will be used to screen for groundwater VOCs to be retained for quantitative evaluation.

On-site and off-site risks via the vapor intrusion pathway will be evaluated first using the VOC concentrations in groundwater, or soil, for JE model input parameters. The indoor air VOC concentrations will be developed by utilizing the JE model (the JE model will not be utilized to calculate risk). It is anticipated that additional subsurface investigation may include an on-site vapor encroachment screening survey that will yield soil gas chemical data that can be used to further refine on-site risks via the vapor intrusion pathway. Should it be determined that a soil gas survey is warranted, to more accurately determine an indoor air exposure point concentration, a Work Plan Addendum will be developed to provide details of the protocol to be used.

Inhalation of VOCs by construction workers during trenching or excavation activities will be evaluated following the Virginia Department of Environmental Quality's (VDEQ's) guidelines for situations where contaminated groundwater may pool in an excavation. The VDEQ spreadsheet, (Table 3.8, Groundwater less than 15 ft: Construction Worker in a Trench), will be utilized to develop VOC concentrations in ambient air. This table can be found on-line at VDEQ's website; see Section 3.2.2 on the following page: <http://www.deq.state.va.us/Programs/LandProtectionRevitalization/RemediationProgram/VoluntaryRemediationProgram/VRPRiskAssessmentGuidance/Guidance.aspx>.

8.2.2.3.3 Dermal Absorption

Average daily chemical intake for dermal absorption of chemicals in soil will be calculated by use of the following formula (USEPA, 2004):

$$DAD = \frac{DA_{event} \times EF \times ED \times EV \times SA}{BW \times AT}$$

where:

- DAD = dermal absorbed dose (mg/kg-day)
- DA_{event} = absorbed dose per event (mg/cm²-event), chemical specific, see below
- EF = exposure frequency (days/year)
- ED = exposure duration (years)
- EV = event frequency (events/day)
- SA = skin surface area available for contact (cm²)
- BW = body weight (kg)
- AT = averaging time (period over which exposure is averaged, days)

The DA_{event} term is calculated for organics by the following formula (USEPA, 2004), assuming a short exposure time (less than that required to reach steady state absorption):

$$DA_{\text{event}} = 2 FA \times K_p \times C_w \left[(6 T_{\text{event}} \times t_{\text{event}}) / \pi \right]^{1/2}$$

where:

- FA = fraction absorbed water (dimensionless)
- Kp = dermal permeability coefficient of compound in water (cm/hr), chemical specific
- Cw = chemical concentration in water (mg/cm³)
- T_{event} = lag time per event (hr/event)
- t_{event} = event duration (hr/event)

The DA_{event} term is calculated for inorganics by the following formula (USEPA, 2004):

$$DA_{\text{event}} = K_p \times C_w \times t_{\text{event}}$$

8.2.3 Toxicity Assessment

The toxicity assessment will identify the toxicity values (i.e. slope factors and reference doses) for COPCs. These toxicity values will be applied to the estimated doses (intakes), calculated in the exposure assessment, in order to evaluate carcinogenic and noncarcinogenic risk. The Integrated Risk Information System (IRIS) (USEPA, accessed on-line) will be the preferred source of toxicity values, as the Tier 1 option. If a toxicity value is not available through IRIS, USEPA's recommended hierarchy of toxicity databases will be followed (per USEPA, 2003) which suggests that the Tier 2 option should be the Provisional Peer Reviewed Toxicity Values (PPRTVs) developed by The Office of Research and Development(ORD)/National Center for Environmental Assessment (NCEA).

Carcinogenic toxicity tables will be developed containing the following information for each COPC: weight of evidence, and for oral, inhalation, and dermal pathways, tumor site(s), unit risk values, and slope factors (SFs). All data provided will be properly referenced in each table.

Presently, toxicological data do not exist from which dermal SFs can be derived. To evaluate the dermal pathway, USEPA has adopted methodology to obtain dermal SFs by adjusting the oral SFs. The equation for extrapolation of a default dermal SF is as follows:

$$\text{Default Dermal SF} = \text{Oral SF} / \text{Oral Absorption Factor (\%)}$$

Tables containing dermal SFs will be presented in the HHRA report and will include the oral absorption factor (oral bioavailability) data properly referenced.

The USEPA's *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (USEPA, 2005a) indicates that carcinogens that act with a mutagenic mode of action exhibit higher cancer potency for early life exposures than for adult exposures. This guidance recommends potency adjustment factors for mutagenic carcinogens and human exposures occurring prior to 16 years of age. For this HHRA, age-dependent adjustment

factors (ADAFs) of 10 and 3, which are recommended by USEPA for ages 0-2 and >2-16, respectively, will be utilized when evaluating risks from exposure to vinyl chloride. When evaluating risk for a child resident from exposure to mutagens (e.g., TCE, VC), kidney risk will be assessed in consideration of a mutagenic mode of action, while all other cancer risks will be assessed by the standard cancer risk approach. In general, for TCE, EPA recommendations, as published in the TCE Assessment in IRIS (September 2011) will be followed.

To provide a quantitative assessment of chemicals not found in IRIS, or other toxicity databases, surrogate toxicity values may be used. If necessary, surrogates will be selected based on similar chemical structures or chemical family. Although this approach presents some uncertainty, it is considered conservative, or protective, because it allows for a numeric estimate of risk where it would have been lacking. This approach is used when evaluating risks from exposure to carcinogenic PAHs detected in environmental media. Benzo(a) pyrene is the only PAH for which an oral cancer SF has been rigorously developed. In order to estimate risk from exposure to other PAHs that may be potentially carcinogenic, a toxicity equivalency factor (TEF) relative to benzo(a)pyrene is applied (USEPA, 1993). TEFs have been developed to relate the potency of all other potentially carcinogenic PAHs to the potency of benzo(a)pyrene. This TEF approach will be used in the event COPCs include PAHs.

Noncarcinogenic toxicity tables will be developed containing the following information for each COPC: critical effect/target organ affected and chronic reference doses (RfDs) and reference concentrations (RfCs). All data provided will be properly referenced in each table.

Oral RfDs are derived from toxicological data and can be obtained from USEPA toxicological databases, such as IRIS. However, for the dermal pathway, oral RfDs are adjusted to derive dermal RfDs in an approach similar as that described above for the derivation of dermal SFs, and as follows:

$$\text{Dermal RfD} = \text{Oral RfD} \times \text{Oral Absorption Factor (\%)}$$

Lead presents a special case because of its lack of toxicity values. Lead is not considered to be carcinogenic; however, young children (less than 6 years of age) exposed to lead are at risk of adverse impacts to their developing central nervous system. For sites where young children are considered to be at risk, the use of USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model would predict the population that may result with an unacceptable blood lead level given site-specific lead exposure. For this site, as adults are the receptors to be evaluated, the USEPA's Adult Lead Model (ALM) (USEPA, 2005b) will be used instead. The ALM is a biokinetic model that evaluates the risks to a developing fetus should the pregnant mother be exposed to lead in on-site contaminated environmental media. If lead is selected as a COPC for this risk assessment, the ALM will be used to evaluate risk.

Tables containing dermal RfDs will be presented in the risk assessment report, and will include the oral absorption factor (oral bioavailability) data properly referenced.

8.2.4 Risk Characterization

The objective of the risk characterization step is to integrate the information developed in the exposure assessment and the toxicity assessment into an evaluation of the potential health risks associated with the COPCs at the Site. Potential cancer risk will be calculated by multiplying the estimated lifetime-averaged daily intake that is calculated for a chemical through an exposure route by the exposure route-specific cancer slope factor, as described below.

$$CR = DI \times SF$$

where:

- CR = Cancer risk (unitless)
- DI = Daily intake of chemical (mg/kg-day)
- SF = Cancer slope factor (mg/kg-day)⁻¹

Excess cancer risk for the inhalation pathway is estimated by utilizing the following formula (USEPA, 2009):

$$CR_{\text{Inhalation}} = IUR \times EC$$

where:

- CR_{Inhalation} = cancer risk via the inhalation pathway (unitless)
- IUR = inhalation unit risk [(µg/m³)⁻¹]
- EC = exposure concentration (µg/m³)

The cancer risks will be summed to calculate total risks for all chemicals, for all exposure routes, and for each receptor.

The potential for noncarcinogenic health effects will be evaluated by the calculation of hazard quotients (HQs) and hazard indices (HIs) (which are HQs summed). An HQ is the ratio of the exposure duration-averaged estimated daily intake through a given exposure route to the chemical and route-specific reference dose, calculated as presented below.

$$HQ = DI / RfD$$

where:

- HQ = Hazard quotient (unitless)
- DI = Daily chemical intake (mg/kg-day)
- RfD = Noncancer reference dose (mg/kg-day)

The HQ for the inhalation pathway will be calculated with the following formula (USEPA, 2009):

$$HQ_{\text{Inhalation}} = EC / [\text{Toxicity Value} \times 1000 \mu\text{g}/\text{m}^3]$$

where:

- HQ = hazard quotient via the inhalation pathway (unitless)
- EC = exposure concentration (µg/m³)
- Toxicity Value = inhalation toxicity value (e.g. RfC)

HQs will be totaled to calculate HIs for each receptor scenario. Initially, HIs will be calculated based on all chemicals and exposure routes. Following the calculation of cumulative noncancer risks, any chemicals which exhibit risks greater than 1.0 will be further evaluated to determine if multiple organ affects are demonstrated. If so, chemicals will be segregated by organ effect and cumulative noncancer risks will be reevaluated separately.

8.2.5 Uncertainty Analysis

A qualitative uncertainty analysis will be provided which presents major assumptions and uncertainties associated with the risk assessment, including general uncertainties associated with the risk assessment process, and site-specific uncertainties associated with the Hardesty Site. The predicted direction of each assumption or uncertainty on the estimate of risk (i.e. overestimate, underestimate, or uncertain) will be indicated. The focus will be on those chemicals and exposure pathways that pose a potential cancer risk that exceeds the acceptable risk range of 1E-05 to 1E-04, or have a total HI greater than 1 (USEPA, 1990).

The MDNR's total acceptable individual excess lifetime cancer risk (IECLR) for each COC is 1E-05. The acceptable risk level for the cumulative sitewide IECLR is 1E-04. The acceptable hazard index (HI) for each COC and all exposure pathways as well as the cumulative sitewide hazard index is 1. Documentation is provided in the Missouri Risk Based Corrective Action Technical Guidance, April, 2006.

8.2.6 Preliminary Remediation Goals

Preliminary Remediation Goals (PRGs), i.e. site cleanup levels, will be calculated for every chemical resulting in an unacceptable level of risk. These chemicals will also be known as COCs, or risk drivers, as they are the chemicals which would be moved forward to the feasibility study phase to evaluate alternatives for clean-up to ensure protectiveness. In order to evaluate clean-up strategies, a clean-up level must first be established, hence the need to calculate PRGs for resulting COCs.

The process to calculate PRGs is essentially the risk calculation in reverse (USEPA, 1991). To calculate PRGs, a target risk level is first determined, such as 1E-05, and then the concentration of the COC in soil or groundwater, which would result in that level of risk is determined. The same exposure parameters and pathways are utilized to calculate PRGs as were used to calculate risk. PRGs will be calculated for all resulting COCs, and for all receptors, at the Site.

Health risks are a primary driver when calculating PRGs; however, ARARs, such as the Missouri Water Quality Standards and leaching to groundwater soil levels, may also have a role in determining cleanup levels.

9.0 REMEDIAL INVESTIGATION PRODUCTS

9.1 Treatability Studies

The need for treatability testing or hot spot remedial action will be identified as early in the RI/FS process as possible. The existing and RI site data and available information will be reviewed to determine if treatability investigations are needed. Treatability testing may be required to assist in the detailed analysis of alternatives and detailed design of the selected remedial alternative. Treatability studies are conducted primarily to achieve the following:

- Provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the detailed analysis of alternatives and to support the remedial design of a selected alternative.
- Reduce cost and performance uncertainties for treatment alternatives to acceptable levels so that a remedy can be selected.

Following the Preliminary Site Characterization report and HHRA, the need for treatability testing will be evaluated. If it is determined that treatability testing is required, a treatability test work plan outlining the steps and data necessary to evaluate and initiate the treatability testing program will be completed. This includes an SAP addendum that will be prepared and submitted to MDNR for review and approval. Following completion of the treatability testing, a report providing a detailed evaluation will be prepared.

9.2 Remedial Investigation Report

After completion of the site characterization, HHRA, treatability studies, and other required tasks, a RI Report will be prepared and submitted for review. The RI report will include these items as well as the following:

- Study area investigation;
- Physical characteristics of the study area;
- Background determination;
- Nature and extent of contamination;
- Data Validation and Usability;
- Contaminant fate and transport;
- Summary and conclusions.

Suggested format for remedial investigation report is given in Table 3-13 of the EPA document Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA; EPA/540/G-89/004; OSWER Directive 9355.3-01; October 1988.

10.0 FEASIBILITY STUDY

If needed, A FS will be prepared for the site. The FS may consist of several different components including the following:

- development of alternatives;
- screening of alternatives; and
- detailed analysis of alternatives

10.1 Development and Screening of Alternatives

The primary objective of the development and screening of alternatives will be to develop an appropriate range of waste management options that will be analyzed more fully in the detailed analysis phase during the FS.

During the development and screening of alternatives, the following tasks will be performed:

- Develop remedial action objectives;
- Develop media-specific general response actions;
- Identify volumes or areas of media to which general response actions might be applied.
- Identify and screen the technologies applicable to each general response action to eliminate those that cannot be implemented technically at the site;
- Identify and evaluate technology process options to select a representative process for each technology type retained for consideration; and
- Assemble a detailed analysis of the alternatives.

Alternatives will be developed concurrently with the RI site characterization. As applicable, documentation regarding the development and screening of the alternatives will be provided to MDNR.

10.2 Detailed Analysis of Alternatives

Following the initial development and screening of the alternatives (as discussed in Section 10.1), a detailed analysis of the alternatives that remain will be conducted. Additionally, alternatives may be further refined and/or modified based on additional site characterization or treatability studies conducted during the RI.

The detailed analysis of alternatives will consist of assessing each option against various evaluation criteria. Additionally, a comparative analysis of all options will be completed using the same evaluation criteria as a basis for comparison. The evaluation criteria with the associated statutory considerations are as follows:

Remedial Investigation / Feasibility Study Work Plan

Hardesty Federal Complex ■ Kansas City, Missouri

March 13, 2013 ■ Terracon Project No. 02107147



- Overall protection of human health and the environment;
- Compliance with ARARs;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume;
- Short-term effectiveness;
- Implementability;
- Costs;
- State (MDNR) acceptance; and
- Community acceptance.

The results of the detailed analysis will be provided in the RI/FS report.

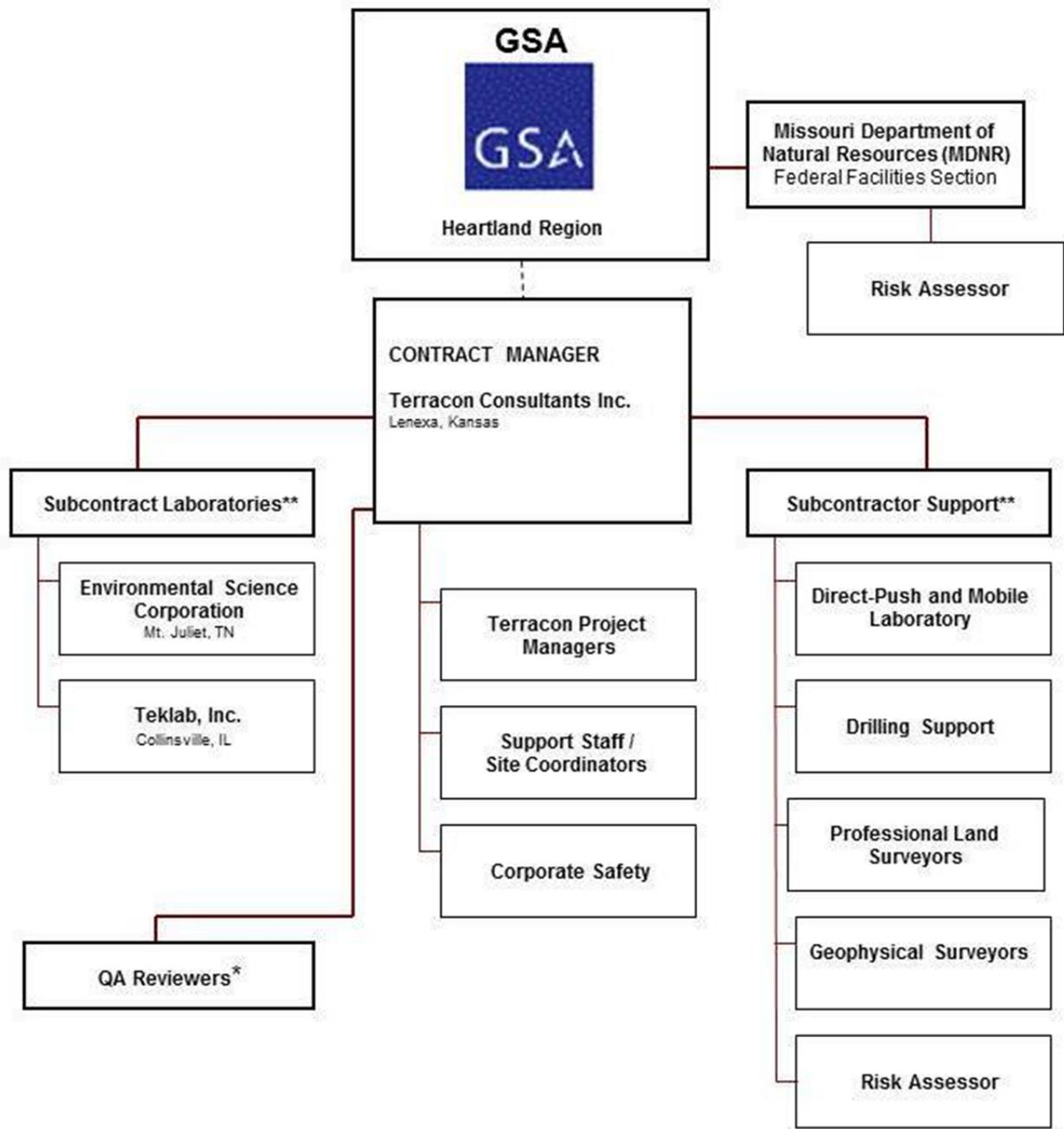
10.3 FS Report

Following characterization of the nature and extent of contaminants, the development and screening of alternatives and the detailed analysis of alternatives, a FS report will be prepared and submitted to MDNR for review. The FS report will provide a basis for remedy selection.

11.0 PROJECT ORGANIZATION

11.1 Project Personnel and Coordination

To aid in coordination with all parties involved, the project personnel associated with this project is outlined in Table 4. This includes the lead agency (MDNR), the previous site owner and responsibly party (GSA), the current site owner (Hardesty Renaissance Economic Development Corporation), and the contractor (Terracon). Terracon will coordinate required efforts relating to the RI/FS WP. The roles and/or responsibilities are also outlined in this table and on the following flow chart.



* Project QA reviewers will consist of senior-level staff without direct involvement with project implementation to prevent bias
 ** Utilization of DBE per Terracon's subcontractor utilization program with GSA

11.2 Project Schedule

An anticipated schedule for the RI/FS process has been formatted on the basis of the projects scope. However, data needs may alter and this schedule is subject to change. Calendar years below are based on the Federal Governments fiscal calendar. The main components of the RI/FS process are outlined as follows:

- Implementation of this RI/FS WP (2013);
- Site characterization, generation and analysis of associated data, and preparation of associated reports (2013 and 2014);
- Performance of the Baseline HHRA (2013 and 2014); and
- If there are unacceptable risks to human health and/or the environment, preparation of a Feasibility Study (2014 and 2015).

Many of the tasks in the RI/FS are interdependent but many of the tasks will be conducted concurrently to be sensitive to time and project costs.

Following the review and approval process for this WP and the associated supporting documents (SAP, QAPP, CRP, and HSP), site preparation and characterization activities will begin. Following the field work, a preliminary site characterization report will be completed. This will be included in the RI Report. Other optional tasks (i.e. treatability studies) will be conducted as necessary based on the information generated during the FS and Proposal Plan (PP). The FS and PP will be completed in conjunction with each other.

Cleanup activities are anticipated to be implemented in 2015 and 2016.

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Remedial Investigation / Feasibility Study Work Plan

Hardesty Federal Complex ■ Kansas City, Missouri

March 13, 2013 ■ Terracon Project No. 02107147



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Remedial Investigation / Feasibility Study Work Plan

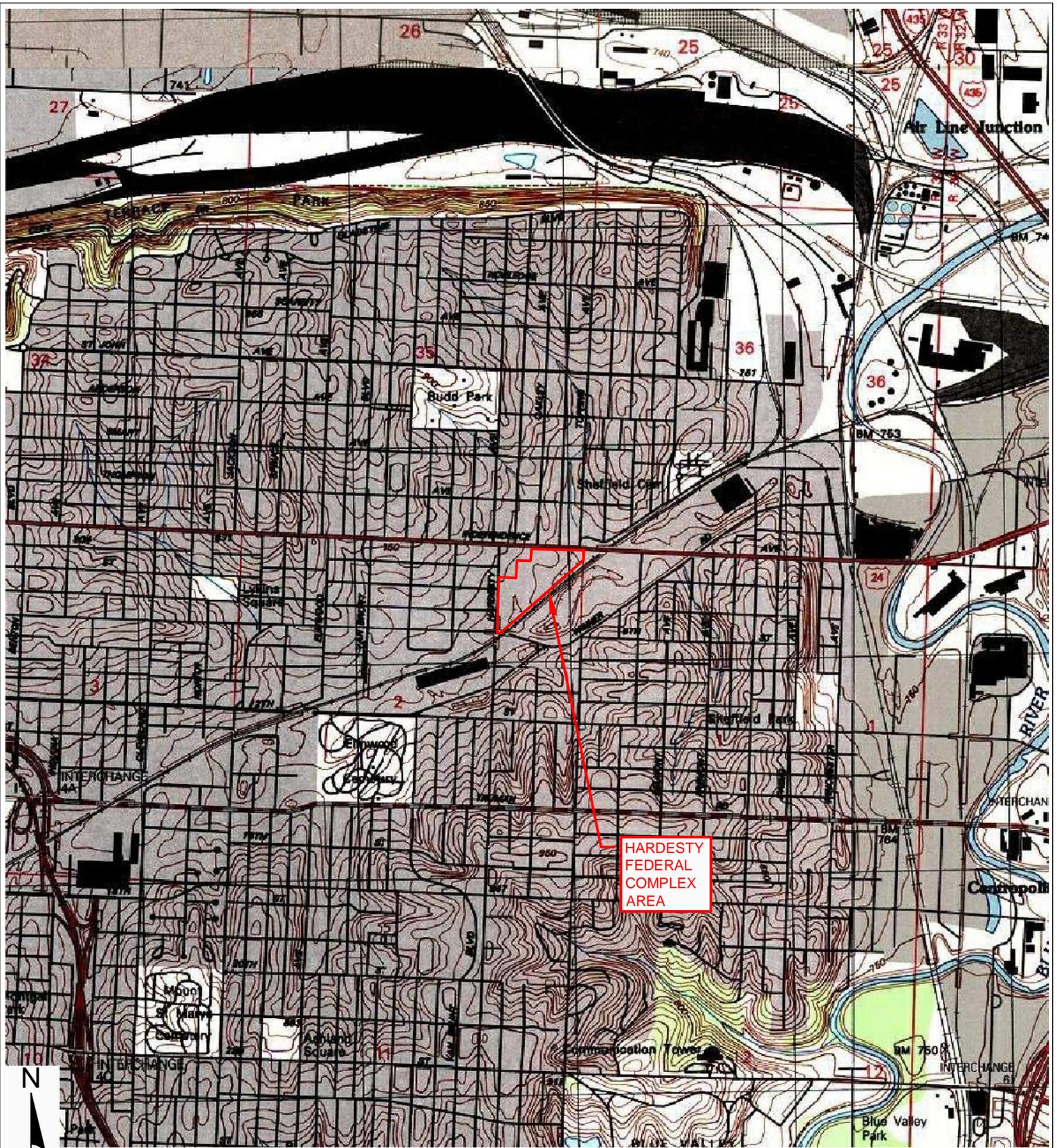
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March 13, 2013 ■ Terracon Project No. 02107147



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Exhibits



U.S.G.S. 7.5 MINUTE SERIES TOPOGRAPHIC MAP

STATE OF MISSOURI-KANSAS QUADRANGLES
 KANSAS CITY 2001 (LEFT)
 INDEPENDENCE 1996 (RIGHT)



DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE

Project Mng:	ADS	Project No.	02107147
Approved By:	ADS	Scale:	1" = 2000'
Checked By:	ADS	Date:	8/2/11
Drawn By:	...	File No.:	...

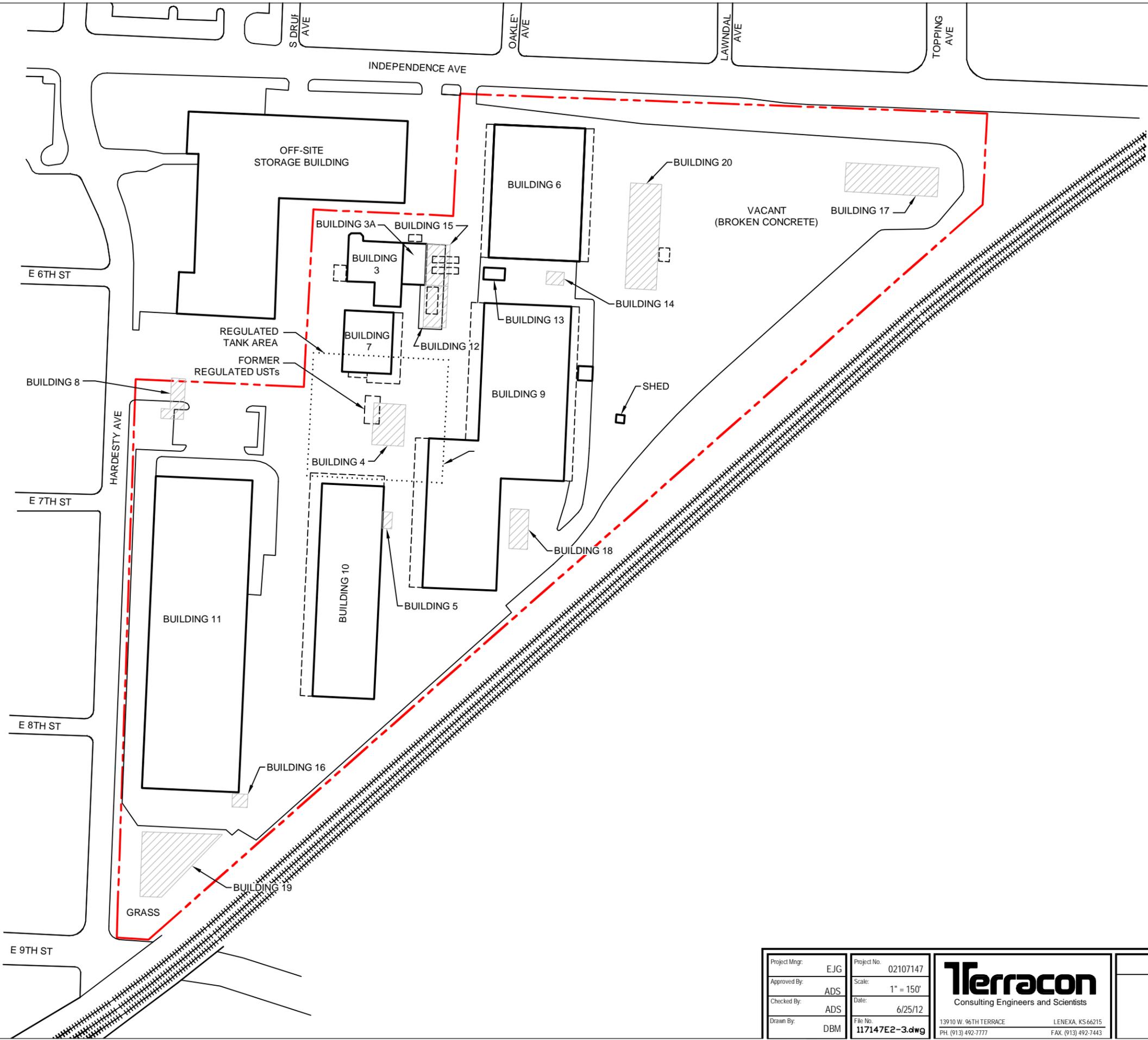
Terracon
 Consulting Engineers and Scientists
 13910 W. 96TH TERRACE LENEXA, KS 66215

EXHIBIT 1 - SITE LOCATION & TOPOGRAPHIC MAP

HARDESTY FEDERAL COMPLEX
 607 HARDESTY AVE
 KANSAS CITY, MISSOURI

EXHIBIT

1



LEGEND

- - - HARDESTY FEDERAL COMPLEX
- APPROXIMATE FORMER BUILDING
- FORMER USTs

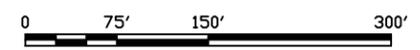


DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

Project Mng:	EJG	Project No.	02107147
Approved By:	ADS	Scale:	1" = 150'
Checked By:	ADS	Date:	6/25/12
Drawn By:	DBM	File No.	117147E2-3.dwg

Terracon
 Consulting Engineers and Scientists
 13910 W. 96TH TERRACE LENEXA, KS 66215
 PH. (913) 492-7777 FAX. (913) 492-7443

EXHIBIT 2 - FACILITY LAYOUT
 HARDESTY FEDERAL COMPLEX
 607 HARDESTY AVE
 KANSAS CITY, MISSOURI

Tables

Table 1
Preliminary Human Health Conceptual Site Model
 Hardesty Federal Complex - Kansas City, Missouri
 Terracon Project No. 02107147

Historical Source/ Operation	Primary Release Mechanism	Secondary Source	Secondary Release Mechanism	Contaminated Medium	Exposure Route	Exposed Populations (Receptors)		
						Construction Workers	Industrial / Commercial Workers	Off-Site Residents
Fabric Treatment, Chemical Storage, Electrical Transformers, Fuels & Solvents Stored in Tanks	Spills and Leaks	Surface Soil	Wind Erosion of Particles	Air (ambient)	Inhalation	█	█	
			Volatilization	Surface Water	Oral Dermal			
			Surface Water Run-Off	Sediments	Oral Dermal			
			Along sewers or water lines	On-Site Surface Soil	Oral Dermal	█	█	
			Digging/ Excavation	On-Site Subsurface Soil	Oral Dermal	█		
		Subsurface Soil	Infiltration	Groundwater	Oral Dermal Inhalation - trenching Vapor Intrusion	█		█

KEY:

- = Pathway not complete; no evaluation required.
- = Pathway is or might be complete; however, data are lacking and/or pathway judged to be minor. No evaluation performed.
- = Pathway is or might be complete; data are available and pathway will be evaluated.

Table 2
Identified Potential Concerns
Hardesty Federal Complex - Kansas City, Missouri
Terracon Project No. 02107147

Area	Identification for Item of Concern	Source/Concern	Listed as Potential Sources of Concern in PA/SI?	Has there been past investigation?	Needs Further Evaluation during RI/FS?	Report Section with Discussion
Other Site Items in Multiple Locations	Item S1	Former creek dump, area of Buildings 9, 10, & 11	Yes	No	No**	4.3.1
	Item S2	Open storage area, insecticide storage	Yes	No	Yes	
	Item S3	Rail Spurs	No	No	Yes	
	Item S4	Paint thinner spill, unknown location	No	Indirectly	Yes	
Buildings 3 and 3A	Item 3.1	Smokestack ash	Yes	Yes	Yes	4.3.2
	Item 3.2	One 1,000-gallon diesel UST, west side of Building 3	Yes	Yes	Limited*	
	Item 3.3	One 2,000-gallon fuel oil UST	Yes	Yes	Yes	
	Item 3.4	Two 23,000-gallon heating oil USTs	Yes			
	Item 3.5	One 178,000-gallon heating oil UST	Yes			
Building 4	Item 4.1	Garage	No	Yes	Limited*	4.3.3
	Item 4.2	Two 1,000-gallon and one 560-gallon gasoline USTs	Yes	Yes	Not Applicable	
Building 5	Item 5.1	Paint house	Yes	No	Yes	4.3.4
Building 6	Item 6.1	Painting activities	Yes	Yes	Yes	4.3.5
	Item 6.2	Circuit board manufacturing	Yes	Yes	Yes	
	Item 6.3	Clothing treatment/renovation plant; use of chemicals in, around, and between Buildings 6 & 9	Yes	Yes	Yes	
	Item 6.4	Cooling tower	No	Yes	Yes	
Building 9	Item 9.1	Indoor firing range	Yes	Yes	No	4.3.6
	Item 9.2	Cooling tower, southeast of building	No	No	Yes	
Building 11	Item 11.1	Film processing	Yes	Yes	No	4.3.7
	Item 11.2	Production of newspaper	Yes	No	No	
Building 13	Item 13.1	Transformer building	No	No	Yes	4.3.8
Building 14	Item 14.1	Pump house with chemical storage tanks	No	Yes	Yes	
Building 19	Item 19.1	"Tank" noted on demo plan	No	No	Yes	4.3.9
Building 20	Item 20.1	One 1,500-gallon fuel oil UST	Yes	Yes	Limited*	4.3.10

* Limited sampling indicates a single soil boring or groundwater sample (as applicable) to verify past screening and analytical results.

** It should be noted that a series of soil borings have been advanced north of Building 10 (during the Regulated Tanks investigation) and are proposed during the site characterization between Buildings 9, 10, and 11 for other items.

Asbestos containing materials (ACM), lead-based paint (LBP), and transformers (with PCBs) have been identified on the site. However, these items are not being addressed in the RI/FS WP.

Table 3
Summary of Human Exposure Assumptions^a
Hardesty Federal Complex - Kansas City, Missouri
Terracon Project No. 02107147

Exposure Pathway	Parameter	Industrial/Commercial Worker	Construction Worker	Off-Site Residents		Parameter Units
				Adult	Child	
General	Body weight (BW)	70	70	70	15	kg
	Exposure frequency (EF)	250	250	350	350	days/year
	Exposure duration (ED)	25	1	30	6	year
	Exposure time (ET)	8	8	24	24	hour/day
	Averaging time - Cancer ^b (AT _C)	25,550	25,550	25,550	25,550	days
	Averaging time - Noncancer ^c (AT _{NC})	9,125	365	10,500	2,190	days
Ingestion of Soil	Soil Intake rate (IR) ^d	100	330	na	na	mg/day
	Fraction ingested from contaminated source (FI)	1	1	na	na	unitless
Inhalation	Particle Emission Factor (PEF) ^d	1.36E+09	tbd	na	na	m ³ /kg
Dermal Absorption	Skin surface area available for soil and groundwater contact (SSA) ^d (includes: face, forearms, and hands)	3,300	3,300	na	na	cm ²
	Soil to skin adherence factor (SAF) ^e	0.4	0.3	na	na	mg/cm ²
	Absorption factors from soil (ABS) ^e	-----chemical specific-----				unitless
	Contact duration with groundwater in an excavation	na	30	na	na	days
	Contact time with groundwater in an excavation	na	1	na	na	hour/day

^(a)USEPA, 1997. *Exposure Factors Handbook*.

^(b)Averaging time of exposure for carcinogenic effects are calculated as follows: 70-year lifetime exposure (70 years x 365 days/year = 25,550 days)

^(c)Averaging time for noncarcinogenic effects are calculated as follows: ED years x 365 days/year

^(d)From: USEPA, 2002. *Supplemental Guidance for Developing Soil Screening Levels*.

^(e)From: USEPA, 2004. *RAGS Part E, Dermal Exposure Guidance*.

na = not applicable

tbd = to be determined

Table 4
Project Personnel
 Hardesty Federal Complex - Kansas City, Missouri
 Terracon Project No. 02107147

Title	Name	Responsibilities	Phone Number
Environmental Team Lead - Facilities Operations	Kevin Phillips	General project oversight and management; financial oversight and budget approvals; scope development; report reviews	816-823-1220
On-site Security	Joe Barro	North Kansas City Bureau of Investigations. On-site security	816-471-2335
MDNR Project Manager	Jim Harris	Lead Agency; General project coordination and oversight; coordination of technical reviews and RI/FS Work Plan and supporting document approval	573-522-1892
Terracon Project Manager	Ashley D. Stuerke	General project oversight and management; EPA and Client contact; scope and TSAP development and implementation; field oversight, data validation; report development	913-998-7388
Terracon Quality Assurance Reviewer	Eric J. Gorman	Internal project audits; report reviews	913-998-7387
Quality Review Officer	Charles Vernoy	Data validation and report reviews	843-884-1234
Professional Environmental Engineers	Robin R. Rodriguez, PhD	Human Health Risk Assessment	314-960-8206

APPENDIX A
Previous Investigations

A.1 – 1999 Phase II (Terracon)

Out 11-11-99
100115

November 11, 1999

Terracon
13910 West 96th Terrace
Lenexa, Kansas 66215
(913) 492-7777 Fax: (913) 492-7443

Berkebile Nelson Immenschuh and McDowell Architects Inc.
One Kansas City Place
1200 Main Street, Suite 1515
Kansas City, MO 64105

Attn: Dale R. Duncan

RE: GSA IDC – Contract GS06P98GY0018
Work Order 7mod PSO1
Phase II Environmental Audit for the Hardesty Complex
BNIM Project Number 99042
Terracon Project No. 50997097

Dear Mr. Duncan:

Terracon has completed limited environmental site assessment services for the above-referenced site. Per the above referenced contract and work order, Terracon collected and arranged for analysis of samples from the following areas at the Hardesty Federal Complex at 607 Hardesty, in Kansas City, Missouri. The laboratory reports are attached.

SCOPE OF WORK (as provided by Berkebile Nelson Immenschuh and McDowell Architects Inc. [BNIM] and developed by GSA)

- Basin of the film processing room on the first floor of building #11. Terracon collected a single grab surface sample (GR-11) and had it analyzed for corrosivity and silver. The sample was not corrosive and silver was not detected above the reporting limit of 1.002 mg/kg.
- Oil pump area in the basement of building #3. Terracon collected a single grab surface sample (GR-3) off of the floor and had it analyzed for polychlorinated biphenyls (PCBs). PCBs were not detected above the reporting limit of 0.1998 mg/kg.
- Ash clean-out room beneath the stack in the basement of building #3. Terracon collected a single grab sample of the ash (GR-3 Basement) and had it analyzed for TCLP metals. Results of the analysis identified lead in the extract at a concentration of 7.0 mg/l. All of the other TCLP metals analyzed were below the reporting limits. The regulatory limit for TCLP lead is 5.0 mg/l. Therefore, because the regulatory limit was exceeded, the material analyzed is a characteristic hazardous waste by definition.

GSA IDC – Contract GS06P98GY0018
Work Order 7mod PSO1
Phase II Environmental Audit for the Hardesty Complex
BNIM Project Number 99042
Terracon Project No. 50997097
November 11, 1999

Terracon

DISCUSSION

The purpose of TCLP (Toxicity Characteristic Leaching Procedure) is to determine appropriate methods for management and disposal based on whether the material is classified hazardous or non-hazardous. A waste is hazardous if any one or more of the 39 TCLP listed substances are present in the extract (leachate) in concentrations equal to or greater than the regulatory limit. By definition, the ash sample collected from the clean-out room beneath the stack in the basement of building #3 is hazardous.

GENERAL COMMENTS

This data submittal is for the sole use of the client. No other individual or entity may rely on the data without express written consent from Terracon. Should the client and Terracon consent to reliance of the data by a third party, the reliance will be limited to this data submitted and only for a limited period of time. It will be subject to all of the terms, conditions and limitations stated in this data transmittal and the proposal. The client and the third party must agree to be bound by the Terms and Conditions in the Professional Services Agreement between Terracon and BNIM.

The analysis, comments, and recommendations presented in this submittal are based on the information collected as discussed in this submittal. When requested by the client, Terracon may provide oral information prior to completing the final written report. Terracon does not, however, recommend sole reliance on oral information. Due to time constraints, oral information may be based upon limited incomplete information and data evaluation. Consequently, the content of the final written report takes precedence over any variation from prior reported oral information. Please note that Terracon does not warrant the work of regulatory agencies or other third parties supplying information used in the compilation of reports.

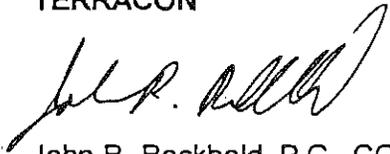
Phase II environmental services of a limited scope, such as the one for this site, will not completely eliminate the risk of the on-site presence or release of hazardous and/or toxic substance contamination. The limitations of these services should be recognized. Even then, it should be understood that there is no guarantee that the site would be free from contamination, particularly where contamination is localized or at concentrations below standard analytical detection limits.

GSA IDC – Contract GS06P98GY0018
Work Order 7mod PSO1
Phase II Environmental Audit for the Hardesty Complex
BNIM Project Number 99042
Terracon Project No. 50997097
November 11, 1999

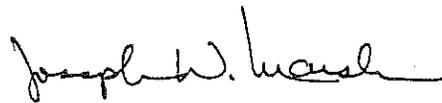
Terracon

Terracon appreciates the opportunity to provide environmental assessment services to BNIM. If you have any questions or if we may be of further service, please give us a call at (913) 492-7777.

Sincerely,
TERRACON



John R. Rockhold, P.G., CGWP
Senior Project Manager



Joseph M. Marsh, P.E.
Associate Principal

Attachment

2960 Foster Crieghton Ave.
Nashville, TN 37204

Phone: 800-785-0980 or 615-726-0177
Fax: 615-726-3404



Fax

To: John Rockhold **From:** Jessica Davenport

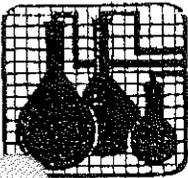
Fax: 913 492 7777 **Date:** November 11, 1999

Phone: **Pages:**

Re: **CC:**

- Urgent**
 - For Review**
 - Please Comment**
 - Please Reply**
 - Please Recycle**
-

•Comments:



SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

TERRACON 7857

Lab Number: 99-A164227
Sample ID: BK-3 BASEMENT
Sample Type: Solid waste
Site ID:

13910 WEST 96 TERRACE
LENEXA, KS 66215

Date Collected: 10/26/99
Time Collected: 15:15
Date Received: 10/28/99
Time Received: 7:00

Project: 50947097
Project Name: HARDESTY FEDERAL COMPLEX
Sampler: TOM WEINHEIMER

TCLP Results

Analyte	Result	Units	Matrix Spike		Date	Time	Analyst	Method
			Req Limit	Recovery (%)				
Arsenic	< 0.100	mg/l	5.0	103	11/ 6/99	13:07	B. Robinson	6010B
Barium	< 1.00	mg/l	100	91	11/ 6/99	13:07	B. Robinson	6010B
Cadmium	< 0.100	mg/l	1.0	94	11/ 6/99	13:07	B. Robinson	6010B
Chromium	< 0.500	mg/l	5.0	91	11/ 6/99	13:07	B. Robinson	6010B
Lead	7.000	mg/l	5.0	112	11/ 6/99	13:07	B. Robinson	6010B
Mercury	< 0.0100	mg/l	0.20	91	11/ 3/99	7:28	B. McCord	7970A
Selenium	< 0.100	mg/l	1.0	104	11/ 6/99	13:07	B. Robinson	6010B
Silver	< 0.100	mg/l	5.0	89	11/ 6/99	13:07	B. Robinson	6010B
TCLP Extraction	Initiated				10/28/99	16:00	J. Wilson	1311

ND = Not detected at the report limit.

TCLP preparation follows method 1311, SW-846 Revision 3.

These results relate only to the items tested.
This report shall not be reproduced except in full and with
permission of the laboratory.

Report Approved By:

Report Date: 11/ 6/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director
Gail A. Lage, Technical Services

Laboratory Certification Number: E10227

COPY 1

11/11/99 THU 14:09 [TX/RX NO 8336]



SPECIALIZED ASSAYS, INC.

2960 Foster Craighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

TERRACON 7857

13910 WEST 96 TERRACE
LENEXA, KS 66215

Project: 50997097

Project Name: HARDESTY FEDERAL COMPLEX

Sampler: TOM WEINHEIMER

Lab Number: 99-A164228

Sample ID: GR-3

Sample type: Solid waste

Site ID:

Date Collected: 10/26/99

Time Collected: 14:45

Date Received: 10/28/99

Time Received: 9:00

Analyte	Result	Units	Report Limit	Quan Limit	Dll Factor	Date	Time	Analyst	Method	Batch
PESTICIDE/PCB's/HERBICIDES										
Aroclor 1016	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803
Aroclor 1221	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803
Aroclor 1232	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803
Aroclor 1242	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803
Aroclor 1248	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803
Aroclor 1254	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803
Aroclor 1260	ND	mg/kg	0.1998	0.0200	10	11/ 2/99	17:23	A. Goodrich	8082	803

ND = Not detected at the report limit.

Sample Extraction Data

Parameter	Wt/Vol Extracted	Extract Vol	Date	Analyst	Method
PCB's	30.3 gm	10.0 ml	10/29/99	C. Terry	3550

surrogate was diluted out due to sample matrix

COPY 1

**SPECIALIZED ASSAYS, INC.**

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

Laboratory Number: 99-A164228
Sample ID: GK-8

Page 2

These results relate only to the items tested.
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permission of the laboratory.

Report Approved By:

Report Date: 11/ 6/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director
Wall H. Lage, Technical Services

Laboratory Certification Number: E10229

COPY 1

11/11/99 THU 14:09 [TX/RX NO 8336]



SPECIALIZED ASSAYS, INC.

2960 Foster Creighton Dr.
P.O. Box 40566
Nashville, TN 37204-0566
Phone 1-615-726-0177

ANALYTICAL REPORT

TERRACON 7857

13910 WEST 96 TERRACE
LEN: XA, KS 66215

Project: 50997097
Project Name: HANDESIY FEDERAL COMPLEX
Sampler: TOM WEINHEIMER

Lab Number: 99-A164224
Sample ID: GK-11
Sample Type: Solid Waste
Site ID:

Date Collected: 10/26/99
Time Collected: 14:15
Date Received: 10/28/99
Time Received: 9:00

Analyte	Result	Units	Report Limit	Quan Limit	Dil Factor	Date	Time	Analyst	Method	Batch
METALS										
Silver	ND	mg/kg	1.00E	1.000	1	11/ 4/99	11:06	G. Robinson	6010B	352
GENERAL CHEMISTRY PARAMETERS										
Corrosivity	NOT CORROSIVE					10/26/99	10:00	McFarland	1110	117

ND = Not detected at the report limit.

These results relate only to the items tested.
This report shall not be reproduced except in full and with
permission of the laboratory.

Report Approved By: Steve Adug Report Date: 11/ 6/99

Theodore J. Duello, Ph.D., Lab Director
Michael H. Dunn, M.S., Technical Director
Johnny A. Mitchell, Dir. Technical Services
Eric Smith, Assistant Technical Director
Gail A. Lage, Technical Services

Laboratory Certification Number: E10224

COPY 1

11/11/99 THU 14:09 [TX/RX NO 8336]

PROJECT QUALITY CONTROL DATA

Matrix Spike Recovery

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch
Aroclor 1260	mg/kg	< 0.0200	0.1971	0.1667	118	17. - 145.	803
Silver	mg/kg	< 0.986	9.449	10.000	94	80 - 120	352

Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch
Aroclor 1260	mg/kg	0.1971	0.1931	2.05	46.	803

Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Aroclor 1016	mg/kg	0.1667	0.1742	104	60 - 140	803
Aroclor 1260	mg/kg	0.1667	0.1968	118	60 - 140	803
Silver	mg/kg	10.000	9.600	96	80 - 120	352

Blank Data

Analyte	Blank Value	Units	Q.C. Batch
Silver	< 1.000	mg/kg	352
Arsenic	< 0.100	mg/l	4101
Barium	< 1.00	mg/l	4101
Cadmium	< 0.100	mg/l	4101
Chromium	< 0.500	mg/l	4101
Lead	< 0.500	mg/l	4101
Mercury	< 0.0100	mg/l	986
Selenium	< 0.100	mg/l	4101
Silver	< 0.100	mg/l	4101
Aroclor 1016	< 0.0200	mg/kg	803
Aroclor 1221	< 0.0200	mg/kg	803
Aroclor 1232	< 0.0200	mg/kg	803
Aroclor 1242	< 0.0200	mg/kg	803
Aroclor 1248	< 0.0200	mg/kg	803
Aroclor 1254	< 0.0200	mg/kg	803
Aroclor 1260	< 0.0200	mg/kg	803

From: SPECIALIZED ASSAYS ENVIRONMENTAL
2960 Foster Creighton Drive
Nashville, Tennessee 37204

To: TOM WEINHEIMER
TERRACON

To follow are laboratory reports relating to your project 50997097.

Please forward these reports to .

If there are problems with the transmission of this data, please call
Specialized Assays client services department.

APPENDIX A
Previous Investigations

A.2 – CAPE Investigations

**DRAFT REMEDIAL ACTION PLAN
UNREGULATED USTs NEAR BUILDING 3A**

**FEDERAL CENTER
607 HARDESTY AVENUE, KANSAS CITY, MO**

Missouri DNR ST# 10970

Spill # 000309-0815-NRB Jackson County

Contract No.: GS06P98GYC0012

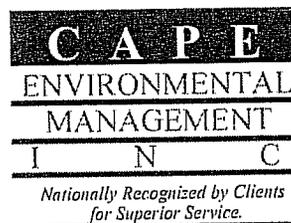
GSA Project No.: RMO20490

Prepared for:



**Property Management Division, Technical Support Branch (6PMT-E)
1500 East Bannister Road, Room 2135
Kansas City, Missouri 64131-3088**

Prepared by:



**2302 Parklake Drive
Atlanta, Georgia 30345**

MARCH 2002

Associated with Building 4 USTs

TABLE 1
Summary of Soil
Analytical Results
GSA Hardesty
607 Hardesty Avenue, Kansas City, Missouri

Sample ID Date	CALMs (STARC)	HAR-SB16 (16-20) 30-Nov-00	SB16(16-20) Dup 30-Nov-00	HAR-SB22 (16-20) 01-Dec-00	HAR-SB28 (12-16) 05-Dec-00	HAR-SB30 (16-20) 05-Dec-00
Analytical Method						
EPA Method 8021A / OA1	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Gasoline Range Hydrocarbons	200	ND	ND	ND	120	17
Benzene	0.05	ND	ND	ND	ND	ND
Toluene	3.7	ND	ND	ND	ND	ND
Ethylbenzene	32	ND	ND	ND	0,180	ND
Xylene (total)	16	ND	ND	ND	ND	ND
Methyl-tert-butyl Ether	none	ND	ND	ND	ND	ND
Method OA2	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mineral Spirits	none	ND	ND	ND	ND	ND
Jet Fuel	200	ND	ND	ND	ND	ND
Kerosene	200	ND	ND	ND	ND	ND
Diesel Fuel	200	ND	ND	ND	5,100	40
Fuel Oil	none	ND	ND	ND	ND	ND
Motor Oil	none	ND	ND	ND	ND	ND
EPA Method 1311/6010	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TCLP Lead	none	N/A	N/A	N/A	N/A	N/A

ND - Not Detected

N/A - This sample was not analyzed for this parameter.

mg/kg - milligrams per kilogram

CALM - Cleanup Levels for Missouri (lowest value of direct exposure and soil to groundwater leachate scenarios)

Bold numbers indicate that they exceed the MO DNR cleanup level

TABLE I
 Summary of Soil
 Analytical Results
 GSA Hardesty
 607 Hardesty Avenue, Kansas City, Missouri

Sample ID	HAR-SB31 (8-12)	HAR-SB32 (12-16)	HAR-SB33 (4-8)	HAR-SB34 (16-20)	HAR-SB35 (12-16)
Date	05-Dec-00	05-Dec-00	05-Dec-00	05-Dec-00	05-Dec-00
Analytical Method					
EPA Method 8021A / OA1	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Gasoline Range Hydrocarbons	ND	29	5.10	7.30	49
Benzene	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND
Xylene (total)	ND	0.19	ND	ND	ND
Methyl-tert-butyl Ether	ND	ND	ND	ND	ND
Method OA2	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mineral Spirits	ND	ND	ND	ND	ND
Jet Fuel	ND	ND	ND	ND	ND
Kerosene	ND	ND	ND	ND	ND
Diesel Fuel	ND	230	270	1,000	440
Fuel Oil	ND	ND	ND	ND	ND
Motor Oil	ND	ND	ND	ND	ND
EPA Method 1311/6010	mg/L	mg/L	mg/L	mg/L	mg/L
TCLP Lead	N/A	N/A	N/A	N/A	N/A

ND - Not Detected

N/A - This sample was not analyzed for this parameter.

mg/kg - milligrams per kilogram

Bold numbers indicate that they exceed the MO DNR cleanup level

TABLE 1
 Summary of Soil
 Analytical Results
 GSA Hardesty
 607 Hardesty Avenue, Kansas City, Missouri

Sample ID	HAR-SB36 (16-20)	HAR-SB37 (16-20)	HAR-SB38 (12-16)	HAR-SB39 (16-20)	SB39 (16-20)Dup
Date	05-Dec-00	06-Dec-00	06-Dec-00	06-Dec-00	06-Dec-00
Analytical Method					
EPA Method 8021A / OA1	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Gasoline Range Hydrocarbons	17	50	5.80	6.20	5.90
Benzene	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND
Xylene (total)	ND	0.47	ND	ND	ND
Methyl-tert-butyl Ether	ND	ND	ND	ND	ND
Method OA2	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mineral Spirits	ND	ND	ND	ND	ND
Jet Fuel	ND	ND	ND	ND	ND
Kerosene	ND	ND	ND	ND	ND
Diesel Fuel	3,400	1,500	ND	150	250
Fuel Oil	ND	ND	ND	ND	ND
Motor Oil	ND	ND	ND	ND	ND
0					
EPA Method 1311/6010	mg/L	mg/L	mg/L	mg/L	mg/L
TCLP Lead	N/A	N/A	N/A	N/A	N/A

ND - Not Detected

N/A - This sample was not analyzed for this parameter.

mg/kg - milligrams per kilogram

Bold numbers indicate that they exceed the MO DNR cleanup level

TABLE 1
Summary of Soil
Analytical Results
GSA Hardesty
607 Hardesty Avenue, Kansas City, Missouri

Sample ID Date	HAR-SB40 (20-24) 06-Dec-00	HAR-SB41 (12-16) 06-Dec-00	HAR-SB42 (20-24) 06-Dec-00	HAR-SB43 (12-16) 06-Dec-00	HAR-SB56 30-May-01
					Soil
Analytical Method					
EPA Method 8021A / OA1					
	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg
Gasoline Range Hydrocarbons	24	ND	ND	ND	ND
Benzene	0.095	ND	ND	ND	ND
Toluene	0.09	ND	ND	ND	ND
Ethylbenzene	0.11	ND	ND	ND	ND
Xylene (total)	0.21	ND	ND	ND	ND
Methyl-tert-butyl Ether	ND	ND	ND	ND	ND
Method OA2					
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mineral Spirits	ND	ND	ND	ND	ND
Jet Fuel	ND	ND	ND	ND	ND
Kerosene	ND	ND	ND	ND	ND
Diesel Fuel	1,400	ND	ND	ND	ND
Fuel Oil	ND	ND	ND	ND	ND
Motor Oil	ND	ND	ND	ND	ND
EPA Method 1311/6010					
	mg/L	mg/L	mg/L	mg/L	mg/L
TCLP Lead	N/A	N/A	N/A	N/A	N/A

ND - Not Detected

N/A - This sample was not analyzed for this parameter.

mg/kg - milligrams per kilogram

CALM - Corrective Action Cleanup Levels (lowest value of direct exposure and soil to groundwater leachate scenarios)

Bold numbers indicate that they exceed the MO DNR cleanup level

TABLE 1
Summary of Soil
Analytical Results
GSA Hardesty
607 Hardesty Avenue, Kansas City, Missouri

Sample ID	HAR-SB58	HAR-SB61
Date	31-May-01	31-May-01
	Soil	Soil
Analytical Method		
EPA Method 8021A / OA1	ug/kg	ug/kg
Gasoline Range Hydrocarbons	ND	ND
Benzene	ND	ND
Toluene	ND	ND
Ethylbenzene	ND	ND
Xylene (total)	ND	ND
Methyl-tert-butyl Ether	ND	ND
Method OA2	mg/kg	mg/kg
Mineral Spirits	ND	ND
Jet Fuel	ND	ND
Kerosene	ND	ND
Diesel Fuel	ND	ND
Fuel Oil	ND	ND
Motor Oil	ND	ND
EPA Method 1311/6010	mg/L	mg/L
TCLP Lead	N/A	N/A

ND - Not Detected

N/A - This sample was not analyzed for this parameter.

mg/kg - milligrams per kilogram

Bold numbers indicate that they exceed the MO DNR cleanup level

TABLE 2
 Summary of Groundwater
 Analytical Results
 GSA Hardesty
 607 Hardest Avenue, Kansas City, Missouri

Sample ID Date	CALMs (GTARC)	HAR-MW4 07-Dec-00	HAR-MW5 07-Dec-00	HAR-MW6 07-Dec-00	HAR-MW7 08-Dec-00	MW7(Dup) 07-Dec-00	HAR-MW8 07-Dec-00	HAR-MW9 08-Dec-00	MW9(Dup) 08-Dec-00	MW-10 31-May-01
Analytical Method										
EPA Method 8021A / OA1	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	ug/L
Gasoline Range Hydrocarbons	10,000	ND	1,040	ND	ND	1,030	2,540	ND	ND	ND
Benzene	5	ND	2.63	ND	ND	ND	ND	ND	ND	ND
Toluene	150	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	320	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl Ether	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method OA2	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	mg/L
Mineral Spirits	none	ND	ND	ND	ND	ND	ND	ND	ND	ND
Jet Fuel	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Kerosene	10000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diesel Fuel	10000	ND	9,000	ND	14,000	39,000	31,000	ND	ND	ND
Fuel Oil	none	ND	ND	ND	ND	ND	ND	ND	ND	ND
Motor Oil	none	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND - Not Detected
 µg/l - micrograms per liter
 mg/l - milligrams per liter
 CALM - Cleanup Levels for Missouri
 Bold | bold number indicates that they exceed the MO DNR groundwater cleanup levels

**FORMER USTs
SITE CHARACTERIZATION DRAFT REPORT**

**FEDERAL CENTER
607 HARDESTY AVENUE, KANSAS CITY, MISSOURI**

**Contract No. GS06P98GYC0012
GSA Project No. RM020490**

Prepared for:



**Property Management Division, Technical Support Branch (6PMT-E)
1500 East Bannister Road, Room 2135
Kansas City, Missouri 64131-3088**

Prepared by:

CAPE
ENVIRONMENTAL
MANAGEMENT
I N C

*Nationally Recognized by Clients
for Superior Service.*

**91 Noll Street
Waukegan, IL 60085
(847) 336-4341**

April 2001

TABLE 1
Summary of Soil Sample Analytical Results
GSA Hardesty
607 Hardesty Avenue, Kansas City, MO

Sample ID	HAR-SB21 (16-20)	HAR-SB22 (16-20)	HAR-SB23 (12-16)	HAR-SB24 (12-16)	HAR-SB25 (12-16)	HAR-SB26 (4-8)	HAR-SB28 (12-16)
Date	01-Dec-00	01-Dec-00	04-Dec-00	04-Dec-00	04-Dec-00	04-Dec-00	05-Dec-00
Analytical Method	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EPA Method 8021A / OA1							
Gasoline Range Hydrocarbons	14	ND	ND	ND	ND	ND	120
Benzene	0.077	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.190	ND	ND	ND	ND	ND	0.180
Xylene (total)	ND	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl Ether	ND	ND	ND	ND	ND	ND	ND
Method OA2							
Mineral Spirits	ND	ND	ND	ND	ND	ND	ND
Jet Fuel	ND	ND	ND	ND	ND	ND	ND
Kerosene	ND	ND	ND	ND	ND	ND	ND
Diesel Fuel	ND	ND	ND	ND	ND	ND	5,100
Fuel Oil	ND	ND	ND	ND	ND	ND	ND
Motor Oil	ND	ND	ND	ND	ND	ND	ND
EPA Method 1311/6010							
TCLP Lead	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ND - Not Detected
 N/A - This sample was not analyzed for this parameter.
 mg/kg - milligrams per kilogram
 bold numbers indicate that they exceed the MO DNR site specific cleanup level

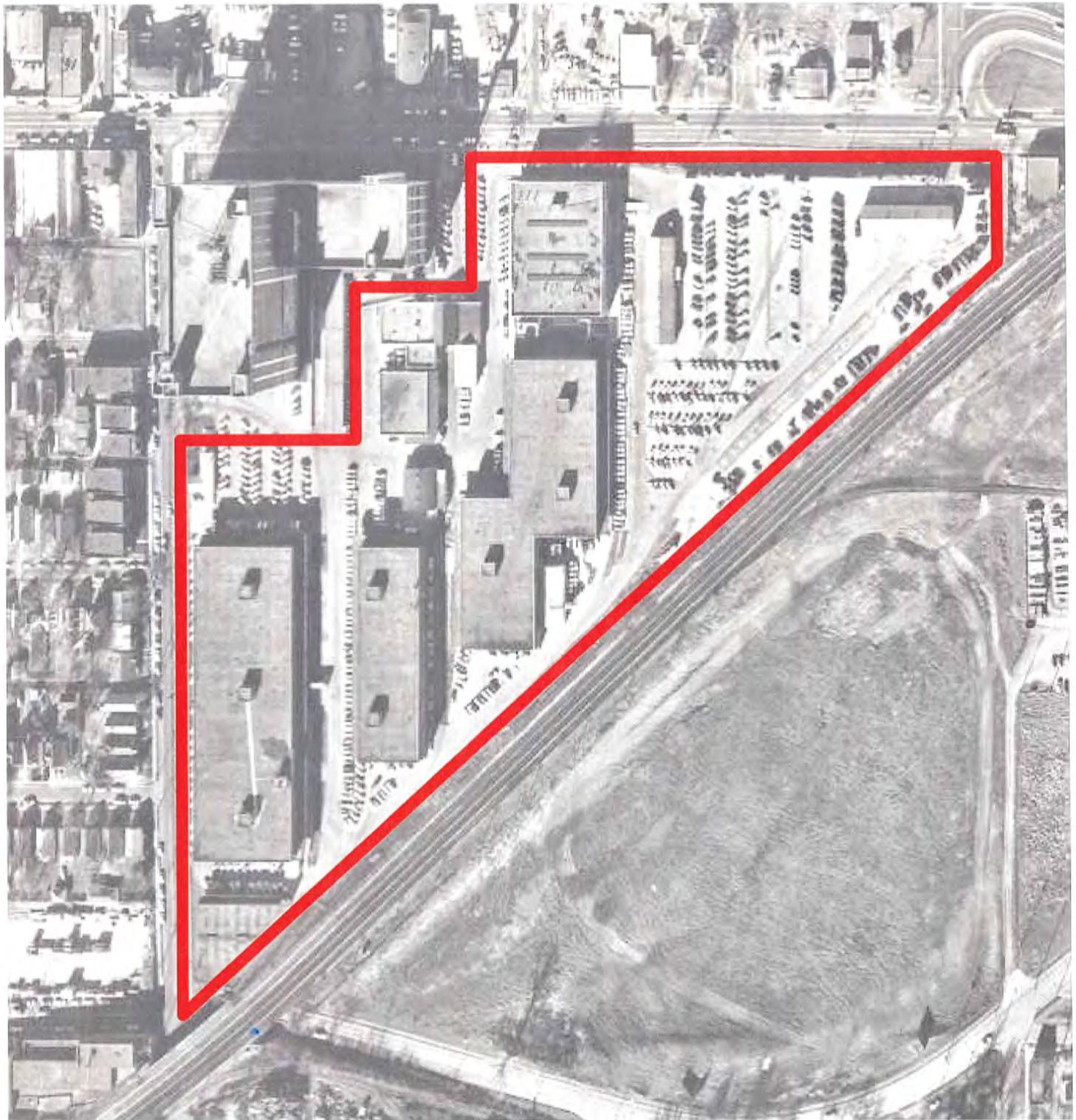
TABLE 1
Summary of Soil Sample Analytical Results
GSA Hardesty
607 Hardesty Avenue, Kansas City, MO

Sample ID	HAR-SB43 (12-16)	HAR-SB44 (12-16)	SB44 (12-16)Dup	HAR-SB45 (12-16)	HAR-SB46 (12-16)	HAR-SB47 (12-16)	HAR-SB48 (16-20)
Date	06-Dec-00	06-Dec-00	06-Dec-00	06-Dec-00	06-Dec-00	06-Dec-00	07-Dec-00
Analytical Method	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EPA Method 8021A / OA1							
Gasoline Range Hydrocarbons	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl Ether	ND	ND	ND	ND	ND	ND	ND
Method OAZ	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mineral Spirits	ND	ND	ND	ND	ND	ND	ND
Jet Fuel	ND	ND	ND	ND	ND	ND	ND
Kerosene	ND	ND	ND	ND	ND	ND	ND
Diesel Fuel	ND	ND	ND	ND	ND	ND	ND
Fuel Oil	ND	ND	ND	ND	ND	ND	ND
Motor Oil	ND	ND	ND	ND	ND	ND	ND
EPA Method 1311/6010	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
TCLP Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ND - Not Detected
 N/A - This sample was not analyzed for this parameter.
 mg/kg - milligrams per kilogram
 bold numbers indicate that they exceed the MO DNR site specific cleanup level

APPENDIX A
Previous Investigations

A.3 – Preliminary Assessment (Terracon)

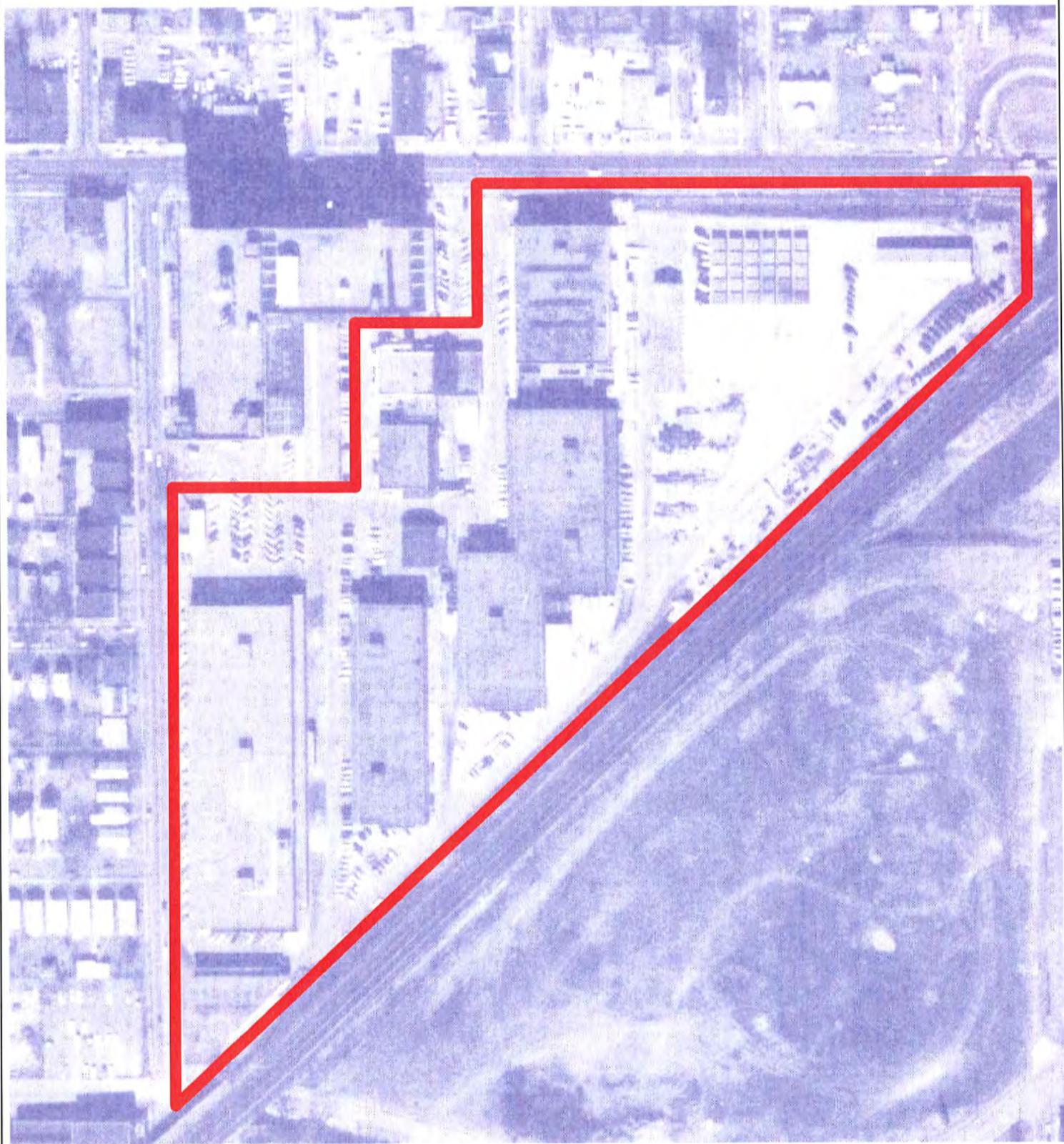


= APPROXIMATE BOUNDARIES
OF THE SUBJECT SITE

SOURCE OF AERIAL PHOTOGRAPH:
MISSOURI DEPARTMENT OF TRANSPORTATION

NOT TO SCALE

1961 AERIAL PHOTOGRAPH HARDESTY FEDERAL COMPLEX 601-607 HARDESTY AVENUE KANSAS CITY, MISSOURI		
Proj. Mngr: TAR	 15950 College Blvd Lenexa, Kansas 66219	Proj. # 50017083
Designed by: TAR		FN: Aerials.ppt
Drawn by: TAR		Date: 10/22/02



= APPROXIMATE BOUNDARIES
OF THE SUBJECT SITE

SOURCE OF AERIAL PHOTOGRAPH:
MID AMERICA REGIONAL COUNCIL

NOT TO SCALE

1967 AERIAL PHOTOGRAPH HARDESTY FEDERAL COMPLEX 601-607 HARDESTY AVENUE KANSAS CITY, MISSOURI		
Proj. Mngr: TAR		Proj. # 50017083
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Drawn by: TAR		Date: 10/22/02

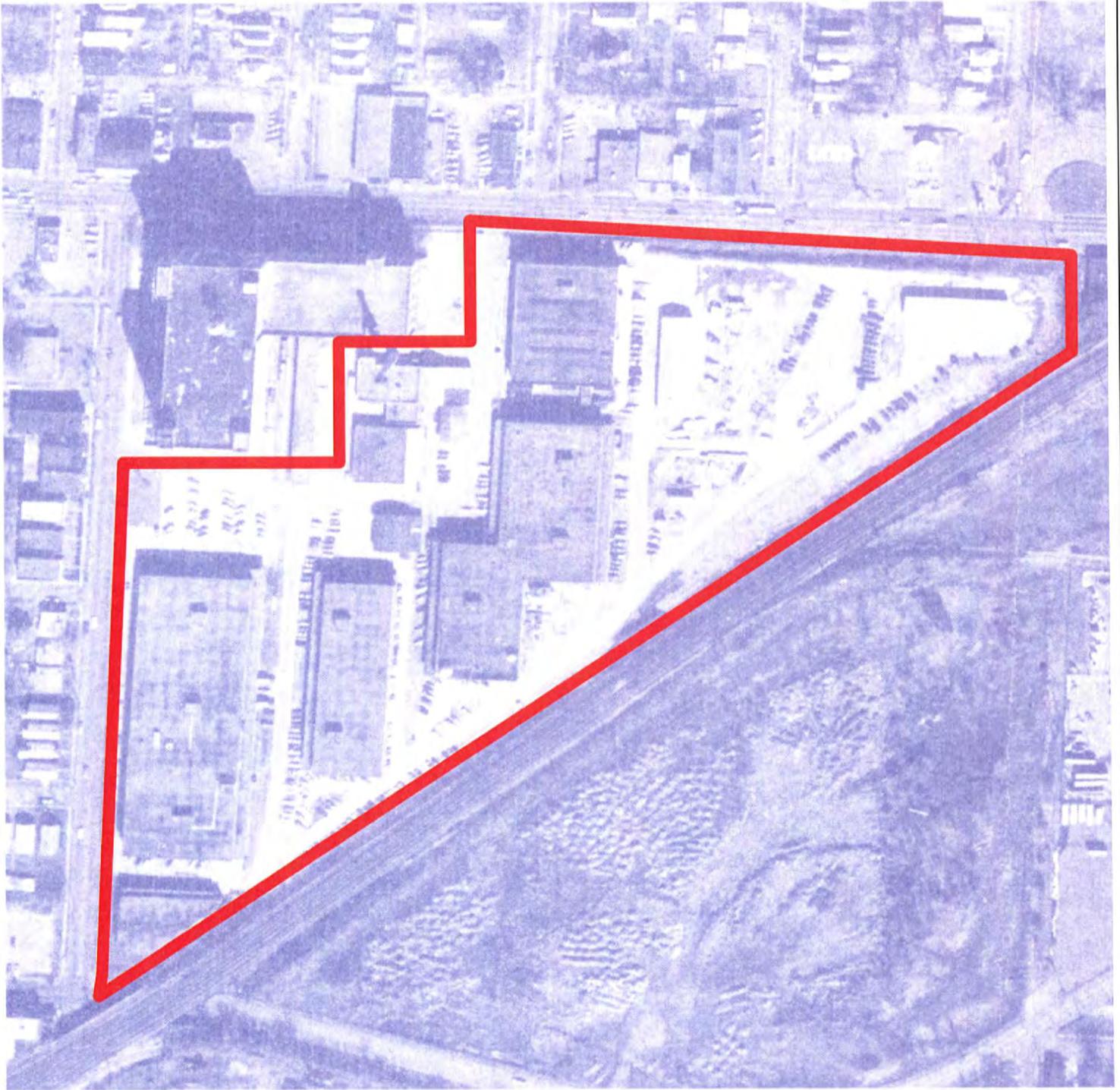


= APPROXIMATE BOUNDARIES
OF THE SUBJECT SITE

SOURCE OF AERIAL PHOTOGRAPH:
MISSOURI DEPARTMENT OF TRANSPORTATION

NOT TO SCALE

1973 AERIAL PHOTOGRAPH HARDESTY FEDERAL COMPLEX 601-607 HARDESTY AVENUE KANSAS CITY, MISSOURI		
Proj. Mngr: TAR	 15950 College Blvd Lenexa, Kansas 66219	Proj. # 50017083
Designed by: TAR		FN: Aerials.ppt
Drawn by: TAR		Date: 10/22/02



= APPROXIMATE BOUNDARIES
OF THE SUBJECT SITE

SOURCE OF AERIAL PHOTOGRAPH:
MID AMERICA REGIONAL COUNCIL

NOT TO SCALE

1980 AERIAL PHOTOGRAPH HARDESTY FEDERAL COMPLEX 601-607 HARDESTY AVENUE KANSAS CITY, MISSOURI		
Proj. Mngr: TAR	 15950 College Blvd Lenexa, Kansas 66219	Proj. # 50017083
Designed by: TAR		FN: Aerials.ppt
Drawn by: TAR		Date: 10/22/02

632

633

640

INDEPENDENCE AV

DENVER AV

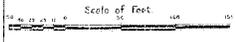
HARDESTY AV

FOREST PARK

3 FOOT WALKWAY BRIDGE OVER STREAM
3 FOOT WALKWAY IN ROW ALL THE TIME
PARK & GOLF CLUBS SURROUNDING FOREST PARK
PARKING LOT 400-400-000-000-000-000

E. 7TH ST

E. 8TH ST



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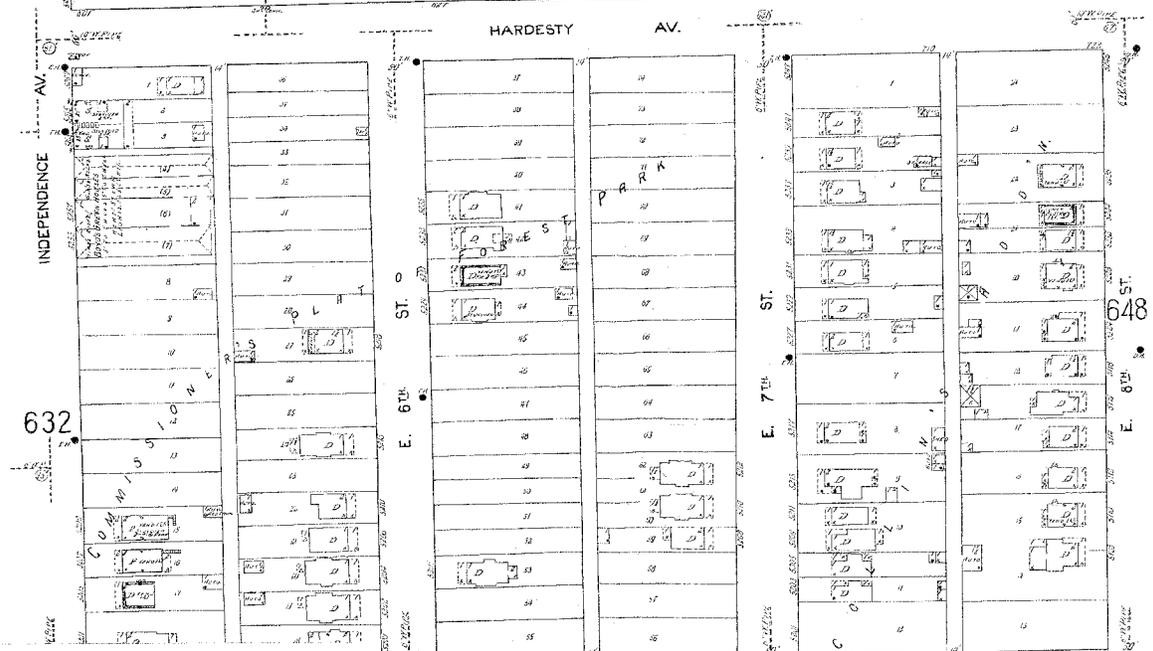
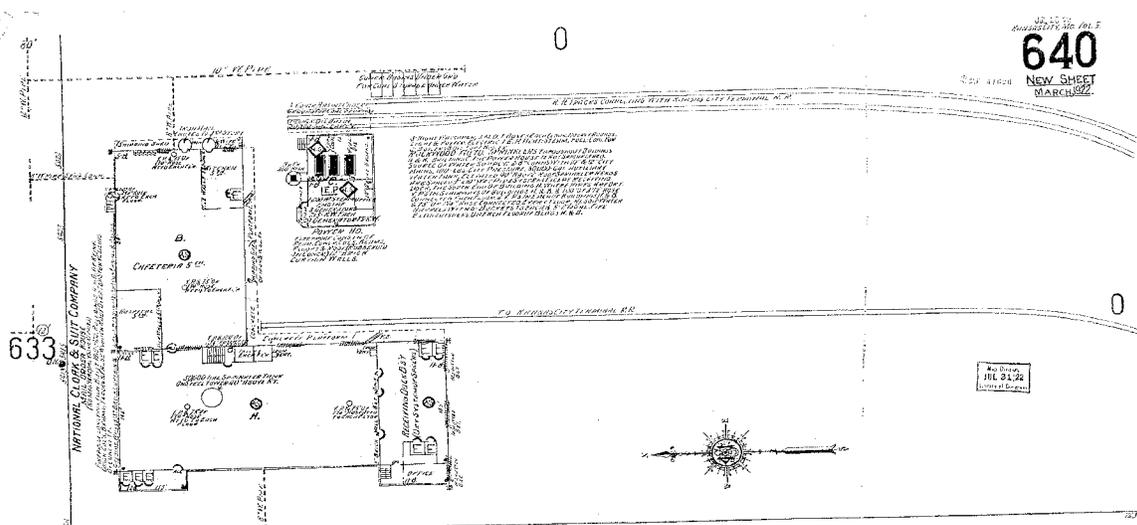
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648

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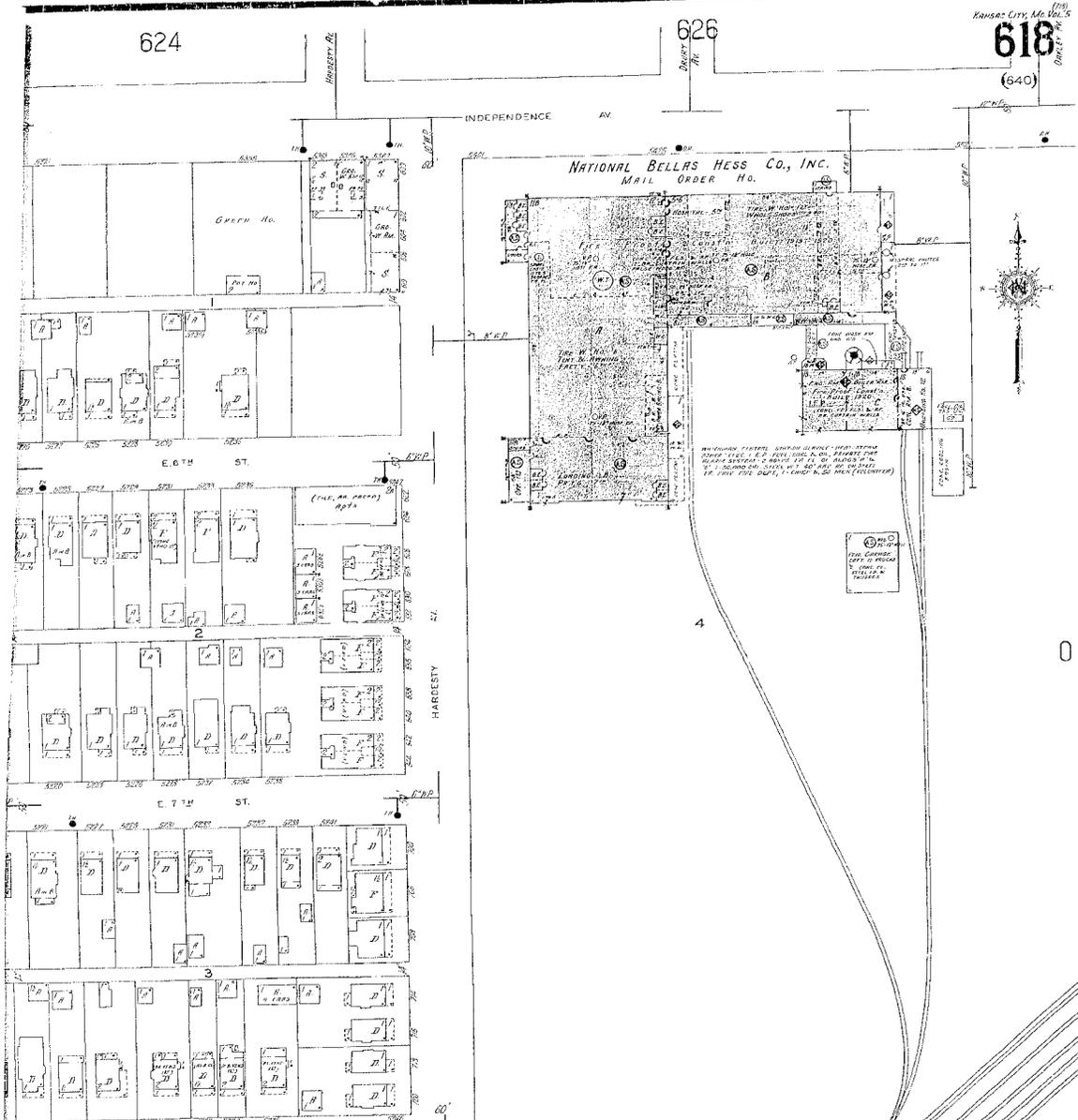


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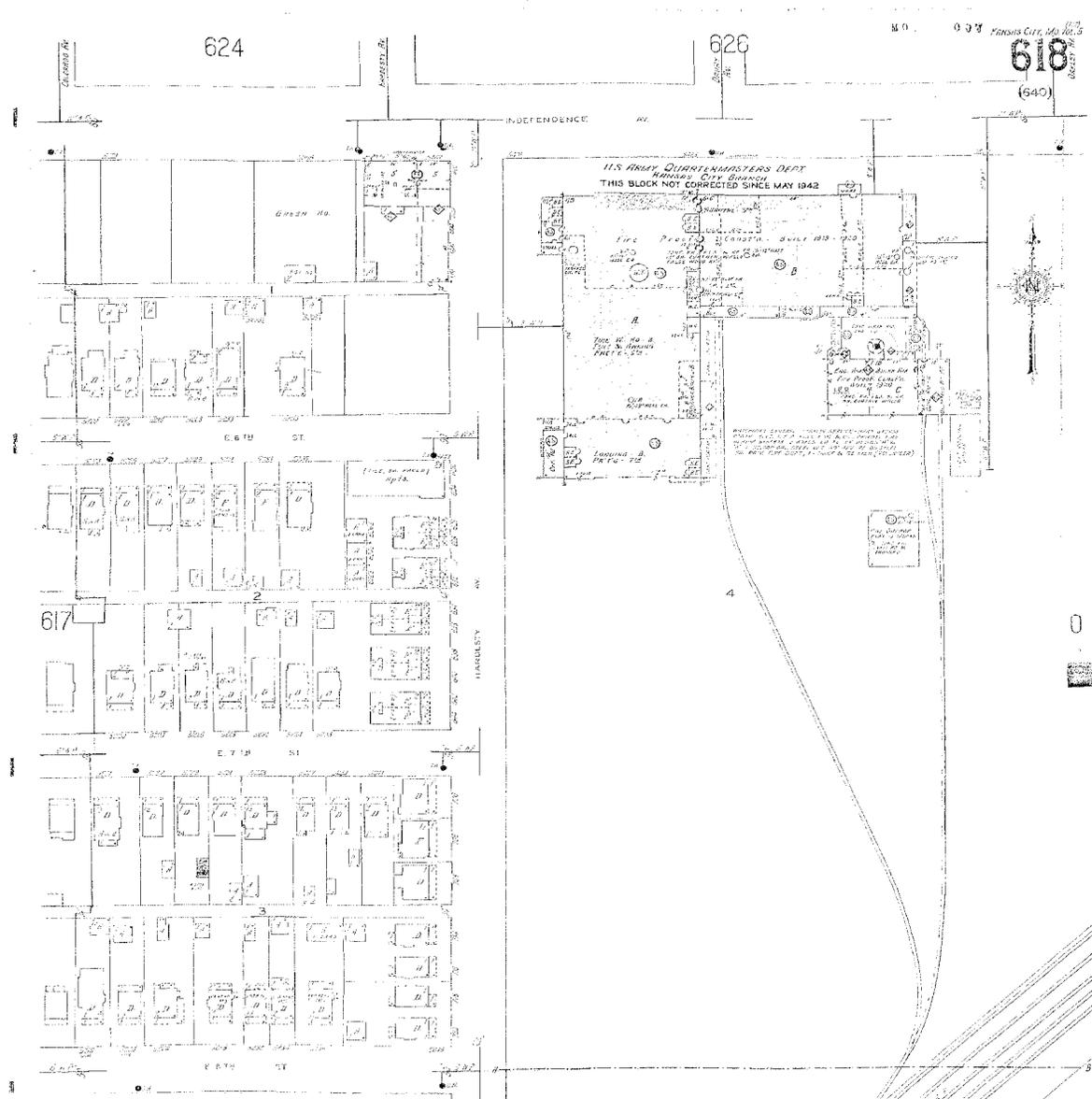


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0002C319138 (1-3)

A519

0002C319170 (1-3)



CHAIN - OF - CUSTODY
GENERAL SERVICES ADMINISTRATION

FACILITY SUPPORT BRANCH (6PMF-M)
1500 East Bannister Rd, Kansas City Mo 64131-3088

note: Please mail report and invoice to - Attention: Kevin Santee CIH, at the above address. Turnaround needed: By TUESDAY 2/22/00 (spoke to Richard)

Sampled by & Date: 2/17/00 Project: Hardesty Complex

Sample ID	Sample & Location	Analysis
1 2 3 21600-1	Fly ash from stack - just inside door (bldg3)	TCLP Lead
21600-2	Fly ash from stack - center of stack floor (bldg 3)	TCLP Lead
21600-3	Fly ash from stack - scraping from stack wall (bldg 3)	TCLP lead

Comments: Please fax me initial results (816) 926-1779 & follow up with final report in mail later. THANKS

Relinquished by: Kevin Santee Date: 2/18/00

Accepted by: Jasper Day Date: 2-21-00 9:50am

Relinquished by: _____ Date: _____

486..

Analyse for
TCLP RCRA
per Kevin Santee
2-25-00
B

Phone: (816) 823-2219 Fax: (816) 926-1779



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

Environmental Chemistry Analysis Report

QuantEM Set ID: 0002CA319138 Date Received: 02/21/00 Received By: Jayne Day Date Sampled: 02/17/00 Time Sampled: 0:00 Extraction Date: Date of Report: 2/22/00 ODEQ Lab No.: 7202 AIHA ID: 101352 KDHE ID: E-10315	Client: General Services Administration 1500 E. Bannister Rd. Kansas City, MO 64131 Contact: Kevin Santee Acct. No.: A319 Project: Hardesty Complex Location: Project No.:
---	---

QuantEM ID	Client ID	Matrix	Parameter	Results	Practical Quantitation Limits	Method Detection Limit	Units	Date/Time Analyzed	Analyst	Method
001	21600-1	Fly ash	TCLP Lead	1.01	0.1	0.1	mg/l	02/22/00 0:00	P. Marshala	EPA 1311/7420
002	21600-2	Fly ash	TCLP Lead	0.181	0.1	0.1	mg/l	02/22/00 0:00	P. Marshala	EPA 1311/7420
003	21600-3	Fly ash	TCLP Lead	0.397	0.1	0.1	mg/l	02/22/00 0:00	P. Marshala	EPA 1311/7420

Authorized Signature: Ray Powell

BMDL = Below Method Detection Limits
BPQL = Below Practical Quantitation Limits

Environmental Chemistry QC Report

QuanTEM Set ID: 0002C319138
 Date Received: 2/21/2000
 Received by: J. Day

Date of Report: 2/22/2000
 ODEQ Lab No. 7202
 AIHA Lab ID: 101352
 KDHE: E-10315

Analyst	Parameter	Method	Date Completed	Time Completed	LCS Recovery (%)	Recovery Limits	Blank	Units	Duplicate % APD	Matrix Spike Recovery (%)	MSD Recovery (%)	Matrix Spike RPD
PJM	TCLP Lead	EPA 1311/7420	2/22/2000	00:00	100	-	BMDL	mg/L	0	99	-	1

Authorized Signature: *Rap Powers*



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

Quantem Set ID: 0002C319170
 Date Received: 2/21/00
 Received by: J. Day

Sampling Date: 2/17/2000
 ODEQ Lab ID: 7202

Environmental Chemistry Analysis Report

Client: General Services Administration
 Contact: Kevin Santee
 Acct. No.: A319

Project: Hardesty Complex
 Location: Stack Bldg. 3

Quantem ID	Client ID	Matrix	Parameter	Method	Analyst	Date Analyzed	Detection Limit	Result	Unit
1	21600-1	Fly Ash	TCLP Arsenic*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Barium*	EPA 1311/6010	NP	2/28/00	0.2	BMDL	mg/L
			TCLP Cadmium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Chromium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Lead*	EPA 1311/6010	NP	2/28/00	0.3	0.60	mg/L
			TCLP Mercury	EPA 1311/245.1	PJM	2/28/00	0.0002	BMDL	mg/L
			TCLP Selenium*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Silver*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Arsenic*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Barium*	EPA 1311/6010	NP	2/28/00	0.2	BMDL	mg/L
			TCLP Cadmium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Chromium*	EPA 1311/6010	NP	2/28/00	0.3	BMDL	mg/L
			TCLP Lead*	EPA 1311/6010	NP	2/28/00	0.3	BMDL	mg/L
			TCLP Mercury	EPA 1311/245.1	PJM	2/28/00	0.0002	BMDL	mg/L
TCLP Selenium*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L			
TCLP Silver*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L			
2		Fly Ash	TCLP Arsenic*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Barium*	EPA 1311/6010	NP	2/28/00	0.2	BMDL	mg/L
			TCLP Cadmium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Chromium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Lead*	EPA 1311/6010	NP	2/28/00	0.3	0.60	mg/L
			TCLP Mercury	EPA 1311/245.1	PJM	2/28/00	0.0002	BMDL	mg/L
			TCLP Selenium*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Silver*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Arsenic*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Barium*	EPA 1311/6010	NP	2/28/00	0.2	BMDL	mg/L
			TCLP Cadmium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Chromium*	EPA 1311/6010	NP	2/28/00	0.3	BMDL	mg/L
			TCLP Lead*	EPA 1311/6010	NP	2/28/00	0.3	BMDL	mg/L
			TCLP Mercury	EPA 1311/245.1	PJM	2/28/00	0.0002	BMDL	mg/L
TCLP Selenium*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L			
TCLP Silver*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L			

*Analysis performed by ODEQ Laboratory Number 7211 with Detection Limits = to their Practical Quantitation Limits

This report applies only to the standards or procedures indicated and to the specific samples listed. It is not indicative of the quality of any other products or procedures, nor does it represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the client and are not to be reproduced without specific written permission.

Environmental Chemistry Analysis Report

QuantEM ID	Client ID	Matrix	Parameter	Method	Analyst	Date Analyzed	Detection Limit	Result	Unit
3		Fly Ash	TCLP Arsenic*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Barium*	EPA 1311/6010	NP	2/28/00	0.2	BMDL	mg/L
			TCLP Cadmium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Chromium*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L
			TCLP Lead*	EPA 1311/6010	NP	2/28/00	0.3	BMDL	mg/L
			TCLP Mercury	EPA 1311/245.1	PJM	2/28/00	0.0002	BMDL	mg/L
			TCLP Selenium*	EPA 1311/6010	NP	2/28/00	0.5	BMDL	mg/L
			TCLP Silver*	EPA 1311/6010	NP	2/28/00	0.1	BMDL	mg/L

Quality Control Data

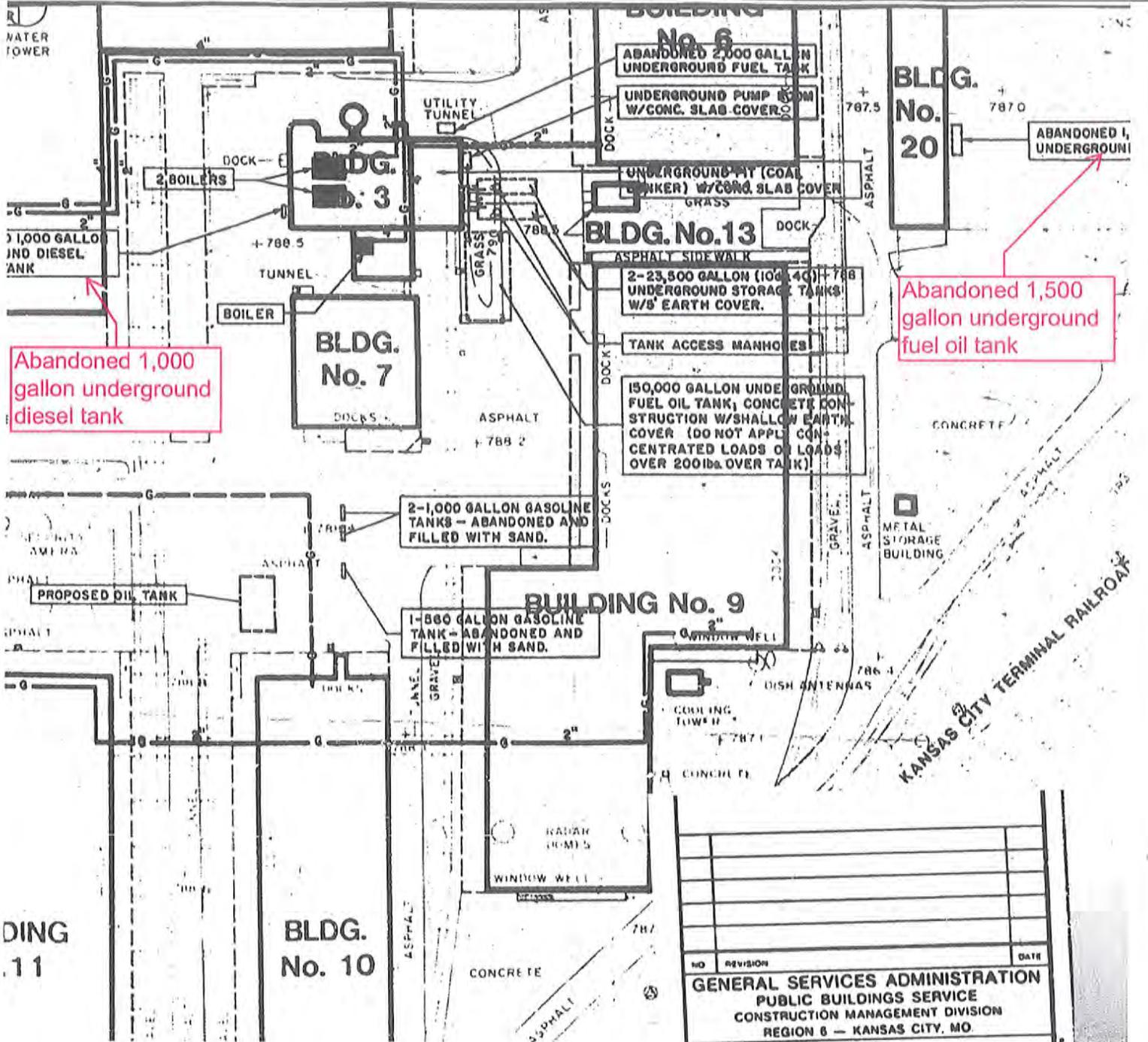
Parameter	Duplicate % Difference	Matrix Spike % Recovery	Lab Control Std. % Recovery
Arsenic	-	-	97
Barium	-	-	103
Cadmium	-	-	99
Chromium	-	-	98
Lead	-	-	98
Mercury	1	103	103
Selenium	-	-	99
Silver	-	-	89

Reviewed & Approved:

Ray Power

Title:

Chemist



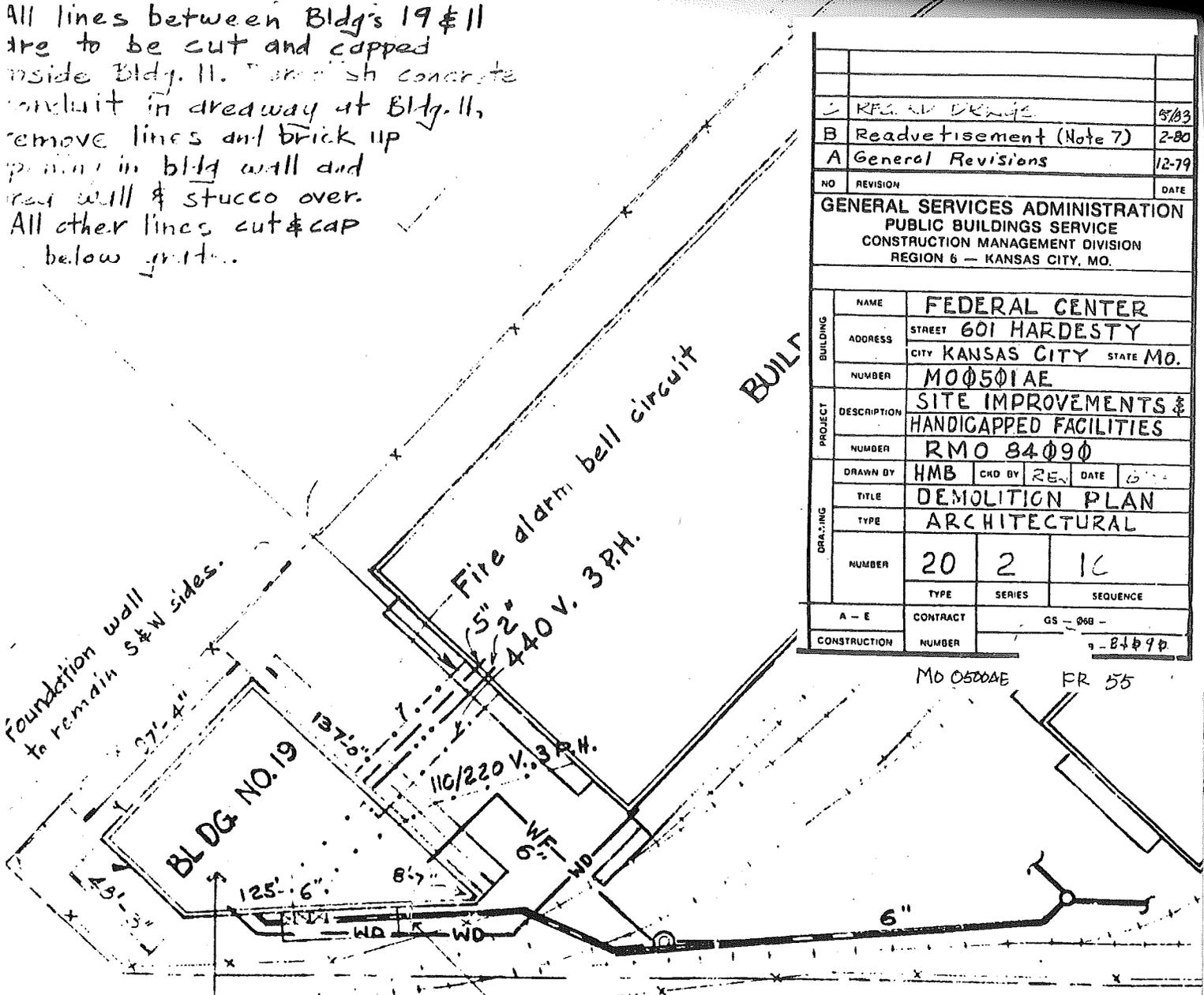
Abandoned 1,000 gallon underground diesel tank

Abandoned 1,500 gallon underground fuel oil tank

NO		REVISION		DATE
GENERAL SERVICES ADMINISTRATION PUBLIC BUILDINGS SERVICE CONSTRUCTION MANAGEMENT DIVISION REGION 8 - KANSAS CITY, MO.				
BUILDING	NAME	FEDERAL CENTER		
	ADDRESS	STREET 607 Hardesty CITY Kansas City STATE MO		
PROJECT	NUMBER	MO 0500 AE		
	DESCRIPTION	MASTER PLAN		
DRAWING	NUMBER	RMO 43130		
	DRAWN BY	CAD BY	DATE	
DATE	TITLE	[REDACTED]		
	TYPE	[REDACTED]		
DRAWING	NUMBER	15	6	[REDACTED]
	TYPE	SERIES	SEQUENCE	
CONSTRUCTION	A - E	CONTRACT	05 - 000 -	TRANS ENV. NO.
	NUMBER	05 - 000 -		

All lines between Bldg's 19 & 11 are to be cut and capped inside Bldg. 11. Finish concrete conduit in area way at Bldg. 11, remove lines and brick up opening in bldg wall and red wall & stucco over. All other lines cut & cap below grade.

Foundation wall to remain S & W sides.



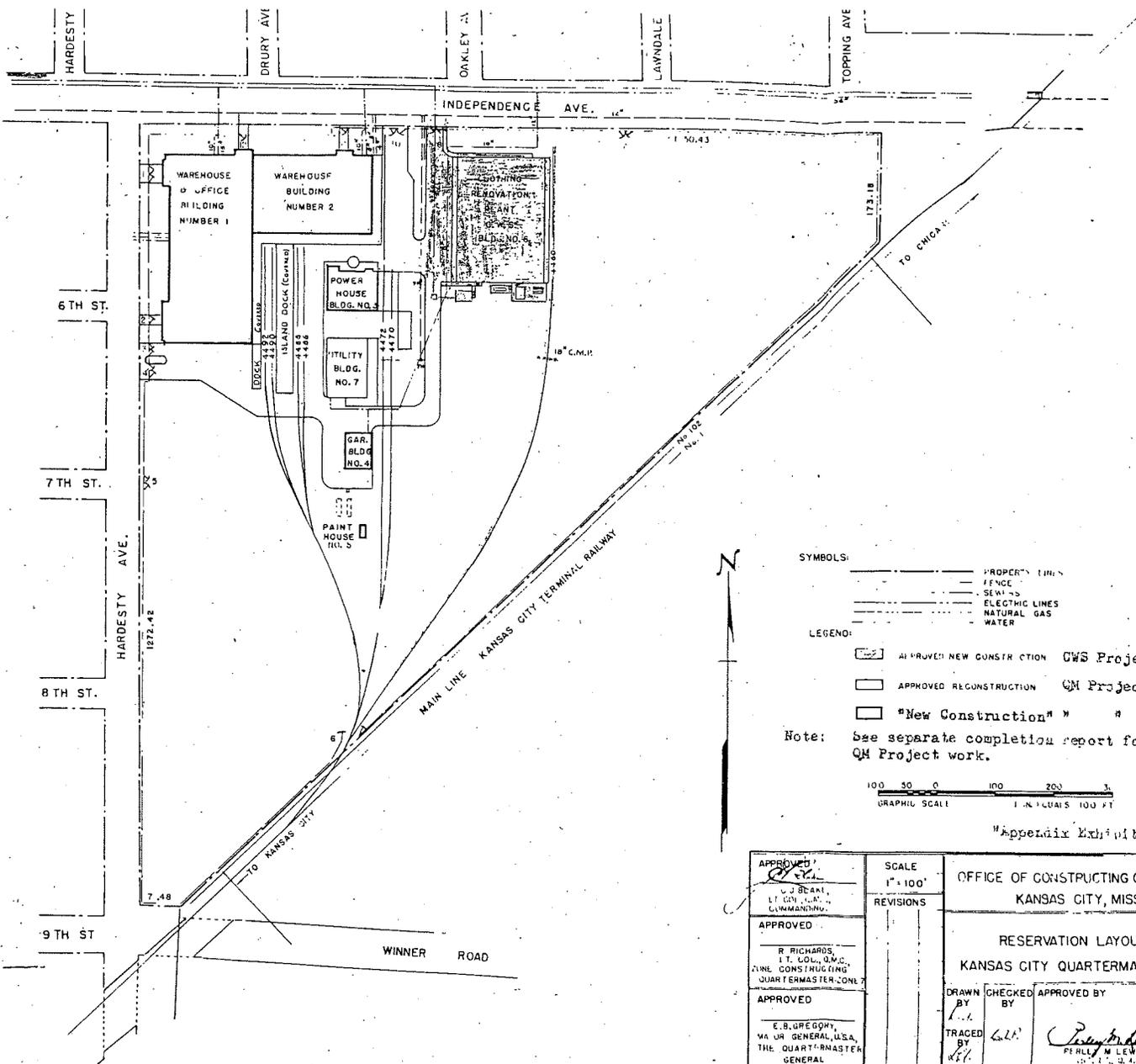
Remove 6 Ft. diameter tank & fill hole.

Bldg. 19. Demolish all walls, piers, pedestals & docks, except west & south walls, to 2'-0" below grade. West & south walls are to be demolished in existing concrete foundation wall (4 1/2" above floor line) & foundation wall left as retaining wall. Bldg. const. is conc. to floor line, conc. block exterior walls, interior wood columns & roof structure. Grade site to drain to the north, slope to be 0.5% to 1%. Repair disturbed asphalt paving. Topsoil and seed remaining earth surface. Fill material removed from below the floor slab may be used as fill material under dock slabs of Bldg. No. 9.

NO	REVISION	DATE
C	REVISION CHANGE	5/83
B	Readvertisement (Note 7)	2-80
A	General Revisions	12-79
GENERAL SERVICES ADMINISTRATION PUBLIC BUILDINGS SERVICE CONSTRUCTION MANAGEMENT DIVISION REGION 6 - KANSAS CITY, MO.		
BUILDING	NAME FEDERAL CENTER	
ADDRESS	STREET 601 HARDESTY	
	CITY KANSAS CITY STATE MO.	
NUMBER	M00501AE	
PROJECT	DESCRIPTION SITE IMPROVEMENTS & HANDICAPPED FACILITIES	
	NUMBER RMO 84090	
DRAWING	DRAWN BY HMB	CHK BY REN DATE 6
	TITLE DEMOLITION PLAN	
NUMBER	TYPE ARCHITECTURAL	
	20	2
A - E	CONTRACT	GS - 060 -
CONSTRUCTION	NUMBER	9-84090

M0 0500AE PR 55

39.1



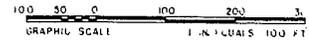
SYMBOLS:

- PROPERTY LINES
- - - FENCE
- - - SEMI-73
- - - ELECTRIC LINES
- - - NATURAL GAS
- - - WATER

LEGEND:

- APPROVED NEW CONSTRUCTION CWS Project
- APPROVED RECONSTRUCTION QM Project
- "New Construction" " " "

Note: See separate completion report for QM Project work.



"Appendix Exhibit No. 1"

APPROVED J. J. BEANT, LT. COL., USA, COMMANDING OFFICER	SCALE 1" = 100' REVISIONS	OFFICE OF CONSTRUCTING QUARTERMASTER KANSAS CITY, MISSOURI
APPROVED R. RICHARDS, LT. COL., USA, THE CONSTRUCTING QUARTERMASTER GENERAL		RESERVATION LAYOUT PLAN KANSAS CITY QUARTERMASTER DEPOT
APPROVED E. S. GREGORY, MAJOR GENERAL, USA, THE QUARTERMASTER GENERAL	DRAWN BY CHECKED BY TRACED BY 	APPROVED BY DATE 11-28-41 DATE 11-28-41 PLAN NO. COM 15-L PERCY M. LEWIS, MAJOR GENERAL, USA, CONSTRUCTING QUARTERMASTER

Demolished Buildings

The following buildings were noted on a 7 July 1945 "Plot Plan of Kansas City Quartermaster Depot" but are no longer extant: Buildings 4, 5, 8, 12, 14, 15 (may be presently attached to 3A), 16, 17, and 18. The majority of these buildings were small in relative comparison to the large warehouse buildings, and are shown below.

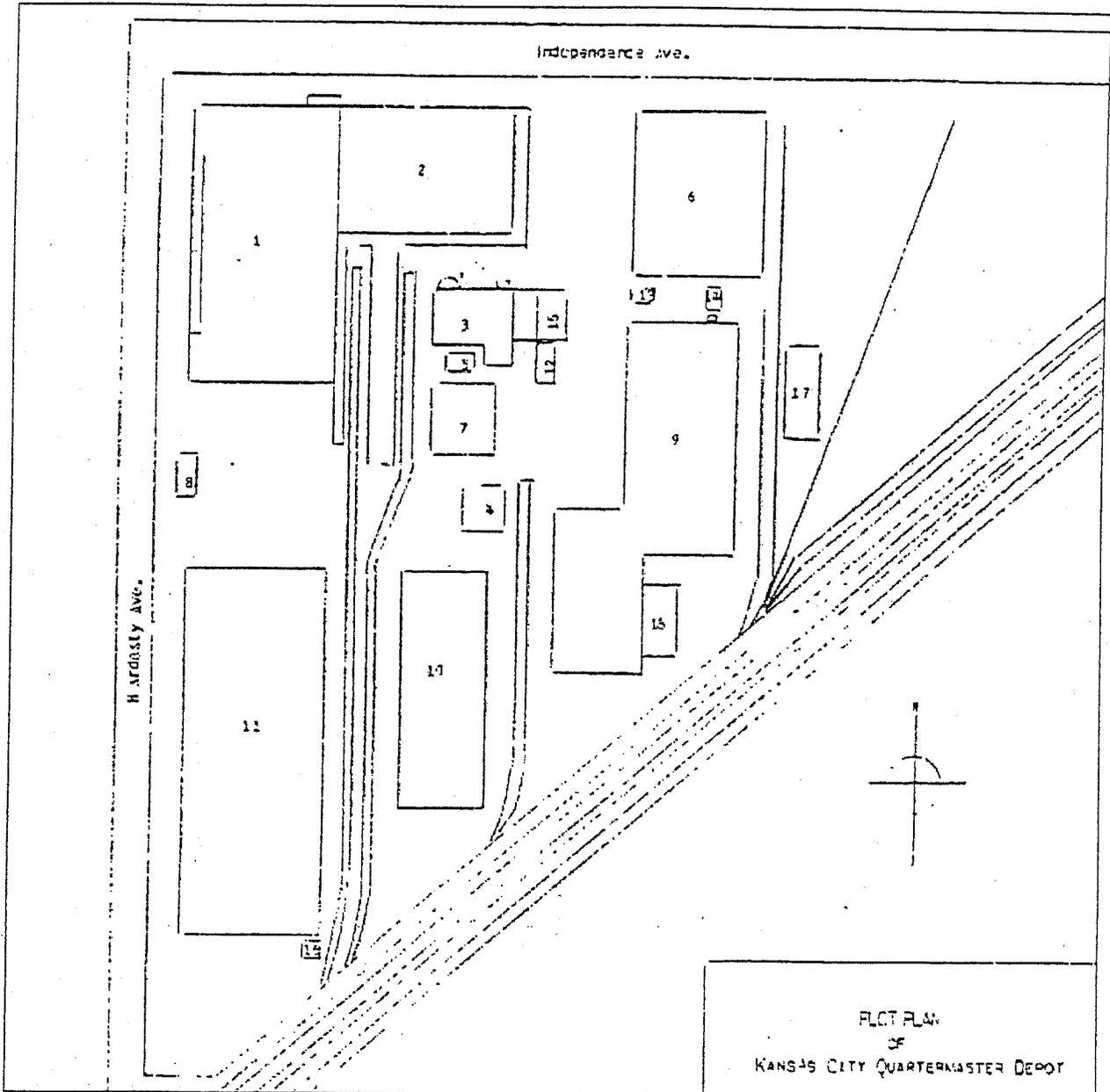
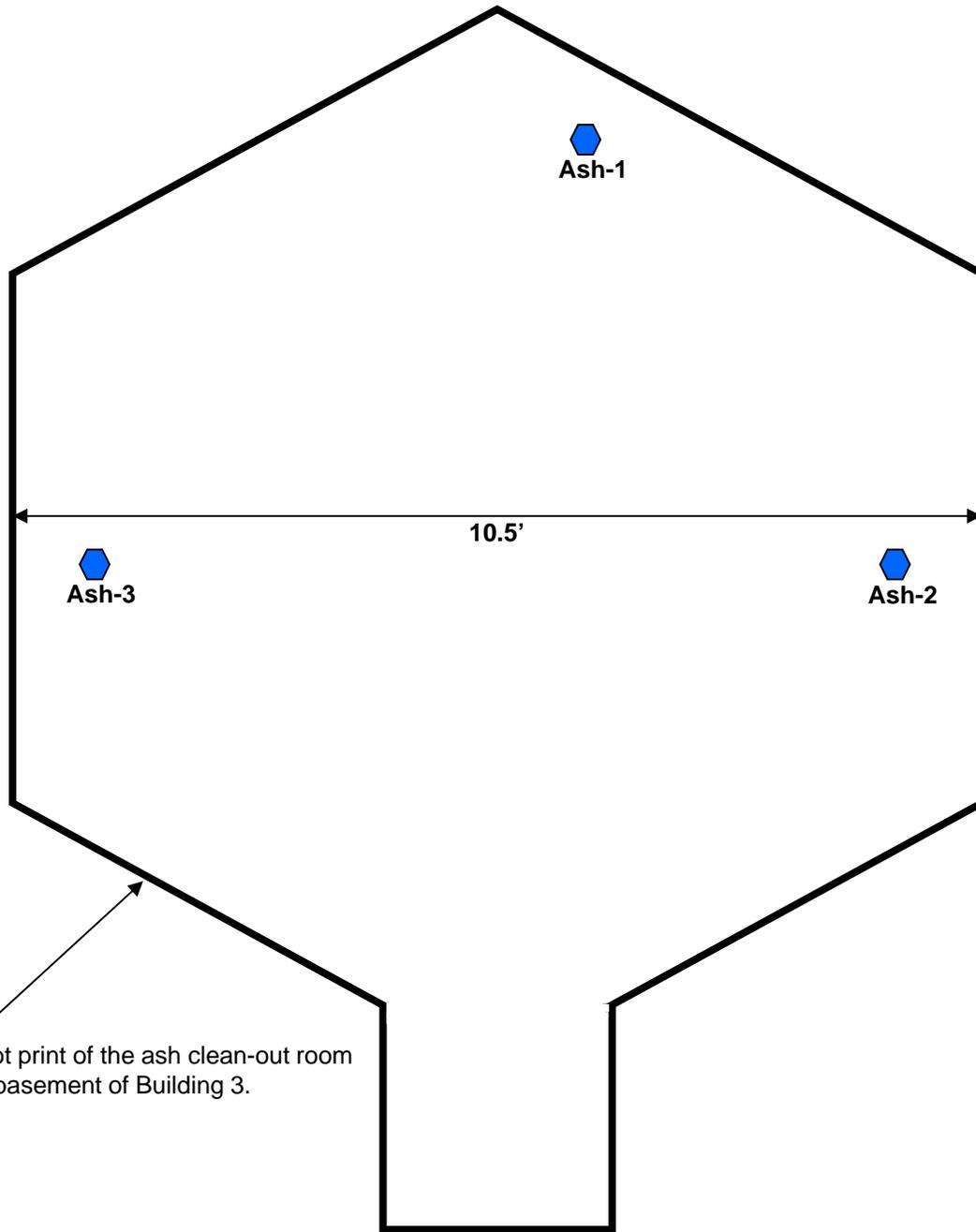


Figure 7. Plot Plan
 From: "Army Service Forces,
 Station Storage Conferences: Tour of Kansas City Quartermaster Depot,"
 19 September 1945.

APPENDIX A
Previous Investigations

A.4 – Site Investigation (Terracon)



Approximate foot print of the ash clean-out room in the basement of Building 3.



 = Approximate sampling location

DIAGRAM IS FOR GENERAL LOCATION ONLY,
AND IS NOT INTENDED FOR CONSTRUCTION
PURPOSES. NOT TO SCALE.

FIGURE 5 - SI SOURCE LOCATIONS – ASH
HARDESTY FEDERAL COMPLEX
601-607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

Proj. Mngr: TAR	Terracon 15950 College Blvd Lenexa, Kansas 66219	Proj. # 50017083
Designed by: TAR		FN: Figure 5.ppt
Drawn by: TAR		Date: 3/4/02

HARDESTY FEDERAL COMPLEX

Table 4: Analytical Results for Ash Samples, February 2002

Sample ID	Date Collected	Date Received	Date Analyzed	Analyte	Result	Report Limit	Units	Method	EPA Regulatory Limit
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Arsenic	< 0.100	0.1	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Barium	< 1.00	1	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Cadmium	< 0.100	0.1	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Chromium	< 0.500	0.5	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Lead	< 0.5000	0.5	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/25/02	Mercury	< 0.0100	0.01	mg/l	7470A	
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Selenium	< 0.100	0.1	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/24/02	Silver	< 0.100	0.1	mg/l	6010B	
ASH-1 NORTH	2/19/02	2/20/02	2/22/02	TCLP Extraction	Initiated			1311	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Arsenic	< 0.100	0.1	mg/l	6010B	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Barium	< 1.00	1	mg/l	6010B	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Cadmium	< 0.100	0.1	mg/l	6010B	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Chromium	< 0.500	0.5	mg/l	6010B	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Lead	0.83	0.5	mg/l	6010B	5
ASH-2 EAST	2/19/02	2/20/02	2/25/02	Mercury	< 0.0100	0.01	mg/l	7470A	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Selenium	< 0.100	0.1	mg/l	6010B	
ASH-2 EAST	2/19/02	2/20/02	2/24/02	Silver	< 0.100	0.1	mg/l	6010B	
ASH-2 EAST	2/19/02	2/20/02	2/22/02	TCLP Extraction	Initiated			1311	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Arsenic	< 0.100	0.1	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Barium	< 1.00	1	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Cadmium	< 0.100	0.1	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Chromium	< 0.500	0.5	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Lead	< 0.5000	0.5	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/25/02	Mercury	< 0.0100	0.01	mg/l	7470A	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Selenium	< 0.100	0.1	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/24/02	Silver	< 0.100	0.1	mg/l	6010B	
ASH-3 WEST	2/19/02	2/20/02	2/22/02	TCLP Extraction	Initiated			1311	
ASH-4F	2/19/02	2/20/02	2/22/02	Arsenic	< 0.100	0.1	mg/l	6010B	
ASH-4F	2/19/02	2/20/02	2/22/02	Barium	< 1.00	1	mg/l	6010B	
ASH-4F	2/19/02	2/20/02	2/22/02	Cadmium	< 0.100	0.1	mg/l	6010B	
ASH-4F	2/19/02	2/20/02	2/22/02	Chromium	< 0.500	0.5	mg/l	6010B	
ASH-4F	2/19/02	2/20/02	2/22/02	Lead	< 0.5000	0.5	mg/l	6010B	
ASH-4F	2/19/02	2/20/02	2/26/02	Mercury	< 0.0100	0.01	mg/l	7470A	
ASH-4F	2/19/02	2/20/02	2/22/02	Selenium	< 0.100	0.1	mg/l	6010B	
ASH-4F	2/19/02	2/20/02	2/22/02	Silver	< 0.100	0.1	mg/l	6010B	

EPA = U.S. Environmental Protection Agency

F = Field Blank

ID = Identification

mg/l = milligrams per liter = parts per million (ppm)

TCLP = Toxicity Characteristic Leaching Procedure

GSA SITE INSPECTION

**HARDESTY FEDERAL COMPLEX
601-607 HARDESTY AVENUE
KANSAS CITY, JACKSON COUNTY, MISSOURI**

**Terracon Project No. 02027042
November 4, 2002**

Prepared for:

**UNITED STATES GENERAL SERVICES ADMINISTRATION
Kansas City, Missouri**

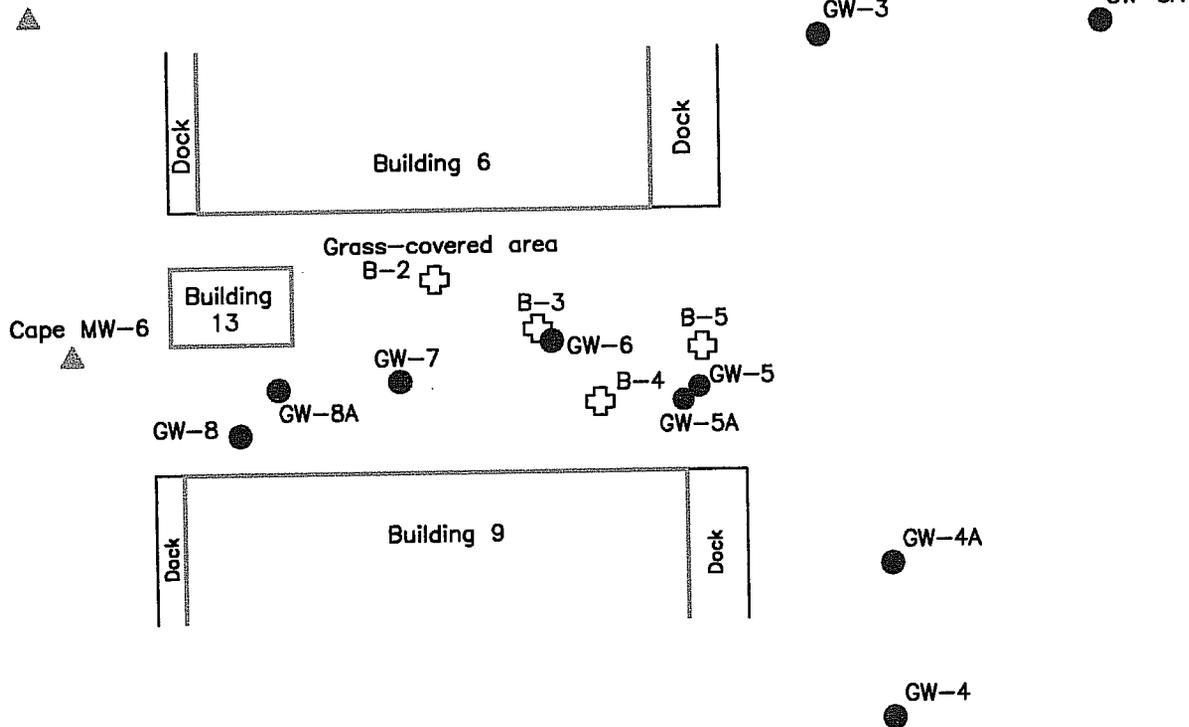
Prepared by:

**TERRACON
Lenexa, Kansas**

Terracon

GW-9

Cape MW "X" (Number not provided)



Cape MW-4, approximately 130 feet south of MW-6



- ⊕ Approximate location of previous sample borings (B-) advanced during the initial SI.
- ▲ Approximate location of existing monitoring wells (MW) (installed by Cape).
- Approximate location of temporary monitoring wells installed by Terracon (GW-).

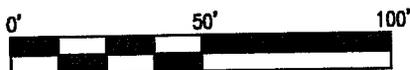
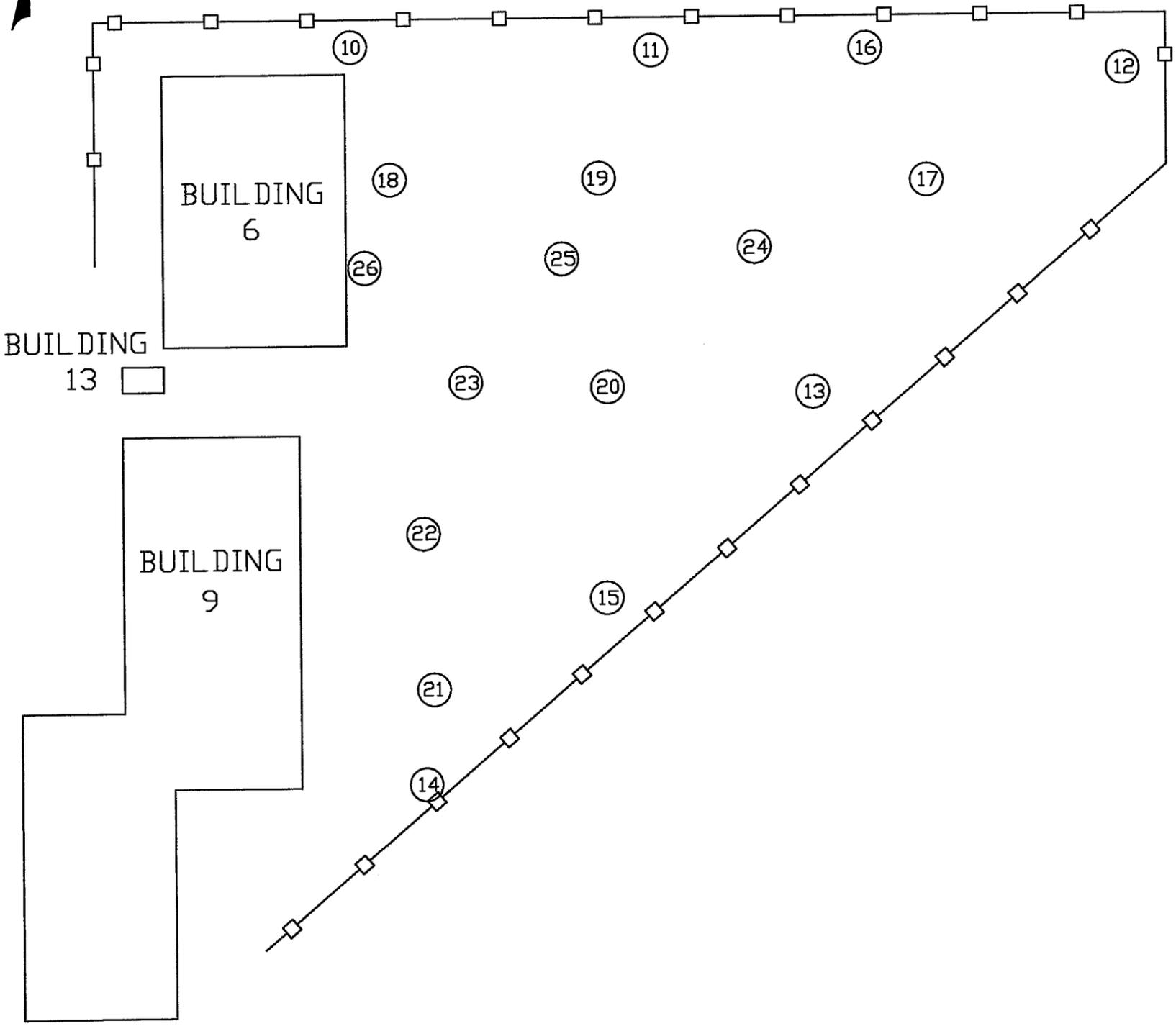


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

FIGURE 6 - PROBE LOCATIONS, FEBRUARY, JUNE & JULY 2002
HARDESTY FEDERAL COMPLEX
 601-607 HARDESTY AVENUE
 KANSAS CITY, MISSOURI

Project Mngr:	TAR	Terracon 13910 WEST 96th TERRACE LENEXA, KANSAS 66215	Project No.	02027042
Designed By:	BTW		Scale:	1"=50'
Checked By:	TAR		Date:	7-3-02
Approved By:	TAR		Drawn By:	BTW
File Name:	FIGURE_6.DWG		Figure No.	6



LEGEND

—□—□— FENCING

⑩ PROBE LOCATION

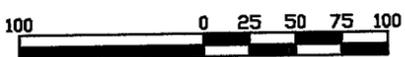
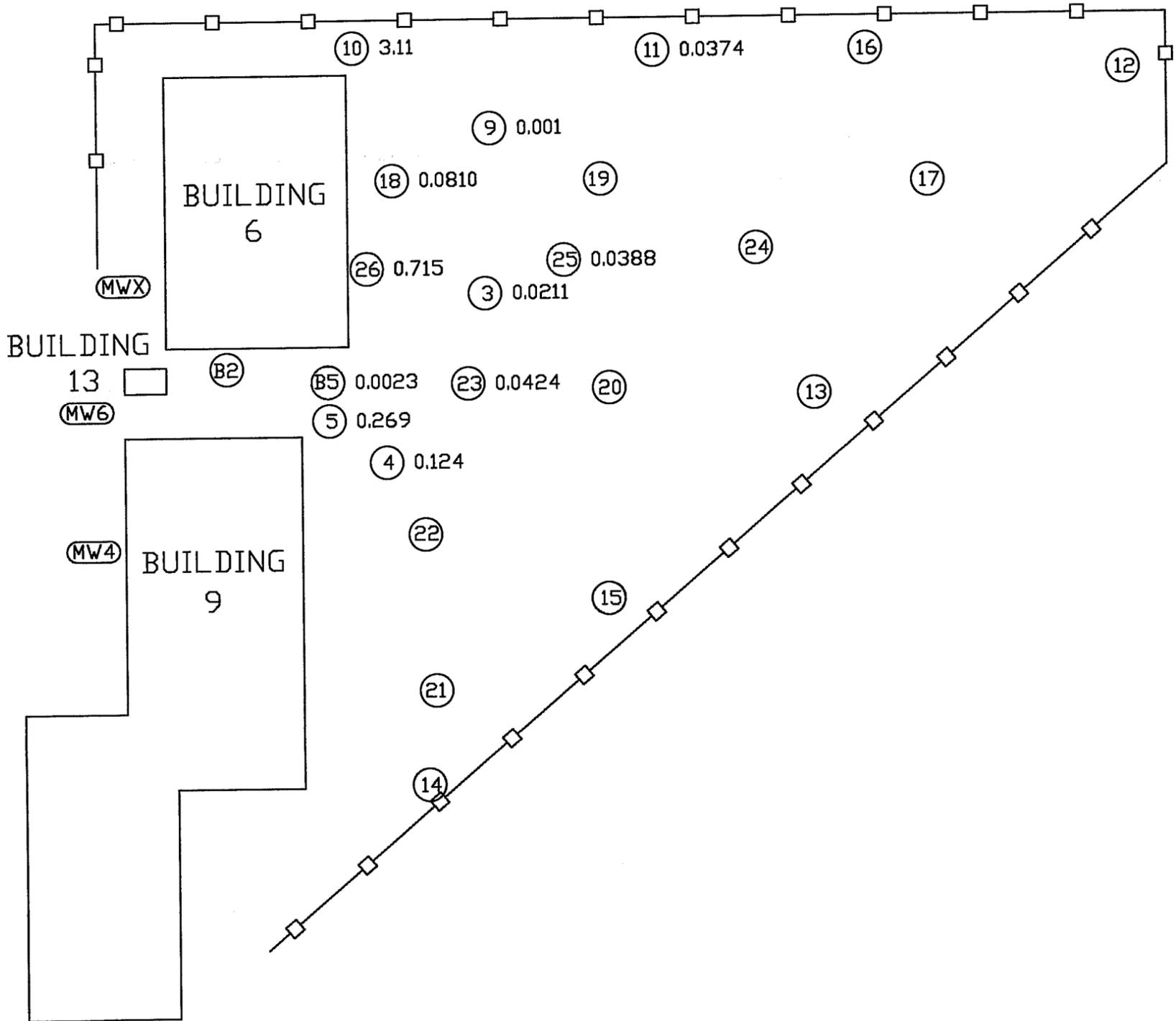


FIGURE 7 - PROBE LOCATIONS OCTOBER 2002 HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI				
Project Mngr:	TAR	Terracon	Project No.	02027042
Designed By:			Scale:	1"=100'
Checked By:	TAR	13910 WEST 96th TERRACE LENEXA, KANSAS 66215	Date:	10-23-02
Approved By:	TAR		Drawn By:	SLJ
File Name:	FIGURE_7.DWG		Figure No.	7



LEGEND

—□— FENCING

⑩ PROBE LOCATION

PCA = 1,1,2,2-TETRACHLOROETHANE

ANALYTICAL RESULTS IN MILLIGRAMS PER LITER (mg/L)

MDNR CALM FOR PCA = 0.0003mg/l

MW = CAPE ENVIRONMENTAL MANGEMENT, INC. MONITORING WELL

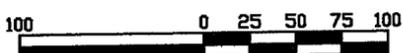
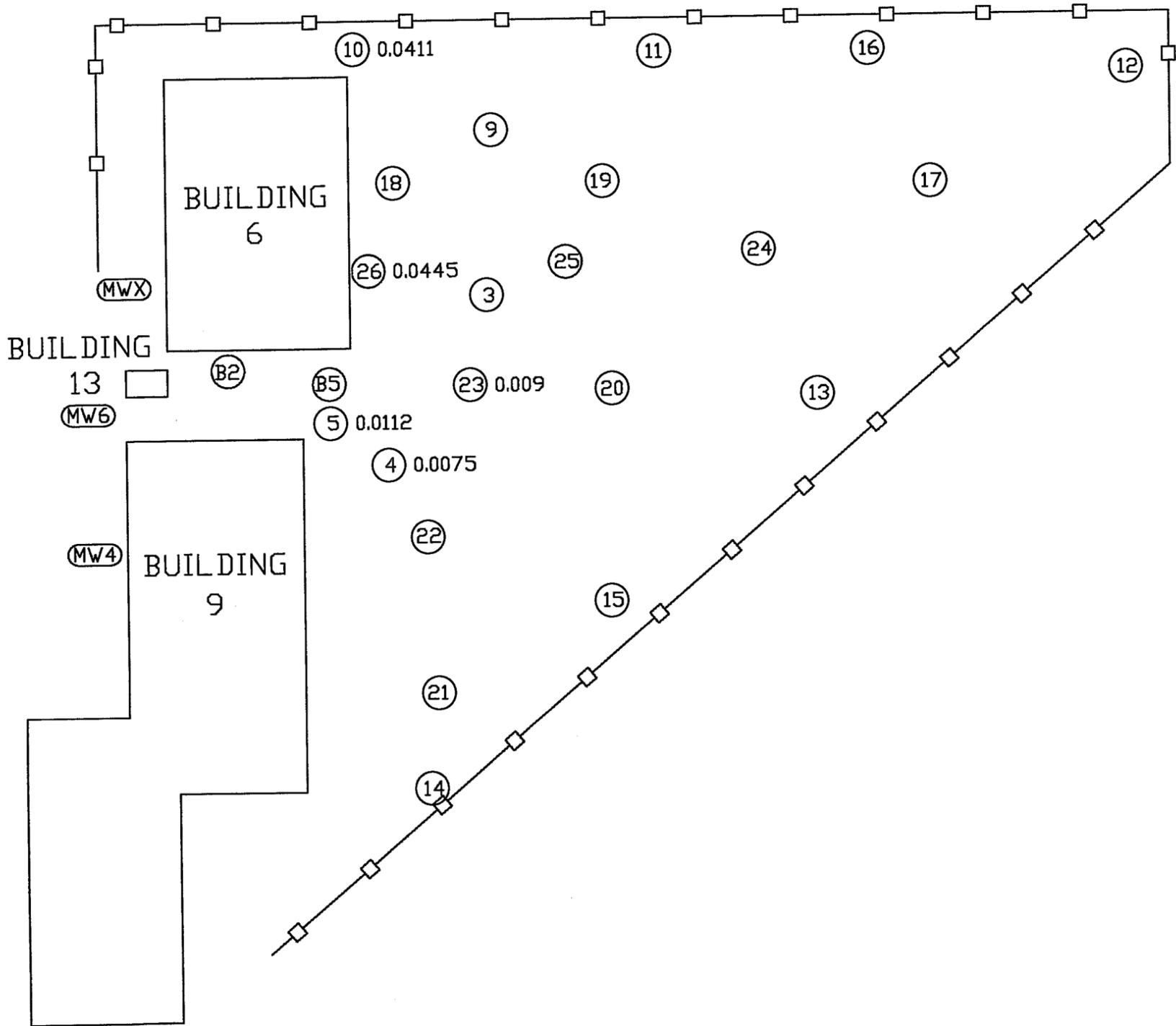


FIGURE 8 - GROUNDWATER PCA ANALYTICAL RESULTS ABOVE ACTION LEVELS
 HARDESTY FEDERAL COMPLEX
 KANSAS CITY, MISSOURI

Project Mngr:	TAR		Project No.	02027042
Designed By:			Scale:	1"=100'
Checked By:	TAR		Date:	10-21-02
Approved By:	TAR		Drawn By:	SLJ
File Name:	FIGURE_8.DWG		Figure No.	8



LEGEND

—□— FENCING

⑩ PROBE LOCATION

TCA = 1,1,2-TRICHLOROETHANE

ANALYTICAL RESULTS IN MILLIGRAMS PER LITER (mg/l)

MDNR CALM FOR TCA = 0.005mg/l

MW = CAPE ENVIRONMENTAL MANGEMENT, INC. MONITORING WELL

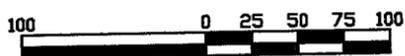
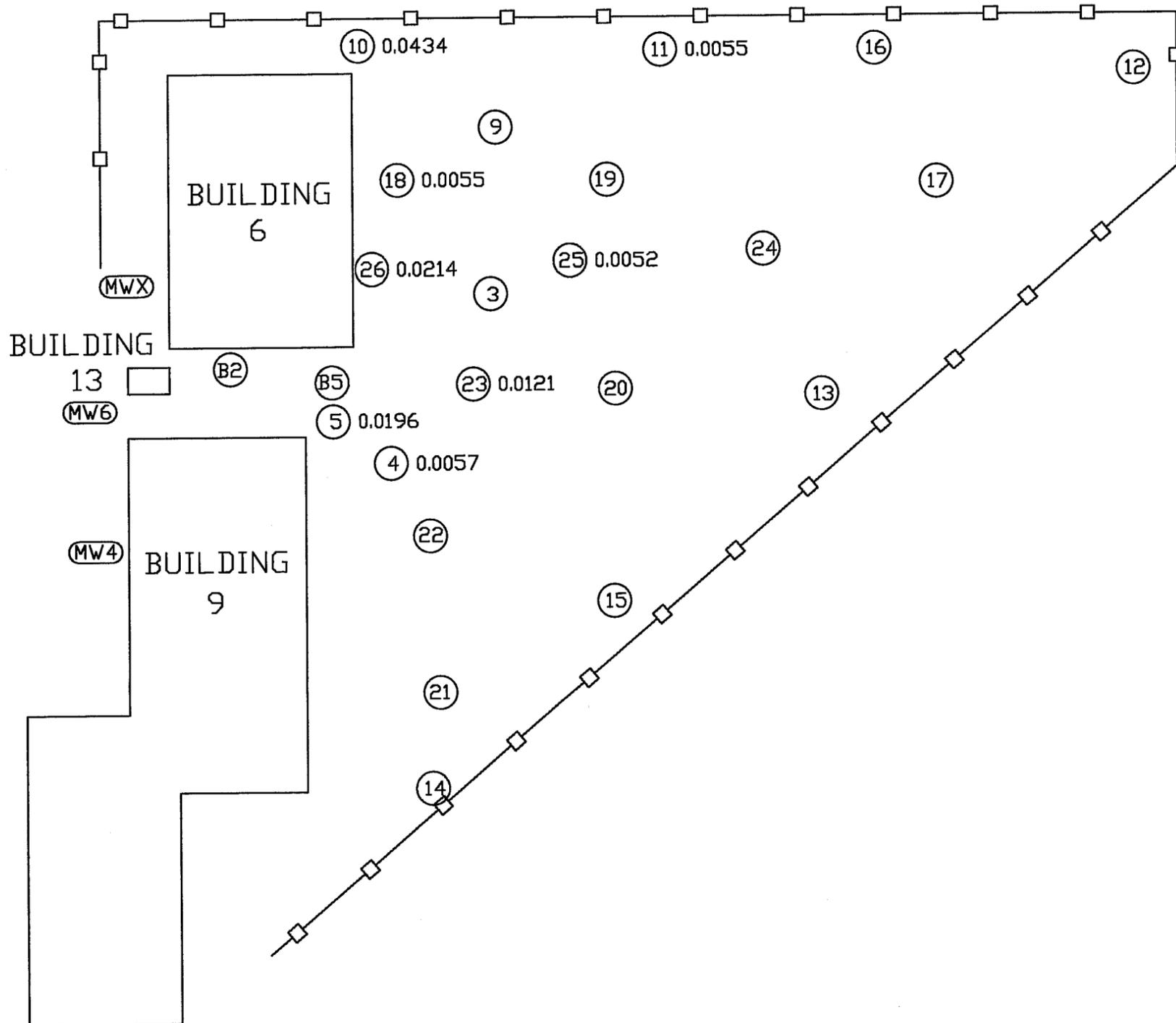


FIGURE 9 - GROUNDWATER TCA ANALYTICAL RESULTS ABOVE ACTION LEVELS HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI				
Project Mngr:	TAR	Terracon	Project No.	02027042
Designed By:			Scale:	1"=100'
Checked By:	TAR	13910 WEST 96 th TERRACE LENEXA, KANSAS 66215	Date:	10-21-02
Approved By:	TAR		Drawn By:	SLJ
File Name:	FIGURE_9.DWG		Figure No.	9



LEGEND

—□— FENCING

⑩ PROBE LOCATION

PCE = TETRACHLOROETHENE

ANALYTICAL RESULTS IN MILLIGRAMS PER LITER (mg/l)

MDNR CALM FOR PCE = 0.005mg/l

MW = CAPE ENVIRONMENTAL MANGEMENT, INC. MONITORING WELL

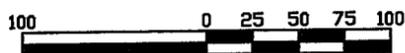
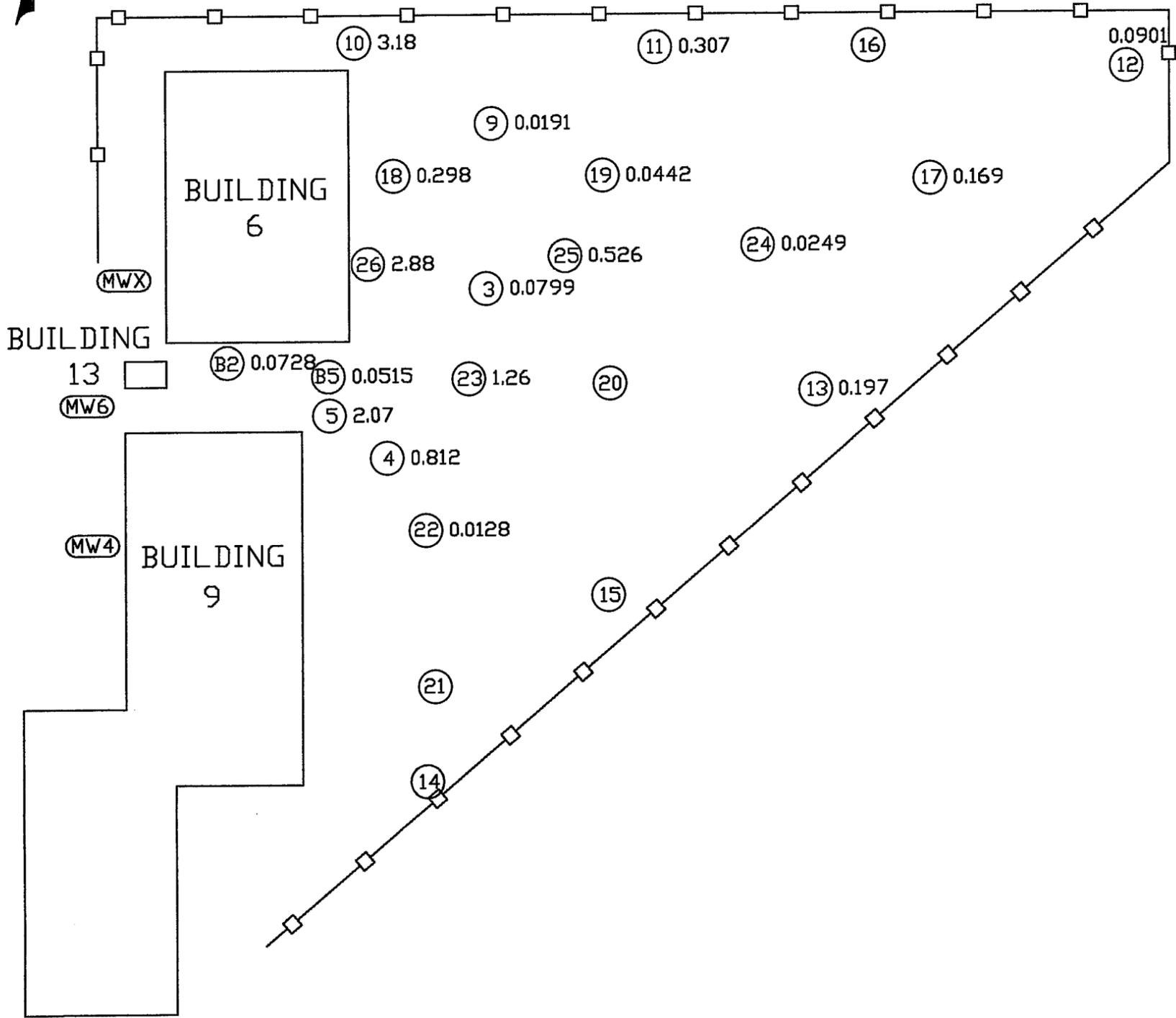


FIGURE 10 - GROUNDWATER PCE ANALYTICAL RESULTS ABOVE ACTION LEVELS HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI		
Project Mngr:	TAR	Project No. 02027042
Designed By:		Scale: 1"=100'
Checked By:	TAR	Date: 10-21-02
Approved By:	TAR	Drawn By: SLJ
File Name:	FIGURE_10.DWG	Figure No. 10



LEGEND

—□— FENCING

⑩ PROBE LOCATION

TCE = TRICHLOROETHENE

ANALYTICAL RESULTS IN MILLIGRAMS PER LITER (mg/l)

MDNR CALM FOR TCE = 0.005mg/l

MW = CAPE ENVIRONMENTAL MANGEMENT, INC. MONITORING WELL

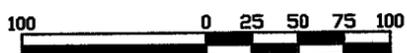
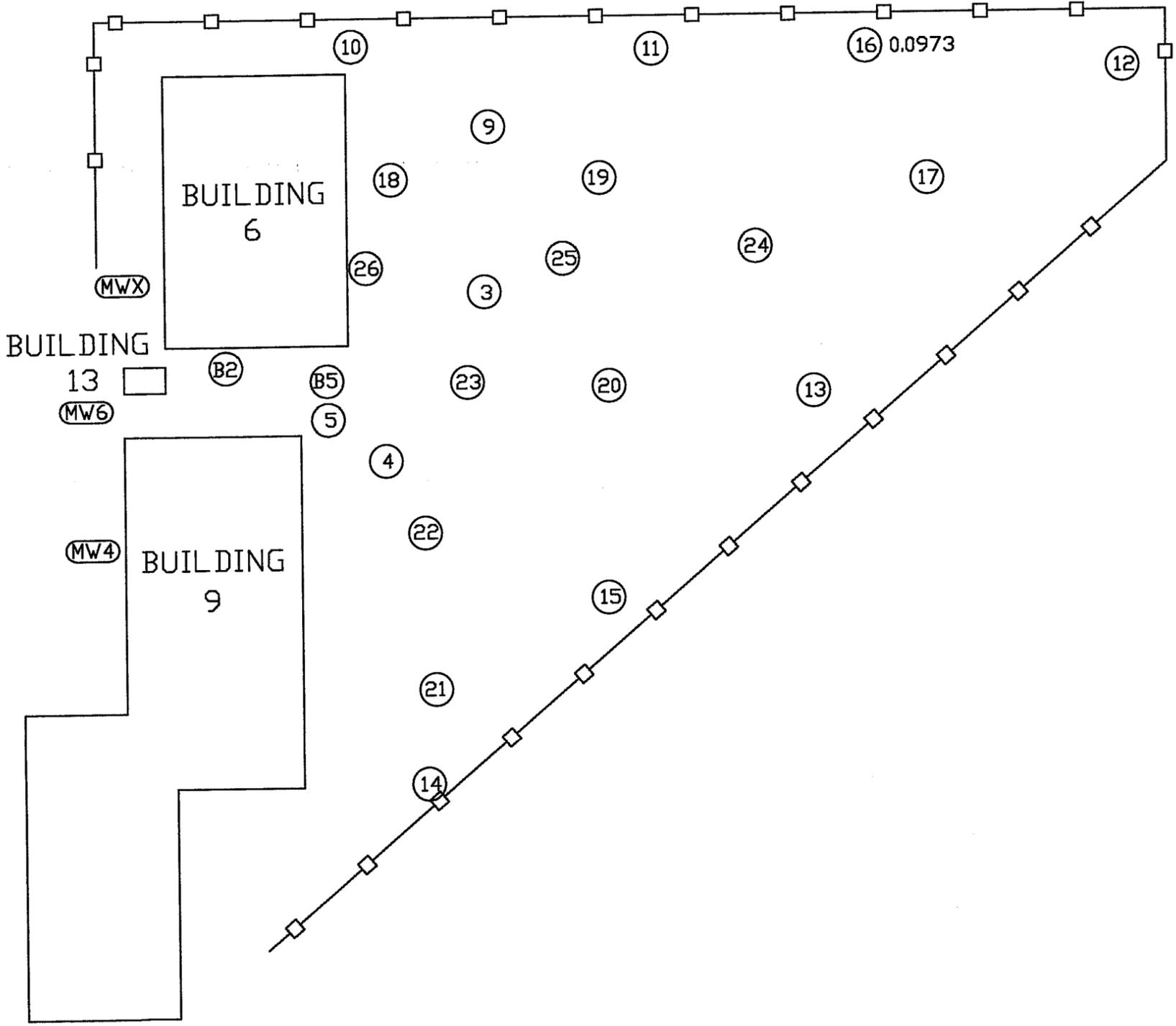


FIGURE 11 - GROUNDWATER TCE ANALYTICAL RESULTS ABOVE ACTION LEVELS HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI		
Project Mngr:	TAR	Project No. 02027042
Designed By:		Scale: 1"=100'
Checked By:	TAR	Date: 10-21-02
Approved By:	TAR	Drawn By: SLJ
File Name:	FIGURE_11.DWG	Figure No. 11



LEGEND

—□— FENCING

⑩ PROBE LOCATION

DCE = CIS-1,2-DICHLOROETHENE

ANALYTICAL RESULTS IN MILLIGRAMS PER LITER (mg/l)

MDNR CALM FOR DCE = 0.07mg/l

MW = CAPE ENVIRONMENTAL MANGEMENT, INC. MONITORING WELL

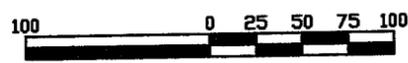


FIGURE 12 - GROUNDWATER DCE ANALYTICAL RESULTS ABOVE ACTION LEVELS HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI		
Project Mngr:	TAR	Project No. 02027042
Designed By:		Scale: 1"=100'
Checked By:	TAR	Date: 10-21-02
Approved By:	TAR	Drawn By: SLJ
File Name:	FIGURE_12.DWG	
		Figure No. 12

HARDESTY FEDERAL COMPLEX
Table 1: Sample Collection Data

Media	Sample ID	Approximate Sample Location	Objective	Probe Depth (Feet bgs)	Depth To GW (Feet bgs)	Sampling Analysis	Date Collected	Time Collected
February Sampling Event								
Source: Sand	Sand-1 (Left)	Building 9 firing range. Approximate equidistant location in bullet stop from other sampling points. 4 to 5 inches below the surface of the sand.	Determine lead concentration of sand in firing range bullet stop for disposal purposes.	NA	NA	TCLP Lead	2/19/02	1130
	Sand-2 (Center)	Building 9 firing range. Approximate equidistant location in bullet stop from other sampling points. 4 to 5 inches below the surface of the sand.	Determine lead concentration of sand in firing range bullet stop for disposal purposes.	NA	NA	TCLP Lead	2/19/02	1135
	Sand-3 (Right)	Building 9 firing range. Approximate equidistant location in bullet stop from other sampling points. 4 to 5 inches below the surface of the sand.	Determine lead concentration of sand in firing range bullet stop for disposal purposes.	NA	NA	TCLP Lead	2/19/02	1140
QA/QC	Sand-4F	Onsite.	Field blank (Distilled/Deionized Water).	NA	NA	TCLP Lead	2/19/02	1145
Source: Dust	1	Building 9 firing range. Floor. Southeast corner.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1050
	2	Building 9 firing range. Floor. Southwest corner.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1055
	3	Building 9 firing range. Floor. East central side.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1100
	4	Building 9 firing range. Floor. Northeast corner.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1105
	5	Building 9 firing range. Wall. Southeast side.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1110
	6	Building 9 firing range. Wall. Southwest side.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1115
	7	Building 9 firing range. Wall. Northeast side.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1120
	8	Building 9 firing range. Wall. Northwest side.	Determine lead concentration of dust on the walls and floor in firing range for cleanup/disposal purposes.	NA	NA	Lead Dust Wipe	2/19/02	1125
Source: Ash	Ash-1 (North)	Building 3. Approximate equidistant location in clean-out room from other sampling points. 4 to 5 inches below the surface of the ash.	Determine types and concentrations of hazardous substances in ash in smokestack clean-out room for disposal purposes.	NA	NA	TCLP RCRA Metals	2/19/02	1000
	Ash-2 (East)	Building 3. Approximate equidistant location in clean-out room from other sampling points. 4 to 5 inches below the surface of the ash.	Determine types and concentrations of hazardous substances in ash in smokestack clean-out room for disposal purposes.	NA	NA	TCLP RCRA Metals	2/19/02	1010
	Ash-3 (West)	Building 3. Approximate equidistant location in clean-out room from other sampling points. 4 to 5 inches below the surface of the ash.	Determine types and concentrations of hazardous substances in ash in smokestack clean-out room for disposal purposes.	NA	NA	TCLP RCRA Metals	2/19/02	1015
QA/QC	Ash-4F	Onsite.	Field blank (Distilled/Deionized Water).	NA	NA	TCLP RCRA Metals	2/19/02	1030
Pathway: Groundwater	GW-1B	Approximately 100.00 feet south from the southwest corner of Building 10.	Groundwater to represent background conditions at the site (away from the suspected chemical storage area).	20.00	8.25	VOCs SVOCs RCRA Metals	2/20/02	0900
	GW-2	Approximately 62.00 feet east from the southwest corner of Building 6 and 18.00 feet south of Building 6.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former recovery tank).	50.00	49.00	VOCs SVOCs RCRA Metals	2/19/02	1300
	GW-3	Approximately 89.00 feet east from the southwest corner of Building 6 and 31.00 feet south of Building 6.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former pump house).	20.00	NA	VOCs SVOCs RCRA Metals	NC	NC
	GW-4	Approximately 105.00 feet east from the southwest corner of Building 6 and 50.00 feet south of Building 6.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former pit).	20.00	NA	VOCs SVOCs RCRA Metals	NC	NC
	GW-5	Approximately 132.00 feet east from the southwest corner of Building 6 and 36.00 feet south of Building 6.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former tank storage).	20.00	8.00	VOCs SVOCs RCRA Metals	2/20/02	1000
QA/QC	GW-6D	Approximately 132.00 feet east from the southwest corner of Building 6 and 36.00 feet south of Building 6.	Duplicate of GW-5.	20.00	8.00	VOCs SVOCs RCRA Metals	2/20/02	1030
	GW-7R	Approximately 105.00 feet east from the southwest corner of Building 6 and 50.00 feet south of Building 6.	Rinsate from GW-4.	NA	NA	VOCs SVOCs RCRA Metals	NC	NC
	GW-8T	Onsite.	Trip blank (Distilled/Deionized Water).	NA	NA	VOCs SVOCs RCRA Metals	2/20/02	1745

HARDESTY FEDERAL COMPLEX
Table 1: Sample Collection Data

Media	Sample ID	Approximate Sample Location	Objective	Probe Depth (Feet bgs)	Depth To GW (Feet bgs)	Sampling Analysis	Date Collected	Time Collected
February Sampling Event								
Pathway: Soil	SS-1B	Approximately 100.00 feet south from the southwest corner of Building 10. 12 to 16 feet bgs.	Native soil to represent background conditions at the site (away from the suspected chemical storage area).	20.00	NA	VOCs SVOCs RCRA Metals	2/19/02	1120
	SS-2	Approximately 62.00 feet east from the southwest corner of Building 6 and 18.00 feet south of Building 6. 12 to 16 feet bgs.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former recovery tank).	50.00	NA	VOCs SVOCs RCRA Metals	2/19/02	1200
	SS-3	Approximately 89.00 feet east from the southwest corner of Building 6 and 31.00 feet south of Building 6. 12 to 16 feet bgs.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former pump house).	20.00	NA	VOCs SVOCs RCRA Metals	2/20/02	1000
	SS-4	Approximately 105.00 feet east from the southwest corner of Building 6 and 50.00 feet south of Building 6. 12 to 16 feet bgs.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former pit).	20.00	NA	VOCs SVOCs RCRA Metals	2/20/02	1100
	SS-5	Approximately 132.00 feet east from the southwest corner of Building 6 and 36.00 feet south of Building 6. 12 to 16 feet bgs.	Determine presence/absence of hazardous substances in the area of suspected chemical storage (former tank storage).	20.00	NA	VOCs SVOCs RCRA Metals	2/19/02	1600
QA/QC	SS-6D	Approximately 105.00 feet east from the southwest corner of Building 6 and 50.00 feet south of Building 6. 12 to 16 feet bgs.	Duplicate of SS-4.	20.00	NA	VOCs SVOCs RCRA Metals	2/20/02	1130
	SS-7R*	Approximately 105.00 feet east from the southwest corner of Building 6 and 50.00 feet south of Building 6.	Rinsate from SS-4 (Distilled/Deionized Water).	NA	NA	VOCs SVOCs RCRA Metals	2/20/02	1230
June/July Sampling Event								
Pathway: Groundwater	GW-1	Approximately 70.00 feet south of Building 10 (asphalt-covered parking area).	Represent background conditions at the site.	18.62	13.75	VOCs only VOCs only	6/5/02 7/1/02	1240 1206
	GW-3	Approximately 50.00 feet northeast from the southeast corner of Building 6 (asphalt-covered parking area).	Assess the extent of VOCs and RCRA Metals.	47.80	33.15	VOCs and RCRA Metals	6/6/02	1725
	GW-4	Approximately 75.00 feet southeast from the northeast corner of Building 9 (asphalt-covered parking area).	Assess the extent of VOCs and RCRA Metals.	38.20	18.73	VOCs only	7/1/02	1145
	GW-5	Approximately 25.00 feet northwest from the northeast corner of Building 9 (grass-covered area).	Assess the source of VOCs and RCRA Metals.	45.75	30.50	VOCs and RCRA Metals	6/6/02	1740
	GW-8	Approximately 25.00 feet northeast from the northwest corner of Building 9 (grass-covered area).	Assess the source of VOCs and RCRA Metals.	18.37	13.75	VOCs only	7/1/02	1215
	GW-9	Approximately 200.00 feet northeast from the southeast corner of Building 6 (asphalt-covered parking area).	Assess the extent of VOCs and RCRA Metals.	38.41	19.35	VOCs only	7/1/02	1130
	Cape MW-4	Approximately 130.00 feet south of Cape MW-6 (asphalt-covered parking area).	Assess the extent of VOCs and RCRA Metals.	40.00	20.00	VOCs and RCRA Metals	6/5/02	1138
	Cape MW-6	Approximately 50.00 feet southwest from the southwest corner of Building 6 (asphalt-covered parking area).	Assess the extent of VOCs and RCRA Metals.	40.00	20.00	VOCs and RCRA Metals	6/5/02	1210
	Cape MW-X	Approximately 60.00 feet northwest from the southwest corner of Building 6 (asphalt-covered parking area).	Assess the extent of VOCs and RCRA Metals.	40.00	20.00	VOCs and RCRA Metals	6/5/02	1225
	QA/QC	TB	Onsite.	Trip blank (Distilled/Deionized Water).	NA	NA	VOCs only VOCs only	6/5/02 7/1/02
FB		Onsite.	Field blank (Distilled/Deionized Water).	NA	NA	VOCs and RCRA Metals	6/6/02 7/1/02	NA
FD-GW-3		Approximately 50.00 feet northeast from the southeast corner of Building 6 (asphalt-covered parking area).	Duplicate of GW-3.	47.80	33.15	VOCs and RCRA Metals	6/6/02	1725
FD-GW-9		Approximately 200.00 feet northeast from the southeast corner of Building 6 (asphalt-covered parking area).	Duplicate of GW-9.	38.41	19.35	VOCs only	7/1/02	1130
October Sampling Event								
Pathway: Groundwater	GW-10	Approximately 25.00 feet south of north perimeter, 4.50 feet east of Building 6.	Determine if VOCs have reached the boundary of the subject site.	39.60	30.00	VOCs only	10/4/02	0935
	GW-11	Approximately 25.00 feet south of north perimeter, 231.58 feet east of Building 6.	Determine if VOCs have reached the boundary of the subject site.	39.40	27.30	VOCs only	10/4/02	1107
	GW-12	Approximately 41.25 feet south of north perimeter, 586.41 feet east of Building 6.	Determine if VOCs have reached the boundary of the subject site.	39.55	24.40	VOCs only	10/4/02	1150
	GW-13	Approximately 283.08 feet south of north perimeter, 489.41 feet east of Building 13.	Determine if VOCs have reached the boundary of the subject site.	44.60	19.10	VOCs only	10/4/02	1135
	GW-14	Approximately 575.58 feet south of north perimeter, 94.00 feet east of Building 9.	Determine if VOCs have reached the boundary of the subject site.	23.40	2.95	VOCs only	10/4/02	1244

HARDESTY FEDERAL COMPLEX
Table 1: Sample Collection Data

Media	Sample ID	Approximate Sample Location	Objective	Probe Depth (Feet bgs)	Depth To GW (Feet bgs)	Sampling Analysis	Date Collected	Time Collected
October Sampling Event								
Pathway: Groundwater	GW-15	Approximately 436.33 feet south of north perimeter, 230.91 feet east of Building 9.	Determine if VOCs have reached the boundary of the subject site.	44.70	22.00	VOCs only	10/4/02	1233
	GW-16	Approximately 25.00 feet south of north perimeter, 392.41 feet east of Building 6.	Determine if VOCs have reached the boundary of the subject site.	39.30	29.60	VOCs only	10/4/02	1055
	GW-17	Approximately 125.00 feet south of north perimeter, 438.25 feet east of Building 6.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	40.16	22.37	VOCs only	10/4/02	1339
	GW-18	Approximately 122.00 feet south of north perimeter, 33.58 feet east of Building 6.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	44.60	15.20	VOCs only	10/4/02	0940
	GW-19	Approximately 122.33 feet south of north perimeter, 191.50 feet east of Building 6.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	39.60	12.00	VOCs only	10/4/02	1215
	GW-20	Approximately 278.33 feet south of north perimeter, 334.91 feet east of Building 13.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	44.20	21.85	VOCs only	10/4/02	1120
	GW-21	Approximately 504.83 feet south of north perimeter, 100.00 feet east of Building 9.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	44.32	17.48	VOCs only	10/4/02	1300
	GW-22	Approximately 387.41 feet south of north perimeter, 92.91 feet east of Building 9.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	44.40	38.25	VOCs only	10/4/02	1310
	GW-23	Approximately 274.33 feet south of north perimeter, 227.91 feet east of Building 13.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	44.40	15.00	VOCs only	10/4/02	1010
	GW-24	Approximately 175.00 feet south of north perimeter, 308.41 feet east of Building 6.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	39.58	37.83	VOCs only	10/4/02	1350
	GW-25	Approximately 182.50 feet south of north perimeter, 163.00 feet east of Building 6.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	34.60	17.75	VOCs only	10/4/02	1035
GW-26	Approximately 188.00 feet south of north perimeter, 14.08 feet east of Building 6.	Assess horizontal extent of VOCs north, northeast, east, and southeast of suspected storage area of clothing treatment/renovation chemicals.	44.40	22.10	VOCs only	10/4/02	0947	
QA/QC	GW-23D	Approximately 274.33 feet south of north perimeter, 227.91 feet east of Building 13.	Duplicate of GW-23.	44.40	15.00	VOCs only	10/4/02	1010
	FB at 19	Onsite at GW-19.	Field blank (Distilled/Deionized Water).	NA	NA	VOCs only	10/4/02	1215
	TB	Onsite.	Trip blank (Distilled/Deionized Water).	NA	NA	VOCs only	10/4/02	NA

B = Background
bgs = Below Ground Surface
D = Duplicate
F = Field Blank
FB = Field Blank
FD = Field Duplicate
GW = Groundwater
ID = Identification
MW = Monitoring Well
NA = Not Applicable
NC = Not Collected
QA/QC = Quality Assurance and Quality Control
R = Rinsate
RCRA = Resource Conservation and Recovery Act
SS = Soil Sample
SVOCs = Semi-Volatile Organic Compounds
T = Trip Blank

**HARDESTY FEDERAL COMPLEX
SOIL ANALYTICAL DATA**

The following is the analytical data from the SI Report. Due to the large number of pages/tables in the SI, this data was consolidated, resulting in fewer pages.

Analyte	Units	Method	Date Collected	SS-1B background	SS-2	SS-3	SS-4	SS-5	SS-6D (Dup)
Chloroethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chloroform	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chloromethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2-Chlorotoluene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
4-Chlorotoluene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dibromo-3-chloropropane	mg/kg	8260B	2/19/02	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000
Dibromochloromethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dibromoethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Dibromomethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dichlorobenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,3-Dichlorobenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,4-Dichlorobenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Dichlorodifluoromethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1-Dichloroethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dichloroethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1-Dichloroethene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	0.116	0.003	< 0.00200	0.0036
cis-1,2-Dichloroethene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.0474	< 0.00200
trans-1,2-Dichloroethene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dichloropropane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,3-Dichloropropane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2,2-Dichloropropane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1-Dichloropropene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
cis-1,3-Dichloropropene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
trans-1,3-Dichloropropene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Ethylbenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Hexachlorobutadiene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2-Hexanone	mg/kg	8260B	2/19/02	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000
Isopropylbenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
4-Isopropyltoluene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
4-Methyl-2-pentanone	mg/kg	8260B	2/19/02	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000
Methylene chloride	mg/kg	8260B	2/19/02	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Naphthalene	mg/kg	8260B	2/19/02	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
n-Propylbenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Styrene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,1,2-Tetrachloroethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,2,2-Tetrachloroethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	0.0064	< 0.00200	0.0293	< 0.00200
Tetrachloroethene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	0.002	< 0.00200	0.0074	< 0.00200
Toluene	mg/kg	8260B	2/19/02	0.005	0.0051	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2,3-Trichlorobenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2,4-Trichlorobenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,1-Trichloroethane	mg/kg	8260B	2/19/02	< 0.00200	0.0059	2.03	0.04	0.009	0.0523
1,1,2-Trichloroethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Trichloroethene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	0.0085	< 0.00200	0.044	< 0.00200
1,2,3-Trichloropropane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2,4-Trimethylbenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,3,5-Trimethylbenzene	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Vinyl chloride	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Xylenes (Total)	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Bromodichloromethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Trichlorofluoromethane	mg/kg	8260B	2/19/02	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/kg	6010B	2/19/02	8.108	6.175	7.171	8.077	6.87	7.045
Barium	mg/kg	6010B	2/19/02	227.799	165.339	152.988	149.423	179.008	154.403
Cadmium	mg/kg	6010B	2/19/02	< 0.965	< 0.996	< 0.996	< 0.962	< 0.954	< 0.978
Chromium	mg/kg	6010B	2/19/02	19.112	18.327	18.725	18.077	13.168	13.699
Lead	mg/kg	6010B	2/19/02	8.687	8.964	8.367	9.038	9.16	9.198
Mercury	mg/kg	7471A	2/19/02	< 0.098	< 0.101	< 0.100	< 0.099	< 0.100	< 0.100
Selenium	mg/kg	6010B	2/19/02	< 0.965	< 0.996	< 0.996	< 0.962	< 0.954	< 0.978
Silver	mg/kg	6010B	2/19/02	< 0.965	< 0.996	< 0.996	< 0.962	< 0.954	< 0.978

Gray shading. Analyte detected above the laboratory detection limits.

HARDESTY FEDERAL COMPLEX
Analytical Results for Groundwater Samples, February 2002

The following is the analytical data from the SI Report. Due to the large number of pages/tables in the SI, this data was consolidated, resulting in fewer pages.

Analyte	Date Collected	Units	Method	GW-1B (background)	GW-2	GW-5	GW-6D (Duplicate)	GW-8T (Trip Blank)
Acenaphthene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Acenaphthylene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Anthracene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Benzo(a)anthracene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Benzo(a)pyrene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Benzo(b)fluoranthene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Benzo(g,h,i)perylene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Benzo(k)fluoranthene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4-Bromophenyl-phenylether	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Butylbenzylphthalate	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Carbazole	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4-Chloro-3-methylphenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4-Chloroaniline	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Bis(2-chloroethoxy)methane	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Bis(2-chloroethyl)ether	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Bis(2-chloroisopropyl)ether	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2-Chloronaphthalene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2-Chlorophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4-Chlorophenyl-phenylether	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Chrysene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Dibenzofuran	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Dibenz(a,h)anthracene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
1,2-Dichlorobenzene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
1,3-Dichlorobenzene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
1,4-Dichlorobenzene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
3,3'-Dichlorobenzidine	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,4-Dichlorophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Diethylphthalate	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,4-Dimethylphenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Dimethylphthalate	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Di-n-Butylphthalate	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4,6-Dinitro-2-methylphenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,4-Dinitrophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,4-dinitrotoluene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,6-Dinitrotoluene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Di-n-octylphthalate	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Fluoranthene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Fluorene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Hexachlorobenzene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Hexachlorobutadiene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Hexachlorocyclopentadiene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Hexachloroethane	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Indeno(1,2,3-cd)pyrene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Isophorone	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2-Methylnaphthalene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2-Methylphenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
3 and 4-Methylphenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Naphthalene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2-Nitroaniline	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
3-Nitroaniline	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4-Nitroaniline	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Nitrobenzene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2-Nitrophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
4-Nitrophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
N-Nitroso-Di-n-Propylamine	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
N-Nitrosodiphenylamine	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Pentachlorophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenanthrene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Pyrene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Bis(2-ethylhexyl)phthalate	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
1,2,4-Trichlorobenzene	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,4,5-Trichlorophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
2,4,6-Trichlorophenol	2/20/02	mg/l	8270C	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Acetone	2/20/02	mg/l	8260B	< 0.05000	< 0.05000	< 0.05000	< 0.05000	< 0.05000
Benzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Bromobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Bromochloromethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Bromoform	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Bromomethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2-Butanone	2/20/02	mg/l	8260B	< 0.05000	< 0.05000	< 0.05000	< 0.05000	< 0.05000
n-Butylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
sec-Butylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
t-Butylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200

HARDESTY FEDERAL COMPLEX
Analytical Results for Groundwater Samples, February 2002

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Analyte	Date Collected	Units	Method	GW-1B (background)	GW-2	GW-5	GW-6D (Duplicate)	GW-8T (Trip Blank)
Carbon disulfide	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Carbon tetrachloride	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chlorobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chloroform	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.0045
Chloromethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2-Chlorotoluene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
4-Chlorotoluene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dibromo-3-chloropropane	2/20/02	mg/l	8260B	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000
Dibromochloromethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dibromoethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Dibromomethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dichlorobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,3-Dichlorobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,4-Dichlorobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Dichlorodifluoromethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1-Dichloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2-Dichloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1-Dichloroethene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
cis-1,2-Dichloroethene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	0.0542	0.0627	< 0.00200
trans-1,2-Dichloroethene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	0.0038	0.0049	< 0.00200
1,2-Dichloropropane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,3-Dichloropropane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2,2-Dichloropropane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1-Dichloropropene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
cis-1,3-Dichloropropene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
trans-1,3-Dichloropropene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Ethylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Hexachlorobutadiene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
2-Hexanone	2/20/02	mg/l	8260B	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000
Isopropylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
4-Isopropyltoluene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
4-Methyl-2-pentanone	2/20/02	mg/l	8260B	< 0.01000	< 0.01000	< 0.01000	< 0.01000	< 0.01000
Methylene chloride	2/20/02	mg/l	8260B	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Naphthalene	2/20/02	mg/l	8260B	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
n-Propylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Styrene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,1,2-Tetrachloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,2,2-Tetrachloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	0.0023	0.0022	< 0.00200
Tetrachloroethene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	0.0032	0.0038	< 0.00200
Toluene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2,3-Trichlorobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2,4-Trichlorobenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,1-Trichloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,1,2-Trichloroethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Trichloroethene	2/20/02	mg/l	8260B	< 0.00200	0.0728	0.0515	0.0633	< 0.00200
1,2,3-Trichloropropane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,2,4-Trimethylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
1,3,5-Trimethylbenzene	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Vinyl chloride	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Xylenes (Total)	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Bromodichloromethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.0027
Trichlorofluoromethane	2/20/02	mg/l	8260B	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Arsenic	2/20/02	mg/l	6010B	0.34	0.622	0.025	0.028	< 0.0050
Barium	2/20/02	mg/l	6010B	15.12	3.76	1	0.977	< 0.0100
Cadmium	2/20/02	mg/l	6010B	0.036	0.034	0.004	0.004	< 0.0010
Chromium	2/20/02	mg/l	6010B	1.352	0.362	0.062	0.059	< 0.0050
Lead	2/20/02	mg/l	6010B	0.966	0.368	0.109	0.101	< 0.0030
Selenium	2/20/02	mg/l	6010B	0.022	0.042	< 0.0050	0.007	< 0.0050
Silver	2/20/02	mg/l	6010B	< 0.0100	< 0.0100	< 0.0050	< 0.0050	< 0.0050
Mercury	2/20/02	mg/l	7470A	0.0014	< 0.0002	0.0007	0.0009	< 0.0002

Gray shading. Analyte detected above the laboratory detection limits.

HARDESTY FEDERAL COMPLEX

Table 6: RCRA Metals Analytical Results for Groundwater Samples, June 2002

The following is the analytical data from the SI Report. Due to the large number of pages/tables in the SI, this data was consolidated, resulting in fewer pages.

Analyte	Units	Method	Date Collected	CAPE-4	CAPE-X (MW-10)	CAPE-6	FB (Field Blank)	GW-3	FD-GW-3 (Dup)	GW-5
Arsenic	mg/l	6010B	6/ 5/02	< 0.0050	< 0.0050	0.034	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Barium	mg/l	6010B	6/ 5/02	0.048	0.079	0.751	< 0.0100	0.315	0.317	0.141
Cadmium	mg/l	6010B	6/ 5/02	< 0.0010	< 0.0010	0.004	< 0.0010	< 0.0010	0.001	0.001
Chromium	mg/l	6010B	6/ 5/02	< 0.0050	< 0.0050	0.007	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Lead	mg/l	6010B	6/ 5/02	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
Selenium	mg/l	6010B	6/ 5/02	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Silver	mg/l	6010B	6/ 5/02	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Mercury	mg/l	7470A	6/ 5/02	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020

Gray shading. Analyte detected above the laboratory detection limits.

HARDESTY FEDERAL COMPLEX
VOC Analytical Results for Groundwater Samples, July 2002

The following is the analytical data from the SI Report. Due to the large number of pages/tables in the SI, this data was consolidated, resulting in fewer pages.

Analyte	Units	Method	Date Collected	GW-1	GW-4	GW-8	GW-9	FD-GW-9 (Dup)	FB (Field Blank)	TB (Trip Blank)
Acetone	mg/l	8260B	7/ 1/02	< 0.0500	0.0154	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
Benzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Bromobenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Bromochloromethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Bromoform	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Bromomethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
2-Butanone	mg/l	8260B	7/ 1/02	< 0.0500	0.012	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500
n-Butylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
sec-Butylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
t-Butylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Carbon disulfide	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Carbon tetrachloride	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Chlorobenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Chloroethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Chloroform	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Chloromethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
2-Chlorotoluene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
4-Chlorotoluene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2-Dibromo-3-chloropropane	mg/l	8260B	7/ 1/02	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Dibromochloromethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2-Dibromoethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Dibromomethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2-Dichlorobenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,3-Dichlorobenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,4-Dichlorobenzene	mg/l	8260B	7/ 1/02	< 0.00100	0.0005	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Dichlorodifluoromethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1-Dichloroethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2-Dichloroethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1-Dichloroethene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
cis-1,2-Dichloroethene	mg/l	8260B	7/ 1/02	< 0.00100	0.039	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
trans-1,2-Dichloroethene	mg/l	8260B	7/ 1/02	< 0.00100	0.0056	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2-Dichloropropane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	0.0008	0.0008	< 0.00100	< 0.00100
1,3-Dichloropropane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
2,2-Dichloropropane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1-Dichloropropene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
cis-1,3-Dichloropropene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
trans-1,3-Dichloropropene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Ethylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Hexachlorobutadiene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
2-Hexanone	mg/l	8260B	7/ 1/02	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Isopropylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
4-Isopropyltoluene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
4-Methyl-2-pentanone	mg/l	8260B	7/ 1/02	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Methylene chloride	mg/l	8260B	7/ 1/02	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Naphthalene	mg/l	8260B	7/ 1/02	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
n-Propylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Styrene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1,1,2-Tetrachloroethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1,1,2,2-Tetrachloroethane	mg/l	8260B	7/ 1/02	< 0.00100	0.124	< 0.00100	0.001	0.0011	< 0.00100	< 0.00100
Tetrachloroethene	mg/l	8260B	7/ 1/02	< 0.00100	0.0057	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Toluene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2,3-Trichlorobenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2,4-Trichlorobenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1,1-Trichloroethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,1,2-Trichloroethane	mg/l	8260B	7/ 1/02	< 0.00100	0.0075	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Trichloroethene	mg/l	8260B	7/ 1/02	< 0.00100	0.812	0.0011	0.0191	0.0188	< 0.00100	< 0.00100
1,2,3-Trichloropropane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,2,4-Trimethylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
1,3,5-Trimethylbenzene	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Vinyl chloride	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Xylenes (Total)	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Bromodichloromethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Trichlorofluoromethane	mg/l	8260B	7/ 1/02	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100

Gray shading. Analyte detected above the laboratory detection limits.

APPENDIX A
Previous Investigations

A.5 – On-site Groundwater Investigation Report (Terracon)

ON SITE GROUNDWATER INVESTIGATION REPORT

**HARDESTY FEDERAL COMPLEX
601-607 HARDESTY AVENUE
KANSAS CITY, JACKSON COUNTY, MISSOURI**

EPA ID No. MON000703320

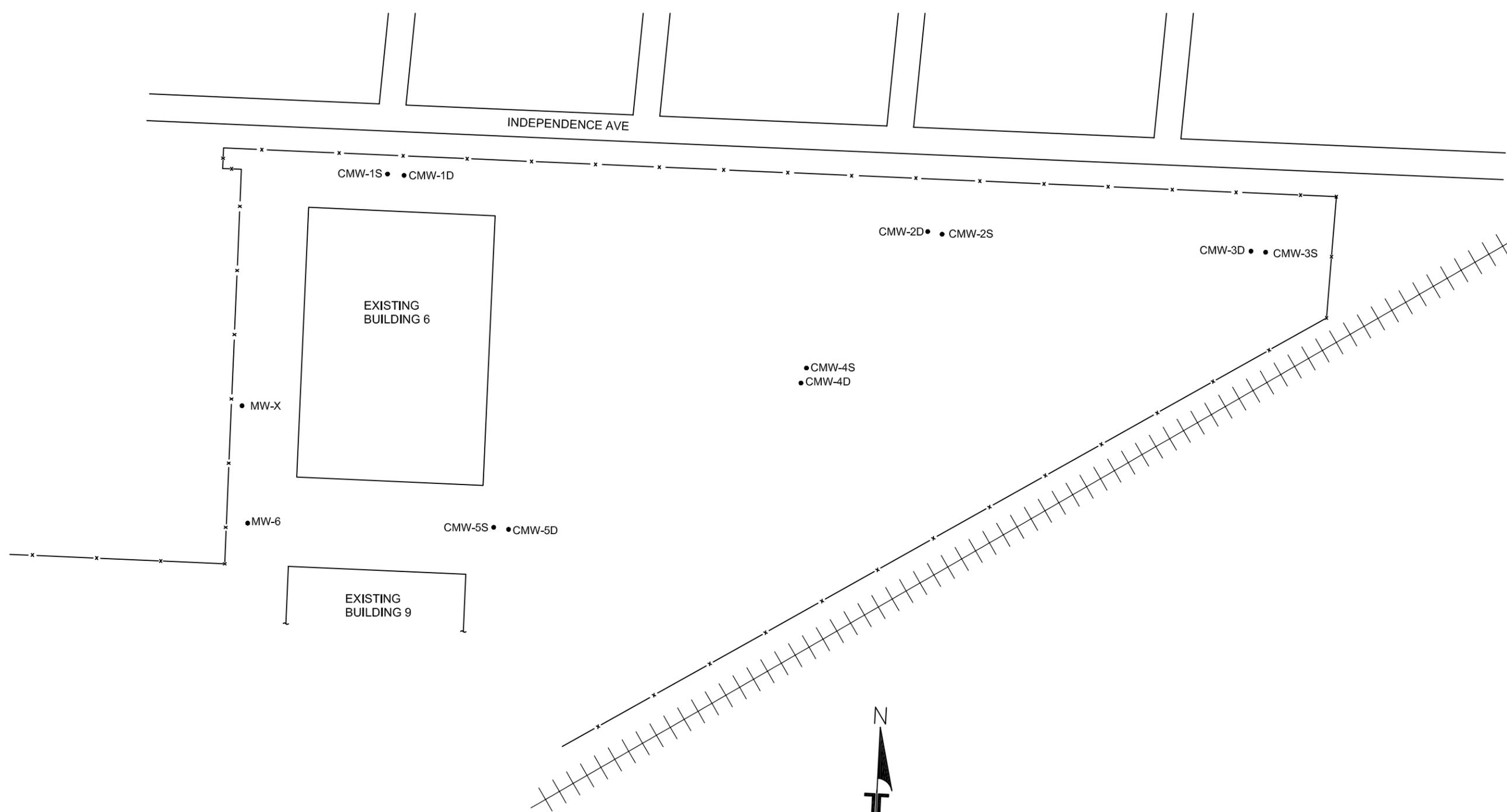
**Terracon Project No. 02037021
August 20, 2003**

Prepared for:

**UNITED STATES GENERAL SERVICES ADMINISTRATION
Kansas City, Missouri**

Prepared by:

Terracon
Lenexa, Kansas



—X— FENCE
 ● MONITORING WELL

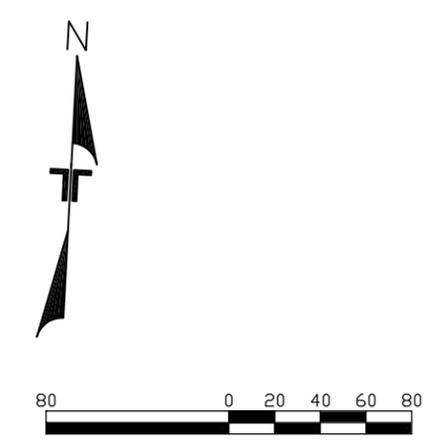


DIAGRAM IS FOR GENERAL LOCATION ONLY,
 AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

FIGURE 2 MONITORING WELL LOCATION MAP HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI		
Project Mngr:	EJG	Project No. 02037021
Designed By:	TAR	Scale: 1"=80'
Checked By:	CAS	Date: 7/23/03
Approved By:	EJG	Drawn By: SAG
File Name:	FIGURE 2.DWG	Figure No. 2

Terracon
 13910 WEST 96th TERRACE
 LENEXA, KANSAS 66215

TABLE 3
SUMMARY OF SOIL ANALYTICAL DATA
HARDESTY FEDERAL COMPLEX
KANSAS CITY, JACKSON COUNTY, MISSOURI

Sample ID (depth in feet)	Sample Date	Associated Monitoring Well	Acetone	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethene (cis-1,2-DCE)	trans-1,2-Dichloroethene (trans-1,2-DCE)	Ethylbenzene	Methylene chloride	1,1,1,2-Tetrachloroethane	1,1,1,2,2-Tetrachloroethane (PCA)	Tetrachloroethene (PCE)	Toluene	1,1,2-Trichloroethane (TCA)	Trichloroethene (TCE)	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes (Total)
STARC*			2,700	630	66	0.8	1,200	2,900	400	51	10	2	40	650	5	40	100	42	418
GW Leach**			none	none	2.8	0.6	0.5	1.0	32	0.02	0.8	0.004	0.1	3.7	0.04	0.1	none	none	16
B1 (10-15)	6/3/03	CMW 1S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0063	0.00270	0.0143
B3 (10-12.3)	6/5/03	CMW 2D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B4 (28.5-30)^	6/5/03	CMW 2S	ND	0.00780	ND	ND	0.0082	0.0063	0.0025	ND	ND	ND	ND	0.0224	ND	ND	0.0175	0.00540	0.0486
B5 (13.5-15)	6/6/03	CMW 3S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0087	0.00420	ND
B5 (20-25)^	6/6/03	CMW 3S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B7 (2.5-5)	6/9/03	CMW 4S	ND	ND	ND	ND	ND	ND	0.0020	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0119
B7A (15-20)	6/9/03	CMW 4S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0092	ND	ND	ND
B7B (15-20)	6/9/03	CMW 4S	0.0515	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0150	ND	ND	ND
B9 (5-10)	6/10/03	CMW 5S	0.0746	ND	ND	ND	ND	ND	ND	ND	ND	0.0022	ND	ND	ND	0.0116	ND	ND	ND
B9 (25-30)^	6/10/03	CMW 5S	ND	ND	0.0042	0.0075	0.0157	0.0038	ND	ND	0.0293	50.5	0.980	ND	0.330	25.6	ND	ND	ND
Trip Blank	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Rinsate	6/10/03	NA	ND	ND	ND	ND	ND	ND	ND	0.00790	ND	ND	ND	0.0012	ND	ND	ND	ND	ND

Laboratory data source: TestAmerica, Inc.

*Missouri Department of Natural Resources (MDNR) Cleanup Levels For Missouri (CALM) Soil Target Concentrations (STARC), Scenario A, dated September 1, 2001.

**MDNR CALM Leaching to Groundwater Values, dated September 1, 2001.

^Samples collected below established groundwater level.

Notes:

- 1) All soil concentrations reported in milligrams/kilogram (mg/kg) (same as parts per million (ppm)).
- 2) ND = not detected above the reporting limit in mg/kg (ppm) as noted in the laboratory analytical report.
- 3) Gray shaded bold cells indicate levels above MDNR CALM STARC, Scenario A, or GW Leach.
- 4) Not established (NE).
- 5) NA = not applicable.

TABLE 4
SUMMARY OF GROUNDWATER ANALYTICAL DATA
HARDESTY FEDERAL COMPLEX
KANSAS CITY, JACKSON COUNTY, MISSOURI

Sample ID	Sample Date	Acetone	sec-Butylbenzene	Chlorobenzene	Chloroform	1,2-Dichlorobenzene	1,2-Dichloroethane (1,2-DCA)	1,1-Dichloroethene	cis-1,2-Dichloroethene (cis-1,2-DCE)	trans-1,2-Dichloroethene (trans-1,2-DCE)	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane (PCA)	Tetrachloroethene (PCE)	1,1,1-Trichloroethane	1,1,2-Trichloroethane (TCA)	Trichloroethene (TCE)	Vinyl Chloride
GTARC*		None	NE	0.1	0.08	0.6	0.005	0.007	0.07	0.1	0.07	0.0003	0.005	0.2	0.005	0.005	0.002
CMW 1S	6/14/03	ND**	ND	ND	ND	ND	ND	ND	0.00440	0.00260	ND	0.0165	0.00200	ND	ND	0.0456	ND
CMW 1D	6/14/03	ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00180	ND	ND	ND	0.0191	ND
CMW 2S	6/14/03	ND**	ND	ND	ND	ND	ND	ND	0.0568	0.0484	ND	0.00100	ND	ND	ND	0.0112	0.00230
CMW 2D	6/14/03	ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00220	0.00270	ND	0.00120	0.218	ND
CMW 3S	6/14/03	ND**	ND	ND	ND	ND	ND	ND	0.0284	0.00230	ND	ND	ND	ND	ND	0.0172	ND
CMW 3D	6/14/03	ND**	ND	ND	ND	ND	ND	ND	0.00240	ND	ND	ND	ND	ND	ND	0.411	0.00170
CMW 4S	6/14/03	ND**	ND	ND	0.00140	ND	ND	ND	ND	ND	ND	0.0204	0.00450	ND	0.00110	0.212	ND
CMW 4D	6/14/03	ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00100	0.00200	ND	ND	0.150	ND
CMW 5S	6/14/03	0.0304	ND	0.00650	0.0133	ND	0.00120	0.0434	0.0689	0.0216	0.0354	25.6	0.692	0.110	0.198	12.3	ND
CMW 5D	6/14/03	ND**	ND	ND	ND	ND	ND	ND	0.00250	ND	ND	0.0504	0.0526	ND	0.0107	2.18	ND
MW-6	6/14/03	ND**	0.00480	ND	ND	0.00440	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW X	6/14/03	ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00370	ND
Duplicate (a)	6/14/03	ND**	ND	ND	ND	ND	ND	ND	0.00260	ND	ND	0.0548	0.0529	ND	0.0111	1.75	ND
Trip Blank	6/14/03	ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Blank	6/14/03	ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Laboratory data source: TestAmerica, Inc.

*Missouri Department of Natural Resources (MDNR) Cleanup Levels For Missouri (CALM) Groundwater Target Concentrations (GTARC), dated September 1, 2001.

(a) Duplicate of CMW-5D

Notes:

- 1) All groundwater concentrations reported in milligrams/liter (mg/l) (same as parts per million (ppm)).
- 2) ND = not detected above the reporting limit of 0.00100 mg/l (ppm).
- 3) ND** = not detected above the reporting limit of 0.0250 mg/l (ppm).
- 4) Gray shaded bold cells indicate levels above MDNR CALM GTARC.
- 5) Not established (NE).

APPENDIX A
Previous Investigations

A.6 – Off-site Groundwater Investigation Report (Terracon)

OFF-SITE GROUNDWATER INVESTIGATION REPORT

**HARDESTY FEDERAL COMPLEX
601-607 HARDESTY AVENUE
KANSAS CITY, JACKSON COUNTY, MISSOURI**

EPA ID No. MON000703320

**Terracon Project No. 02037021
September 9, 2003**

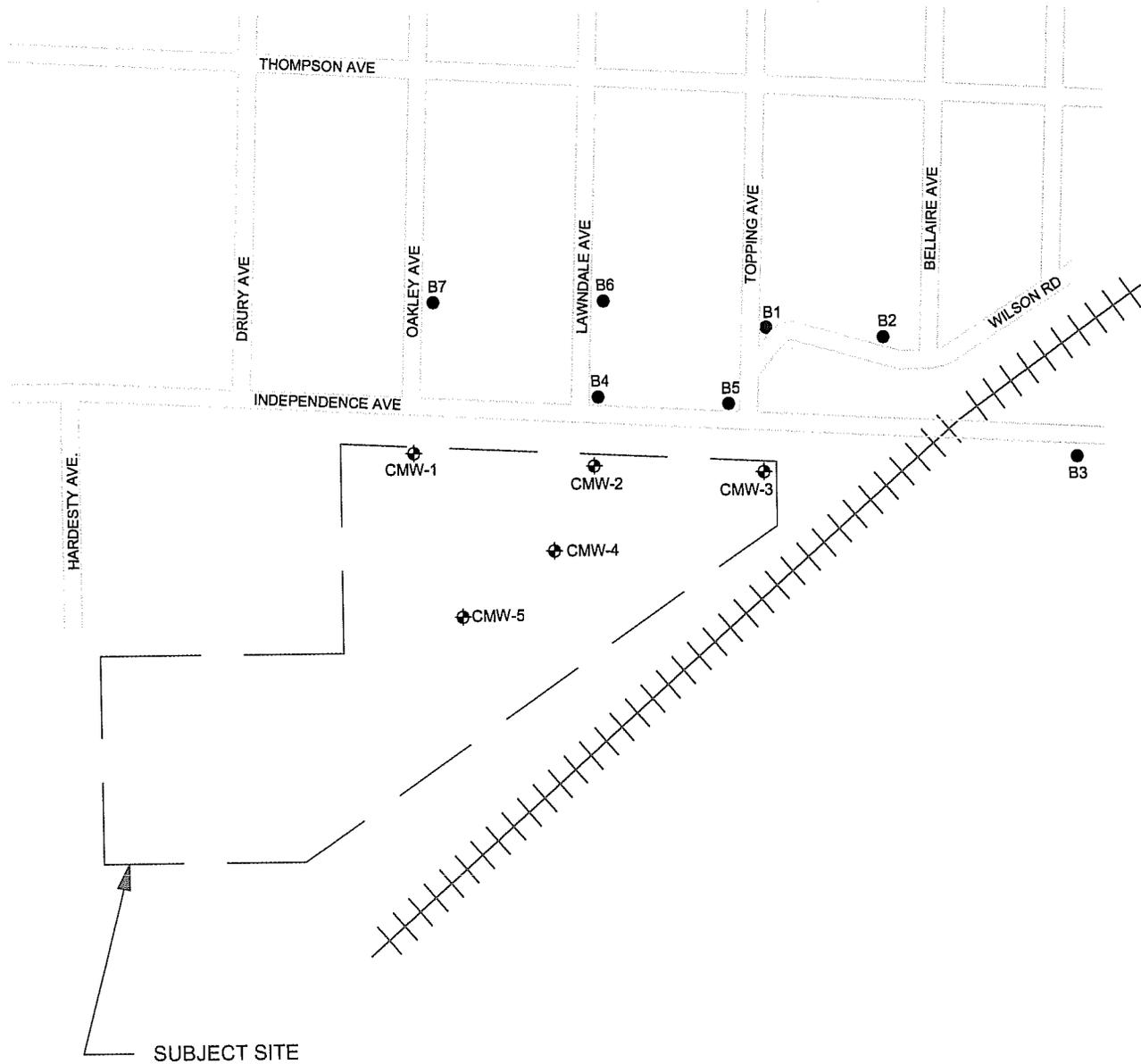
Prepared for:

**UNITED STATES GENERAL SERVICES ADMINISTRATION
Kansas City, Missouri**

Prepared by:

Terracon
Lenexa, Kansas

Terracon



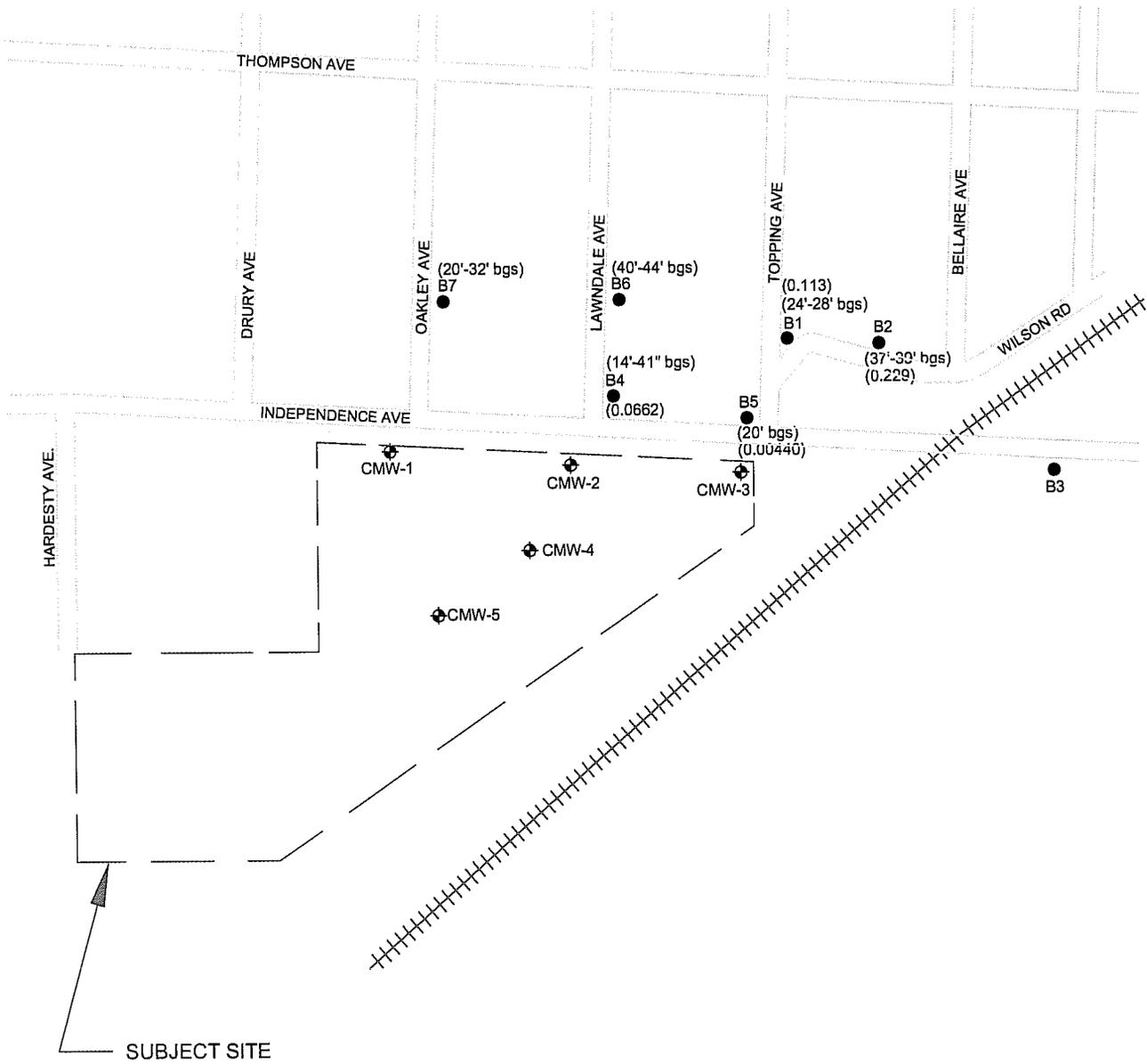
- OFF-SITE BORING LOCATIONS
- ⊕ MONITORING WELL CLUSTERS



DIAGRAM IS FOR GENERAL LOCATION ONLY,
AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

N:\DATA\PROJECTS 03\02037021\Hardesty\CADD\OFF-SITE FIG 2

FIGURE 2 SUBJECT SITE & BORING LOCATIONS HARDESTY FEDERAL COMPLEX KANSAS CITY, MISSOURI			
Project Mngr:	EJG	 13910 WEST 96th TERRACE LENEXA, KANSAS 66215	Project No. 02037021
Designed By:	TAR		Scale: NO SCALE
Checked By:	CAS		Date: 8/4/03
Approved By:	EJG		Drawn By: SAG
File Name:	OFF-SITE FIGURE 2.DWG		Figure No. 2



- OFF-SITE BORING LOCATIONS
- ⊕ MONITORING WELL CLUSTERS
- (0.113) = TCE CONCENTRATION IN mg/L
- (bgs) = BELOW GROUND SURFACE



N:\DATA\PROJECTS 03\02037021\Hardesty\CADD\OFF-SITE FIG 3

**FIGURE 3- SAMPLE INTERVALS
OFF-SITE TRICHLOROETHENE (TCE) CONCENTRATION MAP
HARDESTY FEDERAL COMPLEX
KANSAS CITY, MISSOURI**

Project Mngr:	EJG	 13910 WEST 96th TERRACE LENEXA, KANSAS 66215	Project No.	02037021
Designed By:	TAR		Scale:	NO SCALE
Checked By:	CAS		Date:	9/5/03
Approved By:	EJG		Drawn By:	SAG
File Name:	OFF-SITE FIGURE 3.DWG		Figure No.	3

DIAGRAM IS FOR GENERAL LOCATION ONLY,
AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

TABLE 1
SUMMARY OF OFF-SITE GROUNDWATER ANALYTICAL DATA
HARDESTY FEDERAL COMPLEX
KANSAS CITY, JACKSON COUNTY, MISSOURI

Sample ID	Sample Date	Groundwater Collection Depth (feet bgs)	Boring Refusal (feet bgs)	Methylene chloride	cis-1,2-Dichloroethene (cis-1,2-DCE)	Trichloroethene (TCE)	Naphthalene
GTARC*				0.1	0.07	0.005	0.1
B1	6/14/03	24-28	40	<0.00500	0.0103	0.113	<0.00500
B2	6/14/03	37-39	39	<0.00500	0.00270	0.229	<0.00500
B4	6/14/03	14-41	47	<0.00500	<0.00200	0.0662	<0.00500
B5	6/14/03	20	NR*	<0.00500	<0.00200	0.00440	0.00690
B6	6/14/03	40-44	43.5	<0.00500	<0.00200	<0.00200	<0.00500
B7	6/14/03	20-32	NR**	<0.00500	<0.00200	<0.00200	<0.00500
Trip Blank	6/14/03			<0.00500	<0.00200	<0.00200	<0.00500
Rinsate	6/14/03			<0.00500	<0.00200	<0.00200	<0.00500
Field Blanks	6/14/03			0.00640	<0.00200	<0.00200	<0.00500
B3	Not sampled due to mud and silt content					Water encountered at 11-32 ft.	32 ft.

Laboratory data source: TestAmerica, Inc.

*Missouri Department of Natural Resources (MDNR) Cleanup Levels For Missouri (CALM) Groundwater Target Concentrations (GTARC), dated September 1, 2001.

Notes:

- 1) All groundwater concentrations reported in milligrams/liter (mg/l) (same as parts per million (ppm)).
- 2) bgs = below ground surface
- 3) Gray shaded bold cells indicate levels above MDNR CALM GTARC.
- 4) Not established (NE).
- 5) NR* = no refusal to depth of 56 feet bgs, but encountered sand layer, silty/muddy water entered into hole to 23 feet bgs, unable to collect due to muddy water
- 6) NR** = no refusal to a depth of 52 feet bgs, encountered sand, kept having to pull up sampling point due to sand and silt

APPENDIX A
Previous Investigations

A.7 – Off-site Groundwater Report Investigation Report
(Burns & McDonnell)

OFF-SITE GROUNDWATER INVESTIGATION REPORT

**HARDESTY FEDERAL COMPLEX
601-607 HARDESTY AVENUE
KANSAS CITY, MISSOURI**

July 12, 2004

Burns & McDonnell Project No. 36204

**Burns & McDonnell Engineering Company, Inc.
Engineering-Geologists-Scientists
Kansas City, Missouri**

U:\wcdmaps\36204\ARC\ArcDocs\hardesty_boring\ctn.mxd idk ts 6/28/04 1:7200

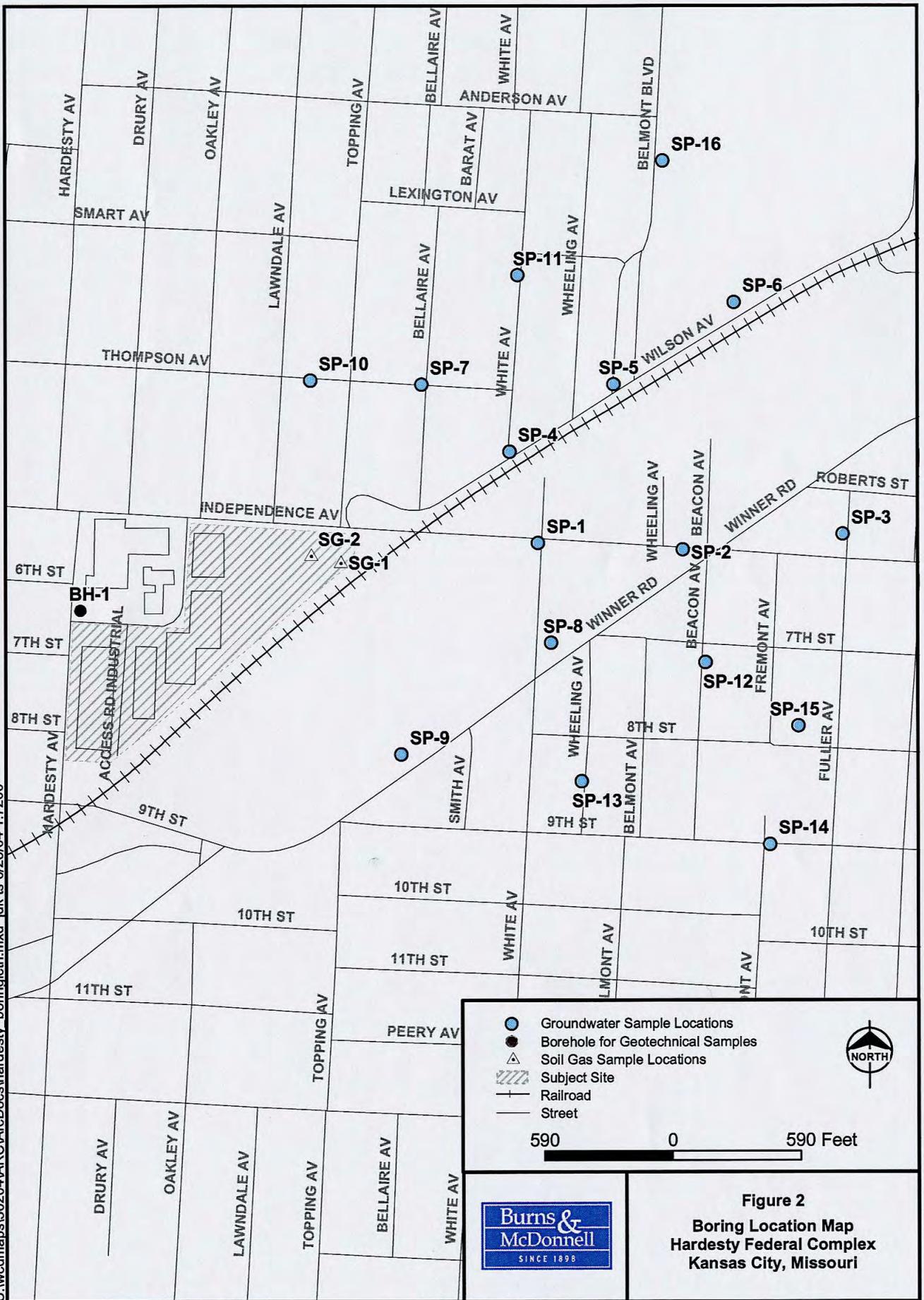


Table 1
Groundwater Results - Field Analysis
May 2004
Hardesty Federal Center

Sample Point:		MDNR	SP-1 / GW-1	SP-1 / GW-2	SP-1 / GW-2D	SP-4 / GW-1	SP-4 / GW-2	SP-5 / GW-1	SP-5 / GW-1D
Date Sampled:		CALM	5/11/2004	5/11/2004	5/11/2004	5/10/2004	5/10/2004	5/10/2004	5/10/2004
Sample Depth From:		GTARC	23	44	44	24	44	23	23
Sample Depth To:		Level	27	48	48	28	48	27	27
Volatiles	UNITS								
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L	70	1.6 J	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ug/L	5	ND	ND	ND	ND	34.7	5.6	6.5
Tetrachloroethylene (PCE)	ug/L	5	ND	ND	ND	ND	ND	ND	ND

Sample Point:		MDNR	SP-6 / GW-1	SP-7 / GW-1	SP-7 / GW-2	SP-9 / GW-1	SP-10 / GW-1	SP-10 / GW-2	SP-16 / GW-2
Date Sampled:		CALM	5/10/2004	5/11/2004	5/11/2004	5/12/2004	5/11/2004	5/11/2004	5/10/2004
Sample Depth From:		GTARC	24	25	53	0	26	42	56
Sample Depth To:		Level	28	29	57	24	30	46	60
Volatiles	UNITS								
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L	70	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	ug/L	5	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	ug/L	5	ND	ND	ND	ND	ND	ND	ND

NOTES: SP-9 sample collected for laboratory analysis only.
 SP-9 sample collected from open air borehole.
 Sample locations SP-2, SP-3, SP-11, SP-12, SP-13, SP-14, and SP-15 were dry.

LEGEND: B- Detected in the associated laboratory method blank
 R- Qualified as unusable in the QC evaluation
 NA- Not analyzed
 F- Detected in the associated equipment rinse blank
 T- Detected in associated trip blank
 ND- Not Detected
 J- Qualified as estimated by the laboratory
 J* - Qualified as estimated in the QC evaluation
 U- Qualified as undetected by the laboratory
 U* - Qualified as undetected in the QC evaluation
 dil - Sample diluted prior to analysis

Table 2
Groundwater Results - Laboratory Analysis
May 2004
Hardesty Federal Center

	Sample Point:	MDNR:	SP-5 / GW-1	SP-7 / GW-2	SP-9 / GW-1	SP-8 / GW-1
	Date Sampled:	CALM	5/10/2004	5/11/2004	5/12/2004	5/13/2004
	Sample Depth From:	GTARC	23	53	0	0
	Sample Depth To:	Level	27	57	24	34
Volatiles	UNITS					
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L	70	ND	ND	ND	ND
Trichloroethene (TCE)	ug/L	5	6.5	ND	ND	ND
Tetrachloroethylene (PCE)	ug/L	5	ND	ND	ND	ND

NOTES: SP-6 sample collected for laboratory analysis only.
 SP-9 sample collected from open air borehole.

LEGEND: B- Detected in the associated laboratory method blank
 R- Qualified as unusable in the QC evaluation
 NA- Not analyzed

F- Detected in the associated equipment rinse blank
 T- Detected in associated trip blank
 ND- Not Detected

J- Qualified as estimated by the laboratory
 U- Qualified as undetected by the laboratory
 (d) - Sample diluted prior to analysis

J*- Qualified as estimated in the QC evaluation
 U*- Qualified as undetected in the QC evaluation

**Table 3
Identification of Chemicals of Potential Concern
Hardesty Federal Center**

Parameter	Number of Detects/ Number of Samples	Maximum Detected Concentration (ug/L)	Location and Depth of Maximum Concentration	Maximum Shallow Concentration ¹ (ug/L)	Location and Depth of Maximum Shallow Concentration	Included as COPC?
2004 Off-Site Investigation ²						
cis-1,2-Dichloroethene	1 / 13	1.6 J	SP-1/GW-1 (23-27 feet)	1.6 J	SP-1/GW-1 (23-27 feet)	yes
Trichloroethene	2 / 13	34.7	SP-4/GW-2 (44-48 feet)	6.5	SP-5/GW-1D (23-27 feet)	yes
Tetrachloroethene	0 / 13	ND	--	ND	--	no
2003 Off-Site Investigation ³						
cis-1,2-Dichloroethene	2 / 6	10.3	B1 (24-28 feet)	10.3	B1 (24-28 feet)	yes
Trichloroethene	4 / 6	229	B2 (37-39 feet)	113	B1 (24-28 feet)	yes
Naphthalene	1 / 6	6.9	B5 (20 feet)	6.9	B5 (20 feet)	yes

Notes:

- ¹ - Represents maximum concentration in samples collected from approximately the top 15 feet of the aquifer.
- ² - 2004 information represents off-site mobile laboratory data and includes all chemicals analyzed off-site and those chemicals detected in laboratory confirmation samples.
- ³ - 2003 information represent off-site laboratory results and includes only positively detected chemicals.

ND - Not Detected

"--" - Information not applicable

Table 4
Allowable Concentrations in Groundwater for Noncancer Effects
Indoor Child Resident Scenario
Hardesty Federal Center

Equation:

$$SSTL_{gw} = \frac{THI \times BW \times AT}{ED \times EF \times ET \times IRa \times VF_{wesp} \times (1/RfDi)}$$

Where:

- Cgw = Allowable concentration in groundwater (mg/L)
- THI = Target hazard index (unitless)
- BW = Body weight (kg)
- AT = Averaging time (days)
- ED = Exposure duration (years)
- EF = Exposure frequency (days/year)
- ET = Exposure time (hours/day)
- IRa = Inhalation rate of air (m³/hr)
- VFwesp = Volatilization factor from groundwater to indoor air (L/m³)
- RfDi = Inhalation reference dose (mg/kg-day)

Variables:

- Cgw = Calculated mg/L
- THI = 1.0 unitless (MDNR, 2004)
- BW = 15 kg (USEPA, 1989)
- AT = 2,100 days (USEPA, 1989)
- ED = 6 years (USEPA, 1989)
- EF = 350 days/year (USEPA, 1991a)
- ET = 24 hours/day (Conservative default assumption)
- IRa = 0.27 m³/hour (USEPA, 1997) (Represents 15.2 m³/day)
- VFwesp = Chemical-specific L/m³ (See Table 6)
- RfDi = Chemical-specific mg/kg-day (USEPA, 2004 unless otherwise noted)

Parameter	VFwesp (L/m ³)	RfDi (mg/kg-day)	Cgw (mg/L)
cis-1,2-Dichloroethene ¹	1.02E-04	1.0E-02	2.28E+02
Trichloroethene ²	2.71E-04	6.0E-03	5.12E+01
Naphthalene	1.08E-05	8.6E-04	1.85E+02

Notes:

- ¹ - Value represents route-to-route extrapolation from oral reference dose (USEPA, 2002).
- ² - Value represents route-to-route extrapolation from withdrawn oral reference dose (USEPA, 2000).

Table 5
Allowable Concentrations in Groundwater for Cancer Effects
Indoor Residential Scenario
Hardesty Federal Center

Equation:

$$C_{gw} = \frac{TR \times AT}{EF \times InhFadj \times VFwesp \times SFi}$$

Where:

- C_{gw} = Allowable concentration in groundwater (mg/L)
 TR = Target risk level (unitless)
 AT = Averaging time (days)
 EF = Exposure frequency (days/year)
 InhFadj = Age-adjusted inhalation factor $([m^3 \cdot year]/[kg \cdot day])$
 Where: $InhFadj = (EDc \times ETc \times IRAc / BWc) + (EDa \times ETa \times IRAa / BWa)$
 EDc = Child exposure duration (years)
 ETc = Child exposure time (hours/day)
 IRAc = Child inhalation rate (m^3 /hour)
 BWc = Child body weight (kg)
 EDa = Adult exposure duration (years)
 ETa = Adult exposure time (hours/day)
 IRAa = Adult inhalation rate (m^3 /hour)
 BWa = Adult body weight (kg)
 VFwesp = Volatilization factor from groundwater to indoor air (L/m^3)
 SFi = Inhalation slope factor $1/(mg/kg \cdot day)$

Variables:

C_{gw} =	Calculated	mg/L
TR =	1E-05	unitless (MDNR, 2004)
AT =	25,550	days (USEPA, 1989)
EF =	350	days/year (USEPA, 1991a)
InhFadj =	7.801	$(m^3 \cdot year)/(kg \cdot day)$ (Calculated)
EDc =	6	years (USEPA, 1989)
ETc =	24	hours/day (Conservative default assumption)
IRAc =	0.27	m^3 /hour (USEPA, 1997) (Represents $6.5 m^3$ /day)
BWc =	15	kg (USEPA, 1989)
EDa =	24	years (USEPA, 1989)
ETa =	24	hours/day (Conservative default assumption)
IRAa =	0.633	m^3 /hour (USEPA, 1997) (Represents $15.2 m^3$ /day)
BWa =	70	kg (USEPA, 1989)
VFwesp =	Chemical-specific	L/m^3 (See Table 6)
SFi =	Chemical-specific	$1/(mg/kg \cdot day)$ (USEPA, 2004 unless otherwise noted)

Parameter	VFwesp (L/m^3)	Weight of Evidence Classification ¹	SFi $1/(mg/kg \cdot day)$	C_{gw} (mg/L)
cis-1,2-Dichloroethene	1.02E-04	D	Not Available	--
Trichloroethene ²	2.71E-04	Not Available	7.00E-03	4.93E+01
Naphthalene	1.08E-05	C	Not Available	--

Notes:

- ¹ - Weight-of-evidence classifications obtained from USEPA's IRIS database (USEPA, 2004).
² - Value obtained from California Office of Environmental Health Hazard Assessment Toxicity Criteria.
 "--" - Not calculated due to lack of available toxicity data.

Table 6
Volatilization Factor from Groundwater to Indoor Air *
Hardesty Federal Center

Equation:

$$VF_{wesp} \left[\frac{L}{m^3} \right] = \frac{H' \left[\frac{D_{ws}^{eff} / L_{GW}}{ER \times L_b} \right]}{1 + \left[\frac{D_{ws}^{eff} / L_{GW}}{ER \times L_b} \right] + \left[\frac{D_{ws}^{eff} / L_{GW}}{(D_{crack}^{eff} / L_{crack}) n} \right]} \times 10^3 \frac{L}{m^3}$$

Where:

- VFwesp = Volatilization factor for groundwater to enclosed-space vapors (L/m³)
- H' = Henry's law constant (unitless)
- Defwfs = Effective diffusion coefficient between groundwater and soil surface (cm²/s)
- Lgw = Depth to groundwater (cm), where Lgw = hcap + hv
- hcap = Thickness of capillary fringe (cm)
- hv = Thickness of vadose zone (cm)
- ER = Enclosed-space air exchange rate (s⁻¹)
- Lb = Enclosed-space volume/infiltration area ratio (cm)
- Defcrack = Effective diffusion coefficient through foundation cracks (cm²/s)
- Lcrack = Enclosed-space foundation or wall thickness (cm)
- n = Areal fraction of cracks in foundations/walls (cm²/cm²)

Variables:

VFwesp =	Calculated	
H' =	Chemical-specific	unitless (USEPA, 1996)
Defwfs =	Chemical-specific	cm ² /s (See Table 7)
Lgw =	305	cm (Site-specific) (assumed depth of 10 feet)
hcap =	5	cm (ASTM, 1995)
hv =	300	cm (Site-specific)
ER =	0.00014	s ⁻¹ (ASTM, 1995) (assumes 12 air exchanges per day)
Lb =	244	cm (assumes 8-ft room height)
Defcrack =	Chemical-specific	cm ² /s (See Table 10)
Lcrack =	15	cm (ASTM, 1995) (represents 6-inch floor slab)
n =	0.00056	cm ² /cm ² (Sager, 1997)

Chemical	H' (unitless)	Defwfs (cm ² /s)	Defcrack (cm ² /s)	VFwesp (L/m ³)
cis-1,2-Dichloroethene	1.67E-01	4.86E-04	5.64E-04	1.02E-04
Trichloroethene	4.22E-01	4.39E-04	5.97E-04	2.71E-04
Naphthalene	1.98E-02	4.84E-04	5.04E-04	1.08E-05

*ASTM, 1995

Table 7
Effective Diffusion Coefficient Between Groundwater and Soil Surface*
Hardesty Federal Center

Equation:

$$D_{ws}^{eff} \left[\frac{cm^2}{s} \right] = \frac{(h_{cap} + h_v)}{\left[\frac{h_{cap}}{D_{cap}^{eff}} + \frac{h_v}{D_s^{eff}} \right]}$$

Where:

- Deffws = Effective diffusion coefficient between groundwater and soil surface (cm²/s)
- hcap = Thickness of capillary fringe (cm)
- hv = Thickness of vadose zone (cm)
- Deffcap = Effective diffusion coefficient through capillary fringe (cm²/s)
- Deffs = Effective diffusion coefficient in soil (cm²/s)

Variables:

- Deffws = Calculated cm²/s
- hcap = 5 cm (ASTM, 1995)
- hv = 300 cm (Site-specific)
- Deffcap = Chemical-specific cm²/s (See Table 8)
- Deffs = Chemical-specific cm²/s (See Table 9)

Chemical	Deffcap (cm²/s)	Deffs (cm²/s)	Deffws (cm²/s)
cis-1,2-Dichloroethene	4.06E-05	5.64E-04	4.66E-04
Trichloroethene	2.60E-05	5.97E-04	4.39E-04
Naphthalene	1.45E-04	5.04E-04	4.84E-04

*ASTM, 1995

Table 8
Effective Diffusion Coefficient Through Capillary Fringe*
Hardesty Federal Center

Equation:

$$D_{cap}^{eff} \left[\frac{cm^2}{s} \right] = D^i \frac{\Theta_{acap}^{3.33}}{\Theta_T^2} + \left(D^w \times \frac{1}{H'} \times \frac{\Theta_{wcap}^{3.33}}{\Theta_T^2} \right)$$

Where:

- Deffcap = Effective diffusion coefficient through capillary fringe (cm²/s)
- Di = Diffusion coefficient in air (cm²/s)
- Oacap = Volumetric air content in capillary fringe soils (cm³/cm³)
- Dw = Diffusion coefficient in water (cm²/s)
- Owcap = Volumetric water content in capillary fringe soils (cm³/cm³)
- Ot = Total soil porosity (cm³/cm³)
- H' = Henry's law constant (unitless)

Variables:

- Deffcap = Calculated cm²/s
- Di = Chemical-specific cm²/s (USEPA, 1996)
- Oacap = 0.059 cm³/cm³ (10 percent of Ot)
- Dw = Chemical-specific cm²/s (USEPA, 1996)
- Owcap = 0.527 cm³/cm³ (90 percent of Ot)
- Ot = 0.586 cm³/cm³ (See Appendix D)
- H' = Chemical-specific unitless (USEPA, 1996)

Chemical	Di (cm ² /s)	Dw (cm ² /s)	H' (unitless)	Deffcap (cm ² /s)
cis-1,2-Dichloroethene	7.36E-02	1.13E-05	1.67E-01	4.06E-05
Trichloroethene	7.90E-02	9.10E-06	4.22E-01	2.60E-05
Naphthalene	5.90E-02	7.50E-06	1.98E-02	1.45E-04

* ASTM, 1995

Table 9
Effective Diffusion Coefficient in Soil
Hardesty Federal Center

Equation:

$$D_s^{eff} \left[\frac{\text{cm}^2}{\text{s}} \right] = D^i \frac{\Theta_{as}^{3.33}}{\Theta_T^2} + \left(D^w \times \frac{1}{H'} \times \frac{\Theta_{ws}^{3.33}}{\Theta_T^2} \right)$$

Where:

Deffs = Effective diffusion coefficient in soil based on vapor-phase concentration (cm²/s)

Di = Diffusion coefficient in air (cm²/s)

Oas = Volumetric air content in vadose zone soils (cm³/cm³)

Dw = Diffusion coefficient in water (cm²/s)

Ows = Volumetric water content in vadose zone soils (cm³/cm³)

Ot = Total soil porosity (cm³/cm³)

H' = Henry's law constant (unitless)

Variables:

Deffs =	Calculated	cm ² /s
Di =	Chemical-specific	cm ² /s (USEPA, 1996)
Oas =	0.167	cm ³ /cm ³ (calculated as Ot - Ows)
Dw =	Chemical-specific	cm ² /s (USEPA, 1996)
Ows =	0.419	cm ³ /cm ³ (See Appendix D)
Ot =	0.586	cm ³ /cm ³ (See Appendix D)
H' =	Chemical-specific	unitless (USEPA, 1996)

Chemical	Di (cm ² /s)	Dw (cm ² /s)	H' (unitless)	Deffs (cm ² /s)
cis-1,2-Dichloroethene	7.36E-02	1.13E-05	1.67E-01	5.64E-04
Trichloroethene	7.90E-02	9.10E-06	4.22E-01	5.97E-04
Naphthalene	5.90E-02	7.50E-06	1.98E-02	5.04E-04

*ASTM, 1995

Table 10
Effective Diffusion Coefficient Through Foundation Cracks*
Hardesty Federal Center

Equation:

$$D_{\text{crack}}^{\text{eff}} \left[\frac{\text{cm}^2}{\text{s}} \right] = D^i \frac{\Theta_{\text{acrack}}^{3.33}}{\Theta_T^2} + \left(D^w \times \frac{1}{H'} \times \frac{\Theta_{\text{wcrack}}^{3.33}}{\Theta_T^2} \right)$$

Where:

- Deffcrack = Effective diffusion coefficient through foundation cracks (cm²/s)
- Di = Diffusion coefficient in air (cm²/s)
- Oacrack = Volumetric air content in foundation crack (cm³/cm³)
- Dw = Diffusion coefficient in water (cm²/s)
- Owcrack = Volumetric water content in foundation crack (cm³/cm³)
- Ot = Total soil porosity (cm³/cm³)
- H' = Henry's law constant (unitless)

Variable Values:

- Deffcrack = Calculated cm²/s
- Di = Chemical-specific cm²/s (USEPA, 1996)
- Oacrack = 0.167 cm³/cm³ (calculated as Ot - Owcrack)
- Dw = Chemical-specific cm²/s (USEPA, 1996)
- Owcrack = 0.419 cm³/cm³ (assumed equal to vadose zone soils)
- Ot = 0.586 cm³/cm³ (See Appendix D)
- H' = Chemical-specific unitless (USEPA, 1996)

Chemical	Di (cm ² /s)	Dw (cm ² /s)	H' (unitless)	Deffcrack (cm ² /s)
cis-1,2-Dichloroethene	7.36E-02	1.13E-05	1.57E-01	5.64E-04
Trichloroethene	7.90E-02	9.10E-06	4.22E-01	5.97E-04
Naphthalene	5.90E-02	7.50E-06	1.98E-02	5.04E-04

*ASTM, 1995

Table 11
Selection of Site-Specific Target Levels in Groundwater
Residential Indoor Scenario
Hardesty Federal Center

Parameter	Cgw		SSTLgw ¹ (mg/L)
	Cancer (mg/L)	Noncancer (mg/L)	
cis-1,2-Dichloroethene	--	2.3E+02	2.28E+02
Trichloroethene	4.93E+01	5.1E+01	4.93E+01
Naphthalene	--	1.8E+02	1.85E+02

Note:

¹ - SSTLgw (site-specific target level in groundwater) represents the lower of the cancer or noncancer Cgw (allowable concentration in groundwater) values.

Cancer Cgw values obtained from Table 5.

Noncancer Cgw values obtained from Table 4.

Table 12
Comparison of Chemical Concentrations in Groundwater
to Site-Specific Target Levels
Hardesty Federal Center

Chemical	Site-Specific Target Level in Groundwater (mg/L)	Maximum Detected Shallow Concentration (mg/L)	Maximum Detected Concentration (mg/L)
cis-1,2-Dichloroethene	228	0.0016 J	0.0016 J
Trichloroethene	49.3	0.113	0.229
Naphthalene	185	0.0069	0.0069

Note:

Maximum concentration values represent the highest concentration from both investigations.

APPENDIX A
Previous Investigations

A.8 – Limited Soils Investigation (SCS Engineers)



Limited Soils Investigation Report

Performed in the Area of Building 6 at
The Hardesty Federal Records Center
601-607 Hardesty Avenue
Kansas City, Missouri

Presented to:

General Services Administration

GSA Public Buildings Service
1500 East Bannister Road
Kansas City, MO 64131

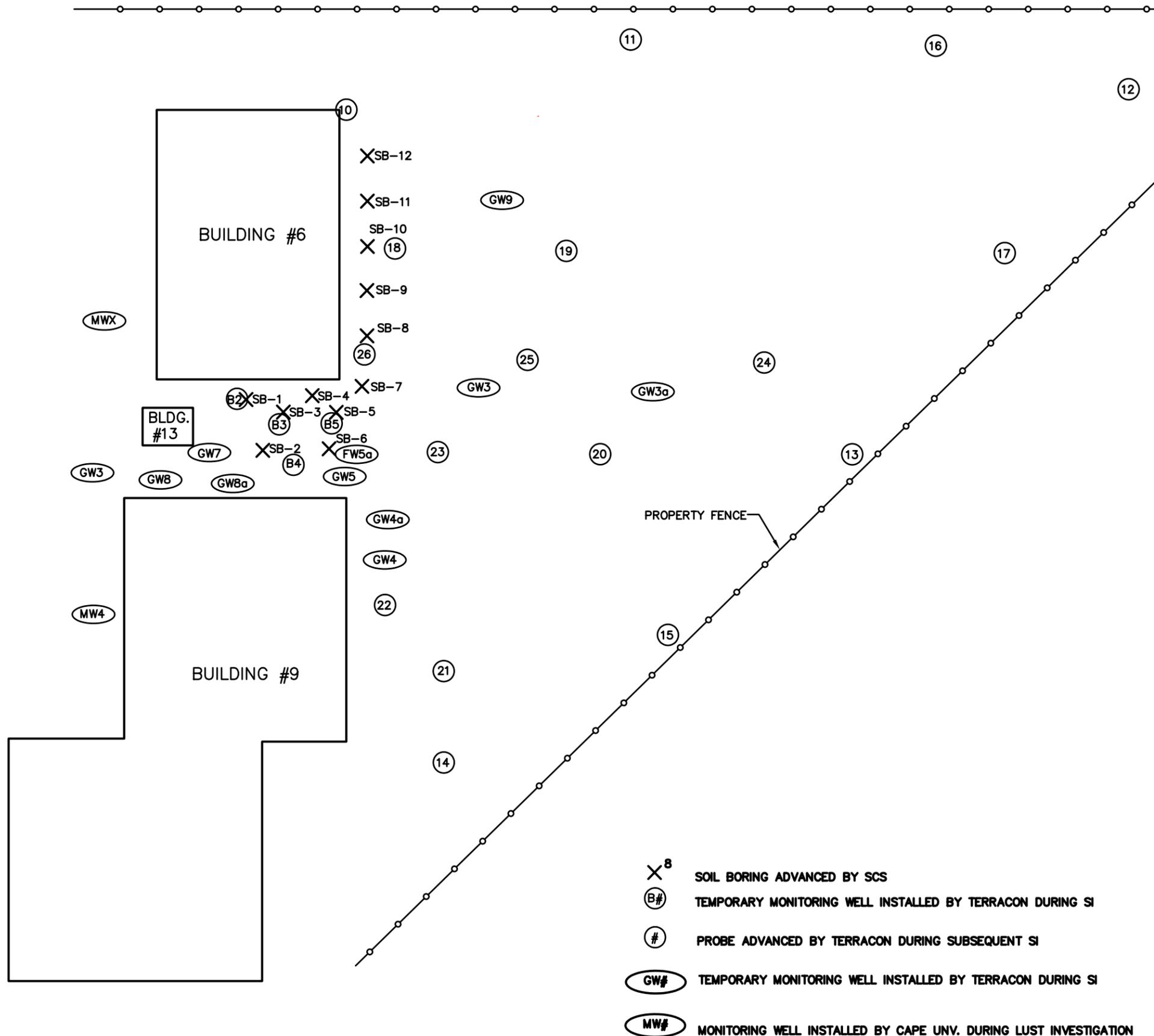
Presented by:

SCS ENGINEERS
10975 El Monte, Suite 100
Overland Park, KS 66211
(913) 451-7510

July 2007
File No. 02200070.61

Offices Nationwide
www.scsengineers.com

INDEPENDENCE AVENUE



- ⊗⁸ SOIL BORING ADVANCED BY SCS
- (B#) TEMPORARY MONITORING WELL INSTALLED BY TERRACON DURING SI
- (#) PROBE ADVANCED BY TERRACON DURING SUBSEQUENT SI
- (GW#) TEMPORARY MONITORING WELL INSTALLED BY TERRACON DURING SI
- (MW#) MONITORING WELL INSTALLED BY CAPE UNV. DURING LUST INVESTIGATION



NOT TO SCALE
SCS ENGINEERS

FIGURE 1

O:\DWGS\ES\02\200070.61-INDEPENDANCE & HARDESTY\dwg\02200070.61-FIG-2

HARDESTY FEDERAL RECORDS CENTER
607 HARDESTY AVENUE, KANSAS CITY, MO
SOIL BORING LOCATIONS
02200070.61 - APRIL 2007

HARDESTY FEDREAL COMPLEX
SOILS DATA

Data from SCS Limited Soils Investigation. Data obtained from the laboratory analytical report.

		SB1	SB2	SB3	SB4	SB5	SB6	SB7	SB8	SB9	SB10	SB11	SB12
PCB's		ND	ND	ND	ND	5	ND	ND					
Acetone	mg/kg	0.059	0.089	0.067	0.066	0.078	ND	0.067	ND	ND	ND	ND	ND
Benzene	mg/kg	ND											
Bromobenzene	mg/kg	ND											
Bromochloromethane	mg/kg	ND											
Bromodichloromethane	mg/kg	ND											
Bromoform	mg/kg	ND											
Bromomethane	mg/kg	ND											
2-Butanone	mg/kg	ND	ND	ND	ND	ND	ND	0.064	ND	ND	ND	ND	ND
sec-Butylbenzene	mg/kg	ND											
n-Butylbenzene	mg/kg	ND											
tert-Butylbenzene	mg/kg	ND											
Carbon disulfide	mg/kg	ND	ND	ND	0.005	ND	0.008	0.015	0.005	ND	ND	ND	ND
Carbon Tetrachloride	mg/kg	ND											
Chlorobenzene	mg/kg	ND											
Chlorodibromomethane	mg/kg	ND											
Chloroethane	mg/kg	ND											
Chloroform	mg/kg	ND	0.003	ND									
Chloromethane	mg/kg	ND											
2-Chlorotoluene	mg/kg	ND											
4-Chlorotoluene	mg/kg	ND											
1,2-Dibromo-3-chloropropane	mg/kg	ND											
1,2-Dibromoethane (EDB)	mg/kg	ND											
Dibromomethane	mg/kg	ND											
1,4-Dichlorobenzene	mg/kg	ND											
1,3-Dichlorobenzene	mg/kg	ND											
1,2-Dichlorobenzene	mg/kg	ND											
Dichlorodifluoromethane	mg/kg	ND											
1,1-Dichloroethane	mg/kg	ND											
1,2-Dichloroethane	mg/kg	ND											
cis-1,2-Dichloroethene	mg/kg	ND	0.002	ND	ND	ND	0.061	0.88	1.4	0.035	0.012	ND	ND
1,1-Dichloroethene	mg/kg	ND	0.02	ND	0.002	ND							
trans-1,2-Dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.004	0.011	0.032	0.009	0.003	ND	ND
1,3-Dichloropropane	mg/kg	ND											
1,2-Dichloropropane	mg/kg	ND											
2,2-Dichloropropane	mg/kg	ND											
cis-1,3-Dichloropropene	mg/kg	ND											
trans-1,3-Dichloropropene	mg/kg	ND											
1,1-Dichloropropene	mg/kg	ND											
Ethylbenzene	mg/kg	ND											
Hexachlorobutadiene	mg/kg	ND											
2-Hexanone	mg/kg	ND											
Isopropylbenzene	mg/kg	ND											
p-Isopropyltoluene	mg/kg	ND											
MtBE	mg/kg	ND											
Methylene Chloride	mg/kg	ND											
4-Methyl-2-pentanone	mg/kg	ND											
Naphthalene	mg/kg	ND	0.005	ND	0.007	ND							
n-Propylbenzene	mg/kg	ND											
Styrene	mg/kg	ND											
1,1,1,2-Tetrachloroethane	mg/kg	ND											
1,1,1,2,2-Tetrachloroethane	mg/kg	ND	ND	ND	0.004	ND							
Tetrachloroethene	mg/kg	ND	0.004	ND	0.006	0.005	ND	ND	ND	0.005	0.01	0.003	ND
Toluene	mg/kg	ND	0.002										
1,2,3-Trichlorobenzene	mg/kg	ND											
1,2,4-Trichlorobenzene	mg/kg	ND											
1,1,2-Trichloroethane	mg/kg	ND											
1,1,1-Trichloroethane	mg/kg	0.006	0.051	ND	0.004	ND							
Trichloroethene	mg/kg	ND	0.026	0.002	0.01	0.036	0.013	0.002	0.04	0.407	0.322	0.049	0.002
Trichlorofluoromethane	mg/kg	ND											
1,2,3-Trichloropropane	mg/kg	ND											
1,3,5-Trimethylbenzene	mg/kg	ND											
1,2,4-Trimethylbenzene	mg/kg	ND	0.002	ND									
Vinyl chloride	ND	ND	ND	ND		ND							
Xylenes, total	ND	ND	ND	ND		ND							
Diesel	mg/kg	138	19.3	23.3	ND	29	ND	ND					
GRO		ND											

Gray shading. Analyte detected above the laboratory detection limits.

APPENDIX A
Previous Investigations

A.9 – 2010 Groundwater Sampling Report (Terracon)

Off-Site Well Installation and Groundwater Sampling

Hardesty Federal Complex
601 Hardesty Avenue
Kansas City, Jackson County, Missouri

January 11, 2011
Terracon Project No. 02107044

EPA Region 7
EPA ID No. MON000703320

Prepared for:

General Services Administration
Kansas City, Missouri

Prepared by:

Terracon Consultants, Inc.
Lenexa, Kansas

Offices Nationwide
Employee-Owned

Established in 1965
terracon.com

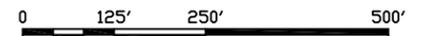
Terracon

Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

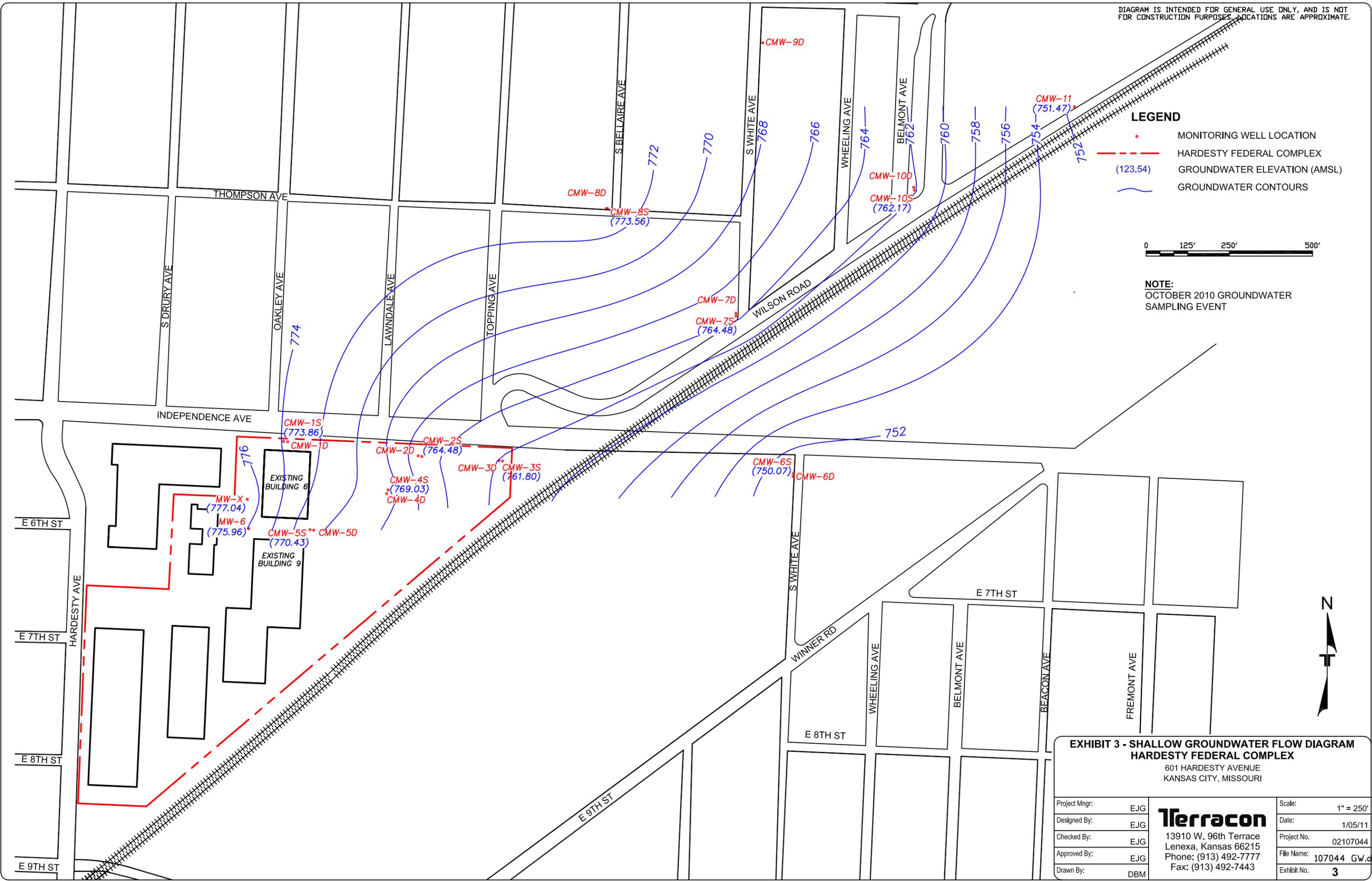
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- (123.54) GROUNDWATER ELEVATION (AMSL)
- ~ GROUNDWATER CONTOURS



NOTE:
OCTOBER 2010 GROUNDWATER SAMPLING EVENT



**EXHIBIT 3 - SHALLOW GROUNDWATER FLOW DIAGRAM
HARDESTY FEDERAL COMPLEX**
601 HARDESTY AVENUE
KANSAS CITY, MISSOURI

Project Mngr:	EJG	Scale:	1" = 250'
Designed By:	EJG	Date:	1/05/11
Checked By:	EJG	Project No.:	02107044
Approved By:	EJG	File Name:	107044 GW.dwg
Drawn By:	DBM	Exhibit No.:	3

Terracon
13910 W. 96th Terrace
Lenexa, Kansas 66215
Phone: (913) 492-7777
Fax: (913) 492-7443

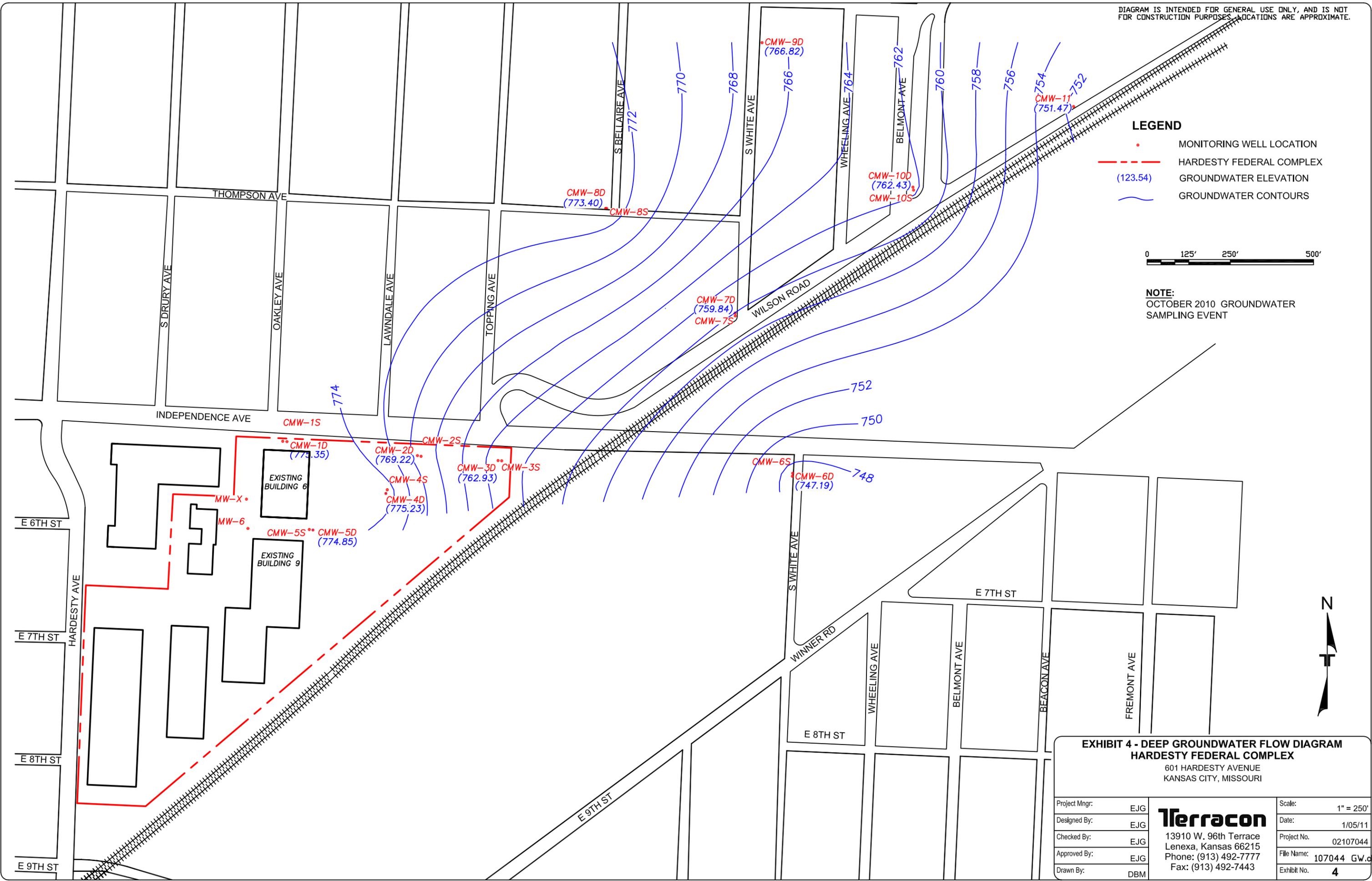
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- (123.54) GROUNDWATER ELEVATION
- ~ GROUNDWATER CONTOURS



NOTE:
OCTOBER 2010 GROUNDWATER SAMPLING EVENT



**EXHIBIT 4 - DEEP GROUNDWATER FLOW DIAGRAM
HARDESTY FEDERAL COMPLEX**
601 HARDESTY AVENUE
KANSAS CITY, MISSOURI

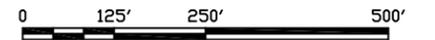
Project Mngr:	EJG	Scale:	1" = 250'
Designed By:	EJG	Date:	1/05/11
Checked By:	EJG	Project No.:	02107044
Approved By:	EJG	File Name:	107044 GW.dwg
Drawn By:	DBM	Exhibit No.:	4

Terracon
13910 W. 96th Terrace
Lenexa, Kansas 66215
Phone: (913) 492-7777
Fax: (913) 492-7443

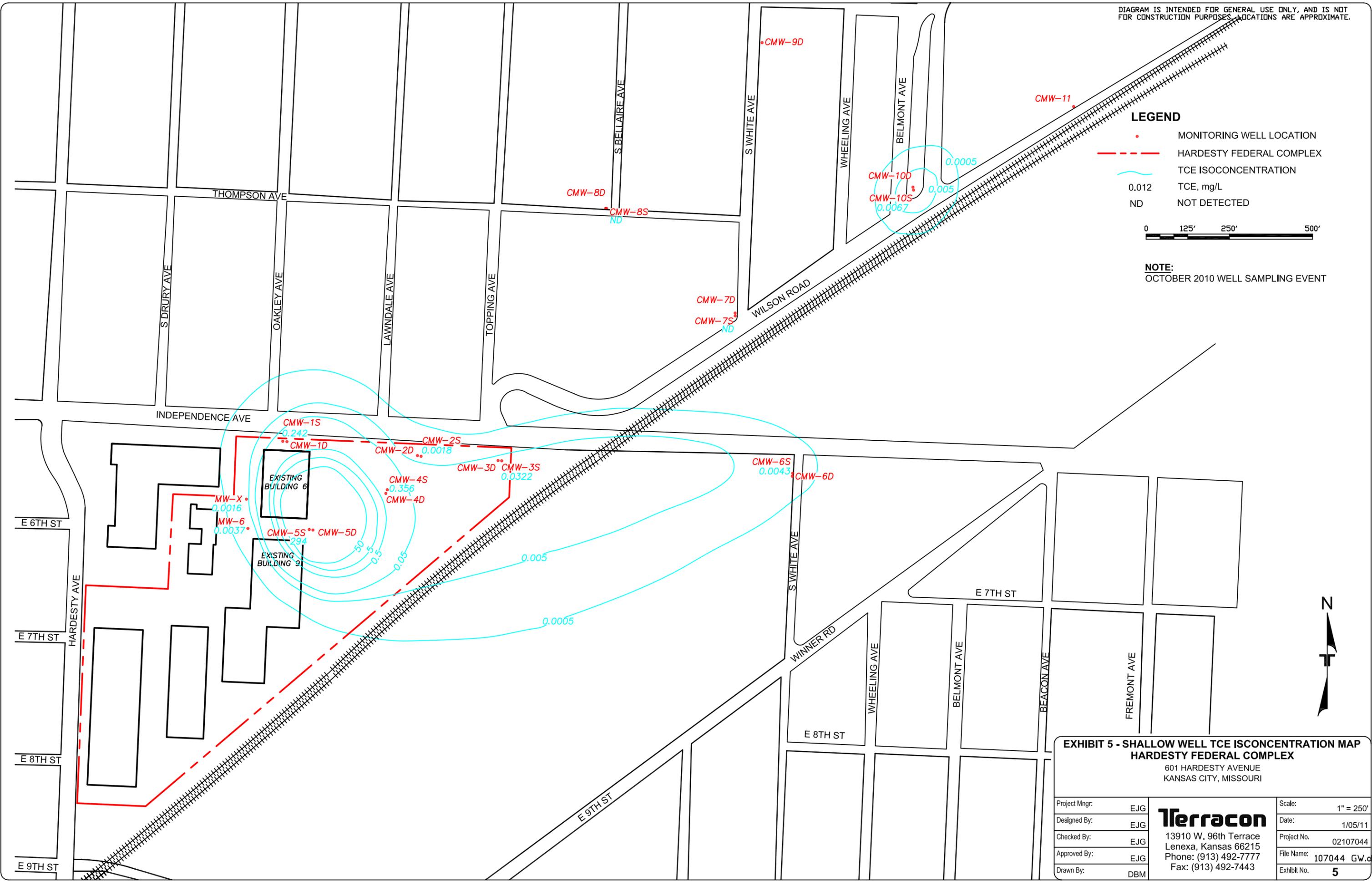
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- ~ TCE ISOCONCENTRATION
- 0.012 TCE, mg/L
- ND NOT DETECTED



NOTE:
OCTOBER 2010 WELL SAMPLING EVENT



**EXHIBIT 5 - SHALLOW WELL TCE ISOCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX**
601 HARDESTY AVENUE
KANSAS CITY, MISSOURI

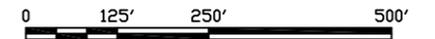
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Designed By:	EJG	Date:	1/05/11
Checked By:	EJG	Project No.:	02107044
Approved By:	EJG	File Name:	107044 GW.dwg
Drawn By:	DBM	Exhibit No.:	5

Terracon
13910 W. 96th Terrace
Lenexa, Kansas 66215
Phone: (913) 492-7777
Fax: (913) 492-7443

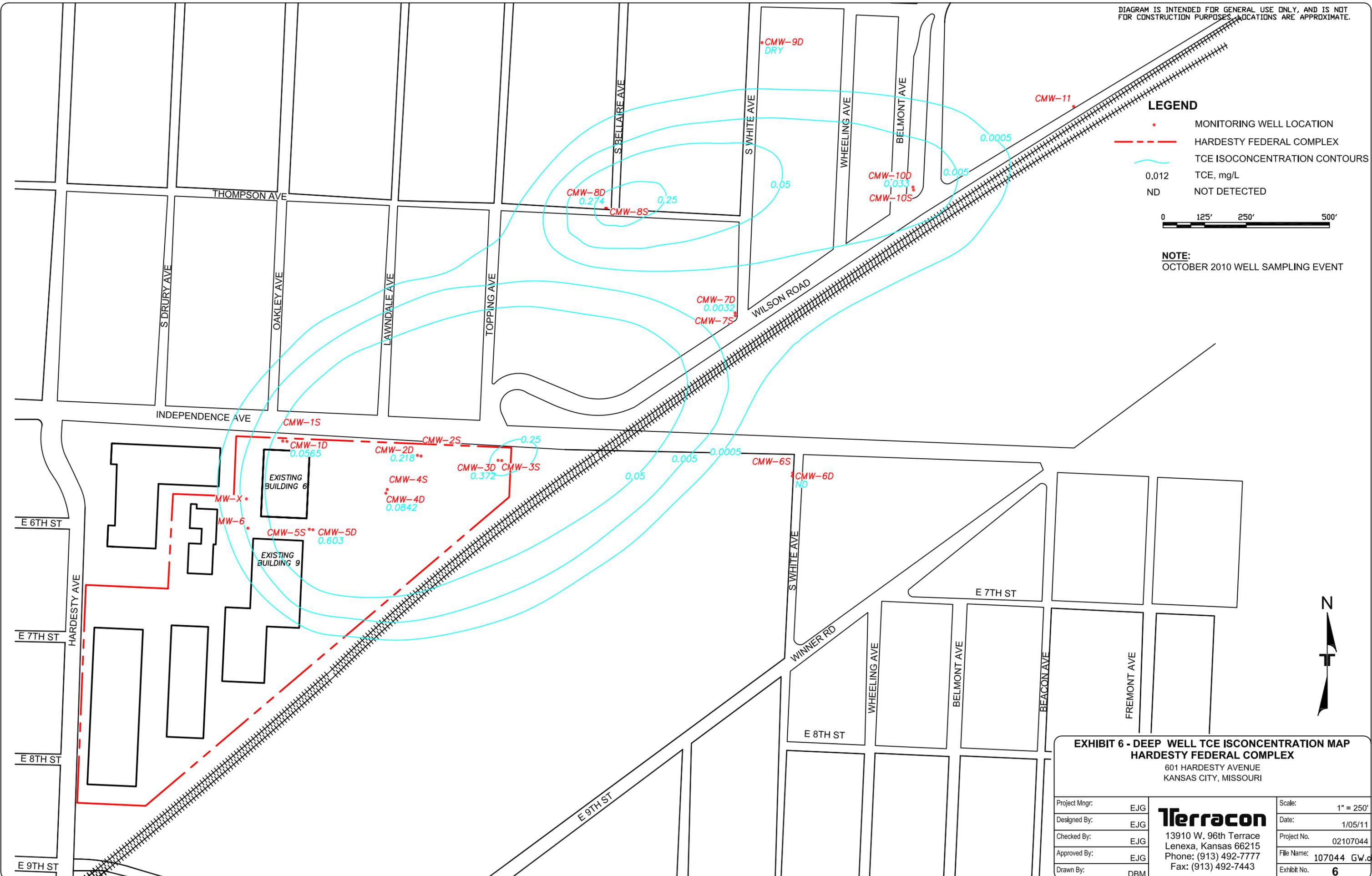
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- ~ TCE ISOCONCENTRATION CONTOURS
- 0.012 TCE, mg/L
- ND NOT DETECTED



NOTE:
OCTOBER 2010 WELL SAMPLING EVENT



**EXHIBIT 6 - DEEP WELL TCE ISOCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX**
601 HARDESTY AVENUE
KANSAS CITY, MISSOURI

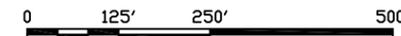
Project Mngr:	EJG	Scale:	1" = 250'
Designed By:	EJG	Date:	1/05/11
Checked By:	EJG	Project No.:	02107044
Approved By:	EJG	File Name:	107044 GW.dwg
Drawn By:	DBM	Exhibit No.:	6

Terracon
13910 W. 96th Terrace
Lenexa, Kansas 66215
Phone: (913) 492-7777
Fax: (913) 492-7443

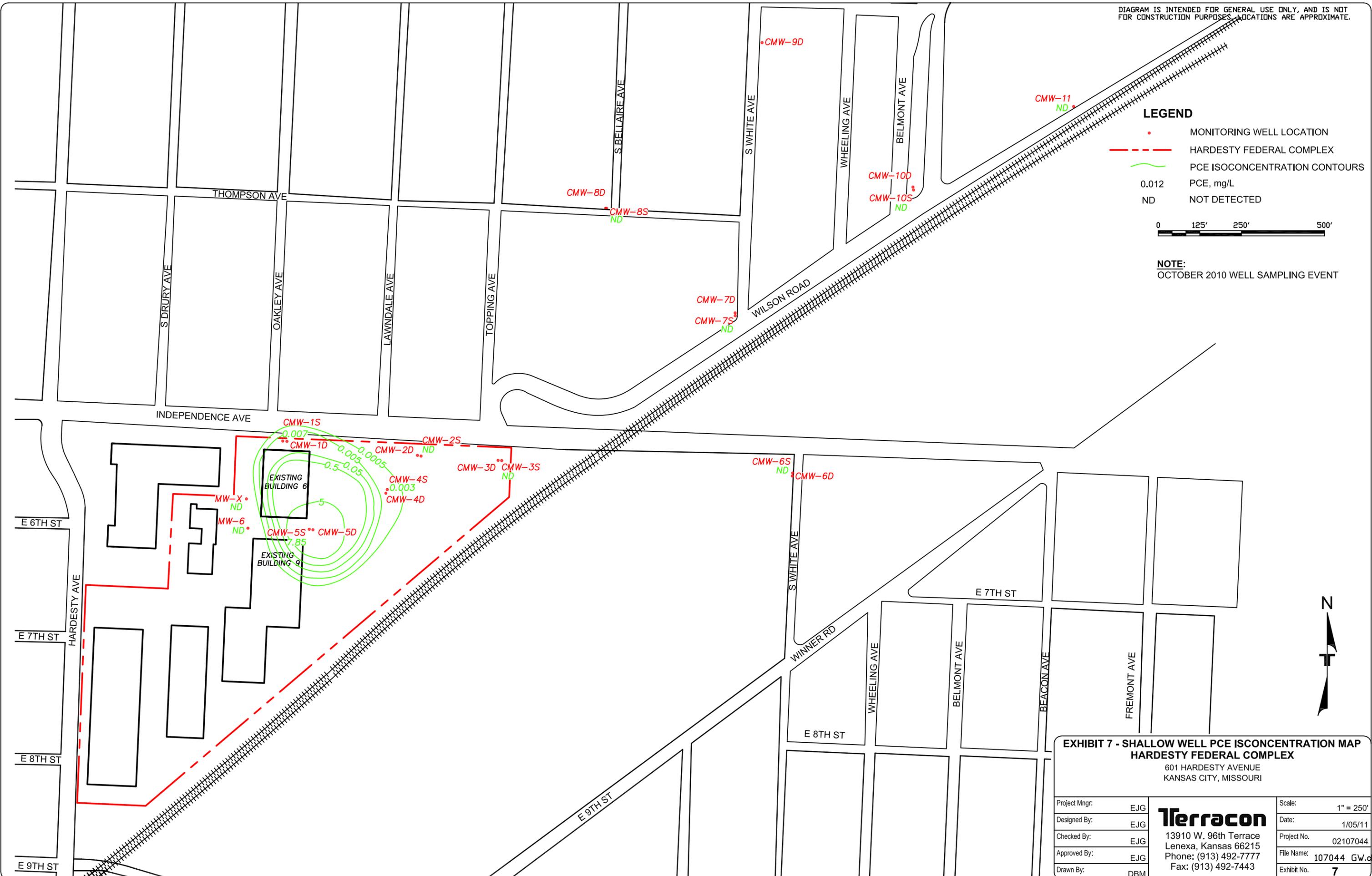
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- PCE ISOCONCENTRATION CONTOURS
- 0.012 PCE, mg/L
- ND NOT DETECTED



NOTE:
OCTOBER 2010 WELL SAMPLING EVENT



**EXHIBIT 7 - SHALLOW WELL PCE ISOCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX**
601 HARDESTY AVENUE
KANSAS CITY, MISSOURI

Project Mngr:	EJG	Scale:	1" = 250'
Designed By:	EJG	Date:	1/05/11
Checked By:	EJG	Project No.:	02107044
Approved By:	EJG	File Name:	107044 GW.dwg
Drawn By:	DBM	Exhibit No.:	7

Terracon
13910 W. 96th Terrace
Lenexa, Kansas 66215
Phone: (913) 492-7777
Fax: (913) 492-7443

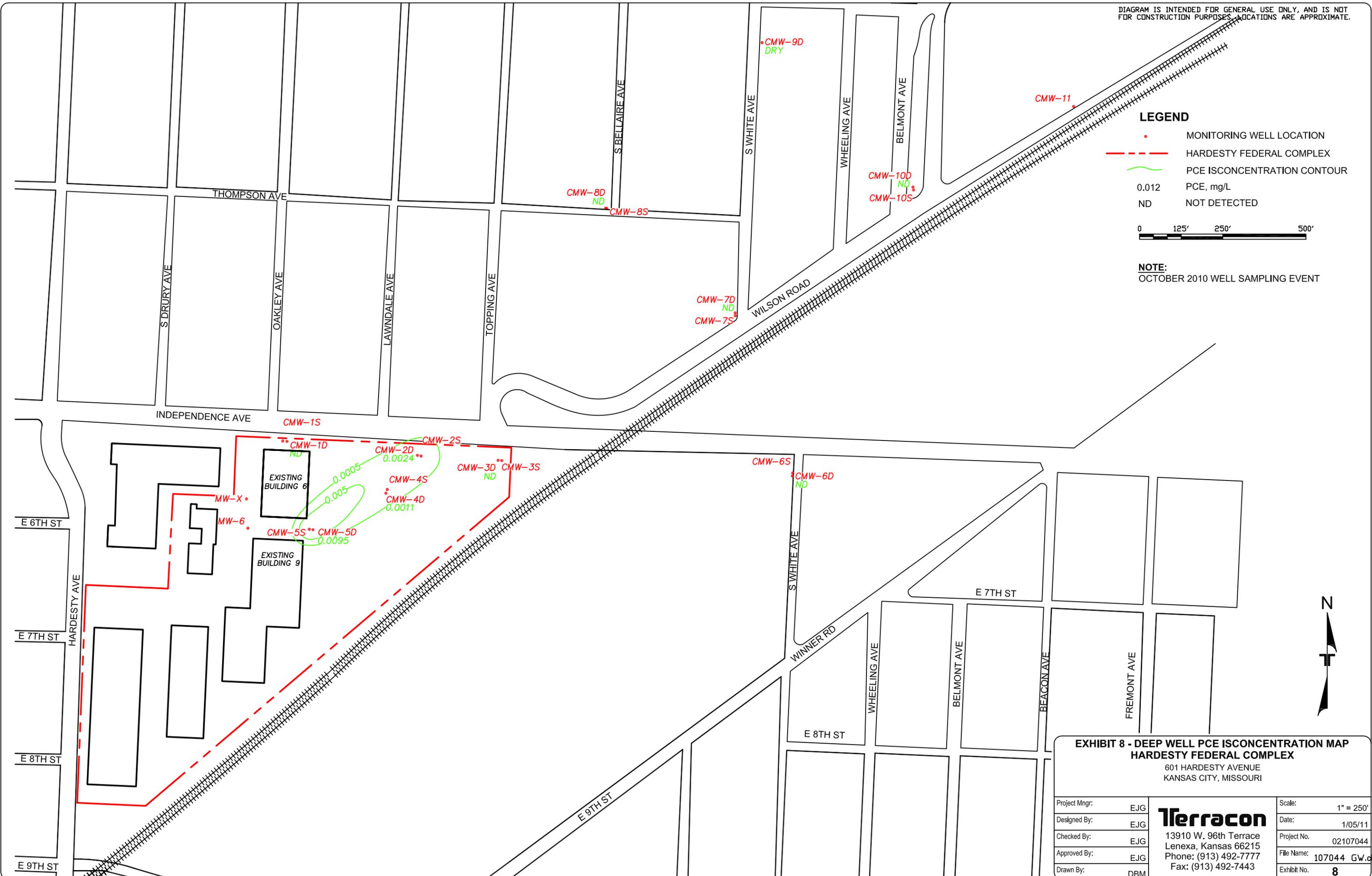
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- PCE ISCONCENTRATION CONTOUR
- 0.012 PCE, mg/L
- ND NOT DETECTED



NOTE:
OCTOBER 2010 WELL SAMPLING EVENT



**EXHIBIT 8 - DEEP WELL PCE ISCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX**
601 HARDESTY AVENUE
KANSAS CITY, MISSOURI

Project Mngr:	EJG	Scale:	1" = 250'
Designed By:	EJG	Date:	1/05/11
Checked By:	EJG	Project No.:	02107044
Approved By:	EJG	File Name:	107044 GW.dwg
Drawn By:	DBM	Exhibit No.:	8

Terracon
13910 W. 96th Terrace
Lenexa, Kansas 66215
Phone: (913) 492-7777
Fax: (913) 492-7443

TABLE 2
On-Site Summary of Groundwater Analytical Data
Off-Site Well Installation and Groundwater Sampling Report
Terracon Project No. 02107044

Sample ID	Collection Date	Analyte	Vinyl Chloride (VC)	1,1-Dichloroethylene (DCE)	Trichloroethylene (TCE)	1,1,2-Trichloroethane (TCA)	Tetrachloroethylene (PCE)	1,1,2,2-Tetrachloroethane (PCA)
		Method	8260B	8260B	8260B	8260B	8260B	8260B
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CMW - 1S	10/21/2010		ND	ND	0.242	ND	0.007	ND
CMW - 1D	10/21/2010		ND	ND	0.0565	ND	ND	ND
CMW - 2S	10/21/2010		ND	ND	0.0018	ND	ND	ND
CMW - 2D	10/21/2010		ND	ND	0.218	ND	0.0024	ND
CMW - 3S	10/21/2010		ND	ND	0.0322	ND	ND	ND
CMW - 3D	10/21/2010		ND	ND	0.372	ND	ND	ND
CMW - 4S	10/21/2010		ND	0.001	0.356	ND	0.003	ND
CMW - 4D	10/21/2010		ND	ND	0.0842	ND	0.0011	ND
CMW - 5S	10/22/2010		ND <0.2	1.19	294	0.756	7.85	ND <0.2
CMW - 5D	10/22/2010		ND	0.0027	0.603	ND	0.0095	ND
MW - 6	10/25/2010		ND	ND	0.0037	ND	ND	ND
DUP - 2 (MW - 6)	10/25/2010		ND	ND	ND	ND	ND	ND
MW - X	10/25/2010		ND	ND	0.0016	ND	ND	ND
DUP - 1 (MW - X)	10/25/2010		ND	ND	0.0013	ND	ND	ND
MRBCA Default Target Levels (DTLs) - Domestic Use			0.002	0.007	0.005	0.005	0.005	0.000689
Residential RBTL: Indoor Inhalation of Vapor Emissions			0.111*	5.83	1.60	1.98	0.338	1.54
Residential RBTL: Dermal Contact			0.0206*	13.4	0.722	0.305	0.00506	0.0645
Non-Residential RBTL: Indoor Inhalation of Vapor Emissions			0.582**	43.3	8.41	10.4	1.77	8.06
Non-Residential RBTL: Dermal Contact			0.0753**	74.4	2.64	1.11	0.0185	0.236
Site Specific Target Levels (SSTLs) ¹			Not Provided	228	49.3	Not Provided	Not Provided	Not Provided

Source:

Keystone Laboratories, Inc., 2010

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance, Appendix B, June 2006. Corrective Action (MRBCA)

Notes:

ND = Not detected above the laboratory analytical detection limit. See individual lab reports for chemical specific detection limit (<0.001)

BOLD = detections above MRBCA DTLs

Highlighted = Detections above Residential RBTL: Indoor Inhalation of Vapor Emissions

¹ = SSTLs obtained from Off-Site Groundwater Investigation Report dated July 12, 2004 prepared by Burns & McDonnell Engineering Company, Inc.; protective for indoor residents

* = Value for residential scenario's associated with vinyl chloride

** = Value for occupational scenario's associated with vinyl chloride

TABLE 3
Off-Site Summary of Groundwater Analytical Data
Off-Site Well Installation and Groundwater Sampling Report
Terracon Project No. 02107044

Sample ID	Collection Date	Analyte	Vinyl Chloride (VC)	1,1-Dichloroethylene (DCE)	Trichloroethylene (TCE)	1,1,2-Trichloroethane (TCA)	Tetrachloroethylene (PCE)	1,1,2,2-Tetrachloroethane (PCA)
		Method	8260B	8260B	8260B	8260B	8260B	8260B
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CMW - 6S	10/21/2010		ND	ND	0.0043	ND	ND	ND
CMW - 6D	10/21/2010		ND	ND	ND	ND	ND	ND
CMW - 7S	10/21/2010		ND	ND	ND	ND	ND	ND
CMW - 7D	10/21/2010		ND	ND	0.0032	ND	ND	ND
CMW - 8S	10/20/2010		ND	ND	ND	ND	ND	ND
CMW - 8D	10/20/2010		ND	ND	0.274	ND	ND	ND
CMW - 10S	10/19/2010		ND	ND	0.0067	ND	ND	ND
CMW - 10D	10/19/2010		ND	ND	0.033	ND	ND	ND
CMW - 11	10/19/2010		ND	ND	ND	ND	ND	ND
MRBCA Default Target Levels (DTLs) - Domestic Use			0.002	0.007	0.005	0.005	0.005	0.000689
Residential RBTL: Indoor Inhalation of Vapor Emissions			0.111*	5.83	1.60	1.98	0.338	1.54
Residential RBTL: Dermal Contact			0.0206*	13.4	0.722	0.305	0.00506	0.0645
Non-Residential RBTL: Indoor Inhalation of Vapor Emissions			0.582**	43.3	8.41	10.4	1.77	8.06
Non-Residential RBTL: Dermal Contact			0.0753**	74.4	2.64	1.11	0.0185	0.236
Site Specific Target Levels ¹			Not Provided	228	49.3	Not Provided	Not Provided	Not Provided

Source:

Keystone Laboratories, Inc., 2010
Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance, Appendix B, June 2006. Corrective Action (MRBCA)

Notes:

ND = Not detected above the laboratory analytical detection limit. See individual lab reports for chemical specific detection limit (<0.001)

BOLD = detections above MRBCA DTLs

Highlighted = Detections above Residential RBTL: Indoor Inhalation of Vapor Emissions

¹ = SSTLs obtained from Off-Site Groundwater Investigation Report dated July 12, 2004 prepared by Burns & McDonnell Engineering Company, Inc.; protective for indoor residents

* = Value for residential scenario's associated with vinyl chloride

** = Value for occupational scenario's associated with vinyl chloride

APPENDIX A
Previous Investigations

A.10 – March 2011 Groundwater Sampling Report (Terracon)

March 2011 Groundwater Sampling Report

Hardesty Federal Complex
607 Hardesty Avenue
Kansas City, Jackson County, Missouri

June 10, 2011

Terracon Project No. 02107147

Prepared for:

General Services Administration
Kansas City, Missouri

Prepared by:

Terracon Consultants, Inc.
Lenexa, Kansas

Offices Nationwide
Employee-Owned

Established in 1965
terracon.com

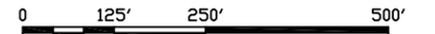
Terracon

Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

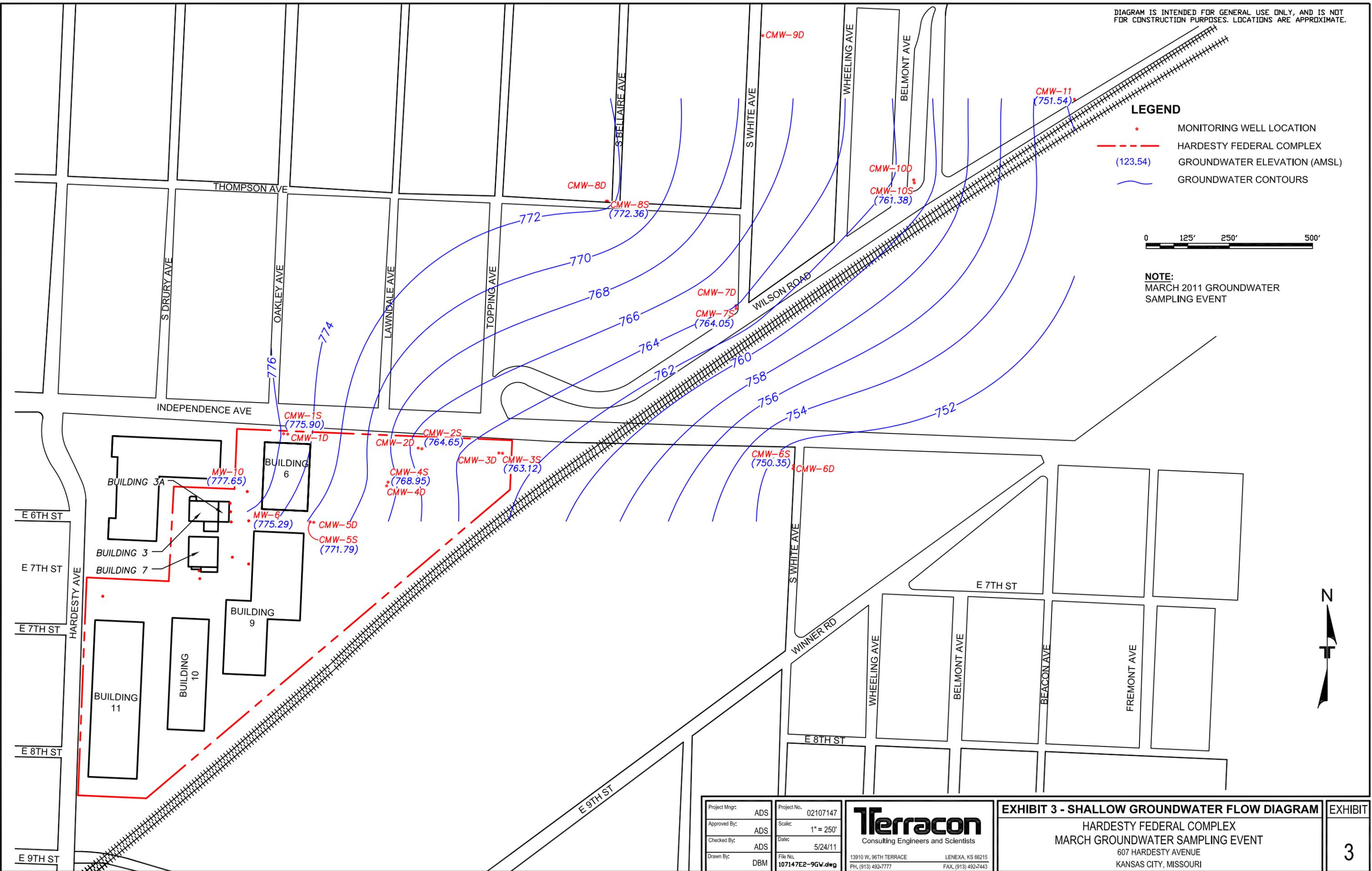
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- (123.54) GROUNDWATER ELEVATION (AMSL)
- GROUNDWATER CONTOURS



NOTE:
MARCH 2011 GROUNDWATER SAMPLING EVENT



Project Mng'r:	ADS	Project No.:	02107147
Approved By:	ADS	Scale:	1" = 250'
Checked By:	ADS	Date:	5/24/11
Drawn By:	DBM	File No.:	107147E2-9GW.dwg

Terracon
Consulting Engineers and Scientists
13910 W. 96TH TERRACE
LENEXA, KS 66215
PH. (913) 492-7777 FAX. (913) 492-7443

EXHIBIT 3 - SHALLOW GROUNDWATER FLOW DIAGRAM
HARDESTY FEDERAL COMPLEX
MARCH GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

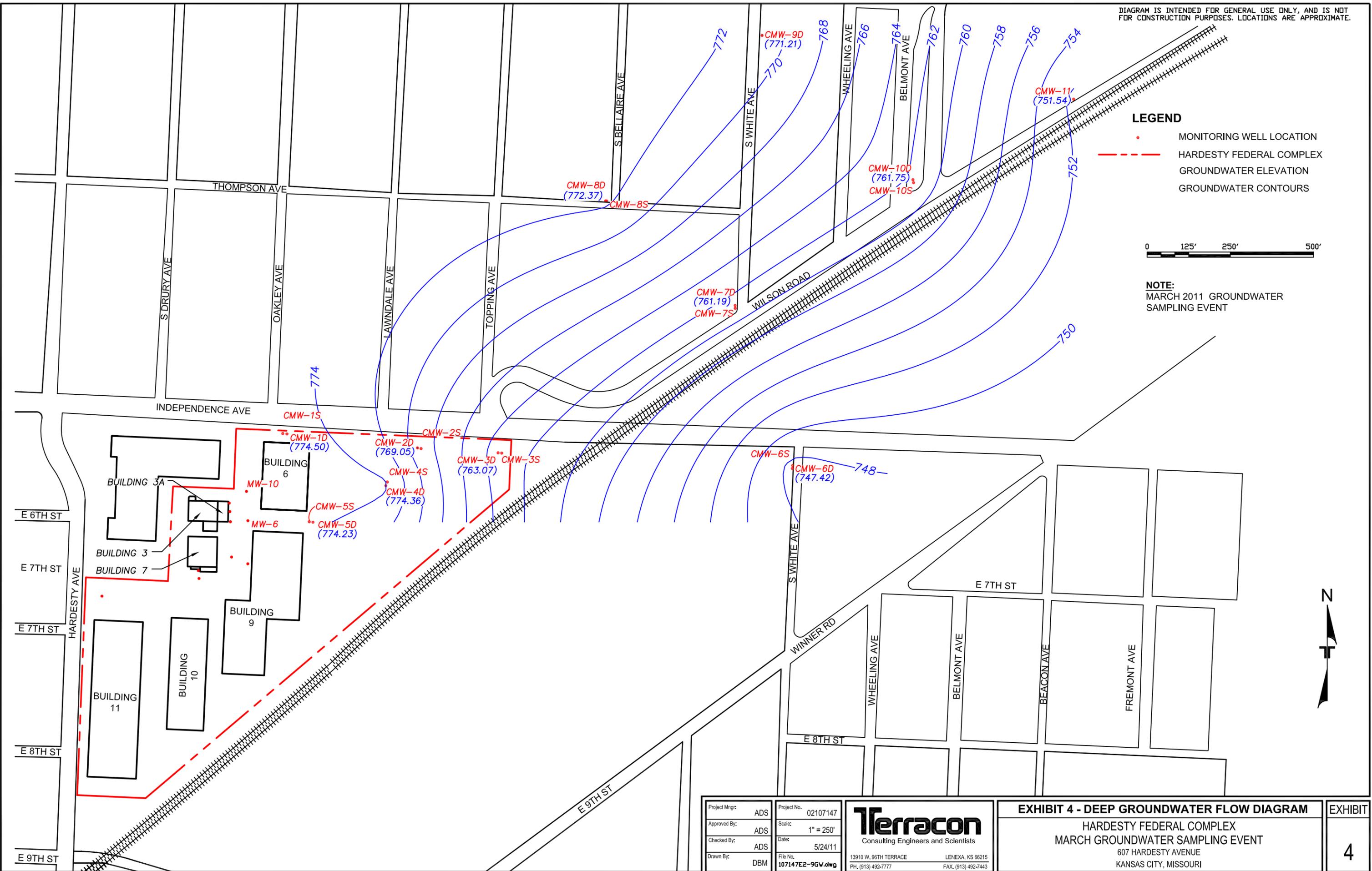
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- GROUNDWATER ELEVATION
- GROUNDWATER CONTOURS



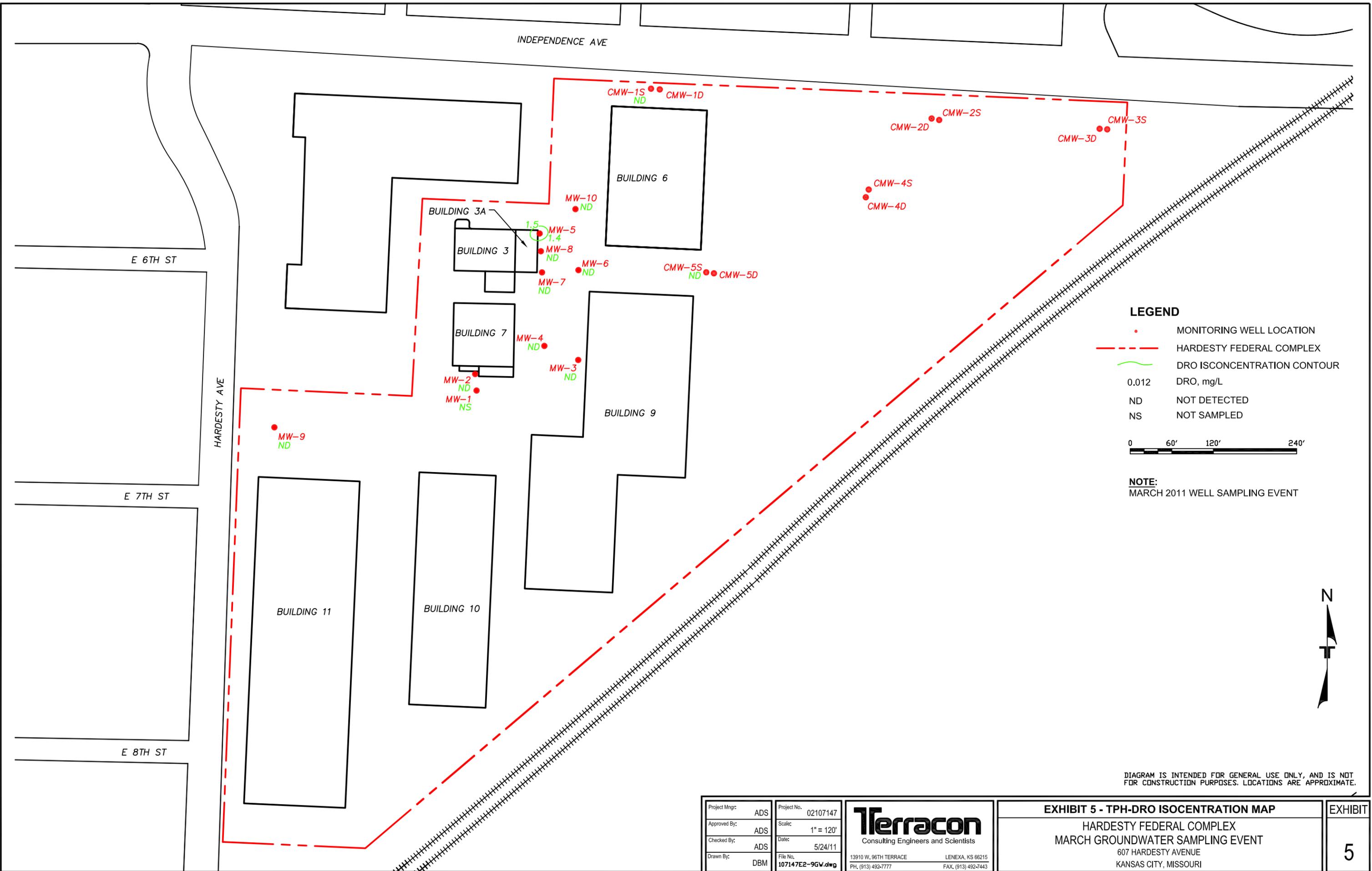
NOTE:
MARCH 2011 GROUNDWATER SAMPLING EVENT



Project Mng'r:	ADS	Project No.:	02107147
Approved By:	ADS	Scale:	1" = 250'
Checked By:	ADS	Date:	5/24/11
Drawn By:	DBM	File No.:	107147E2-9GW.dwg

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EXHIBIT 4 - DEEP GROUNDWATER FLOW DIAGRAM
HARDESTY FEDERAL COMPLEX
MARCH GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI



LEGEND

- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- ~ DRO ISCONCENTRATION CONTOUR
- 0.012 DRO, mg/L
- ND NOT DETECTED
- NS NOT SAMPLED

0 60' 120' 240'

NOTE:
MARCH 2011 WELL SAMPLING EVENT



DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

Project Mngr:	ADS	Project No.	02107147
Approved By:	ADS	Scale:	1" = 120'
Checked By:	ADS	Date:	5/24/11
Drawn By:	DBM	File No.	107147E2-9GW.dwg

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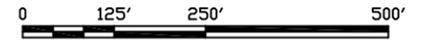
EXHIBIT 5 - TPH-DRO ISOCENTRATION MAP
HARDESTY FEDERAL COMPLEX
MARCH GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

EXHIBIT
5

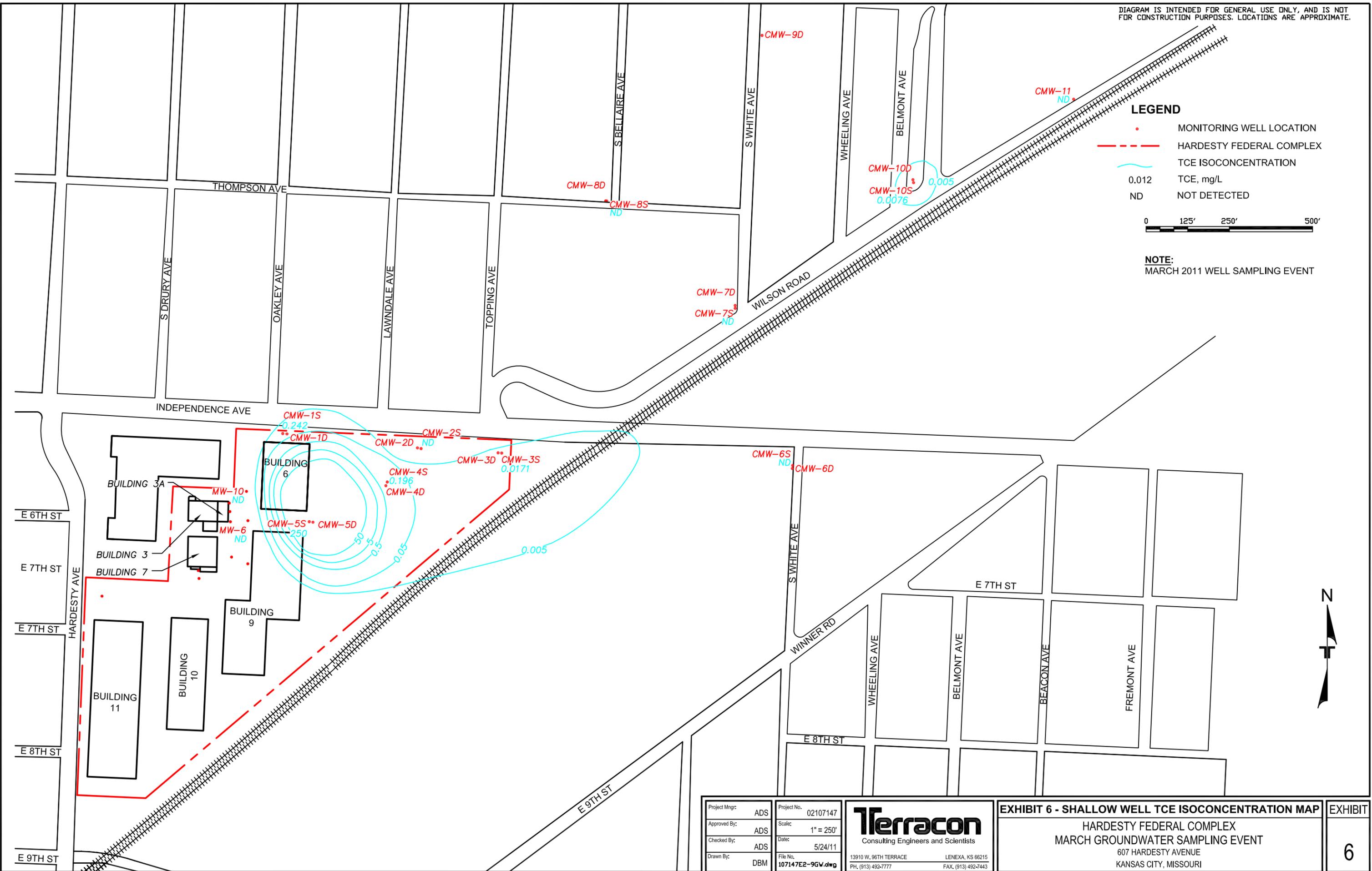
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- ~ TCE ISOCONCENTRATION
- 0.012 TCE, mg/L
- ND NOT DETECTED



NOTE:
MARCH 2011 WELL SAMPLING EVENT



Project Mng'r:	ADS	Project No.:	02107147
Approved By:	ADS	Scale:	1" = 250'
Checked By:	ADS	Date:	5/24/11
Drawn By:	DBM	File No.:	107147E2-9GW.dwg

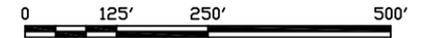
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LENEXA, KS 66215
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EXHIBIT 6 - SHALLOW WELL TCE ISOCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX
MARCH GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

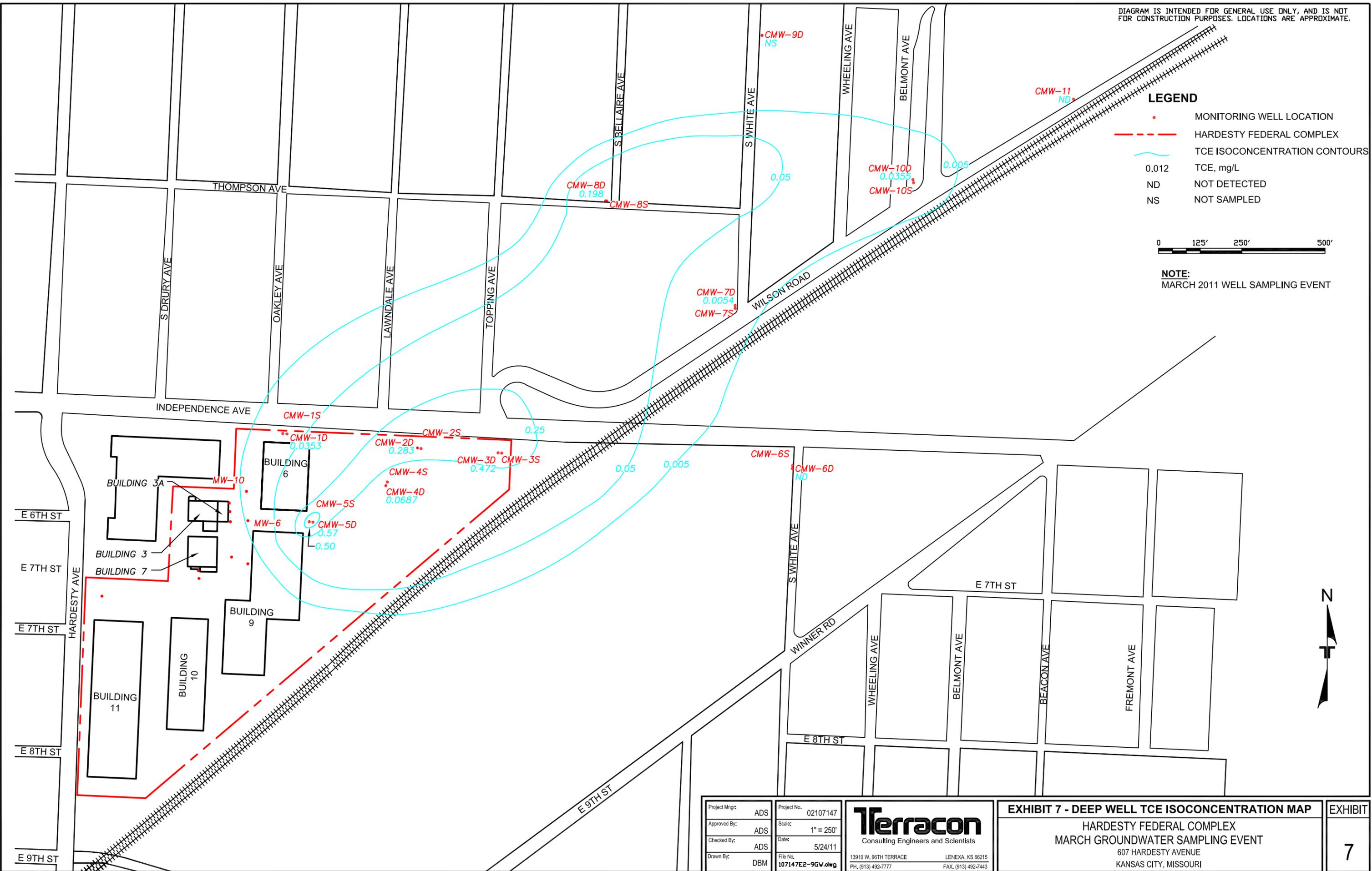
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- ~ TCE ISOCONCENTRATION CONTOURS
- 0.012 TCE, mg/L
- ND NOT DETECTED
- NS NOT SAMPLED



NOTE:
MARCH 2011 WELL SAMPLING EVENT



Project Mgr:	ADS	Project No.	02107147
Approved By:	ADS	Scale:	1" = 250'
Checked By:	ADS	Date:	5/24/11
Drawn By:	DBM	File No.	107147E2-9GW.dwg

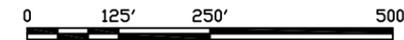
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EXHIBIT 7 - DEEP WELL TCE ISOCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX
MARCH GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

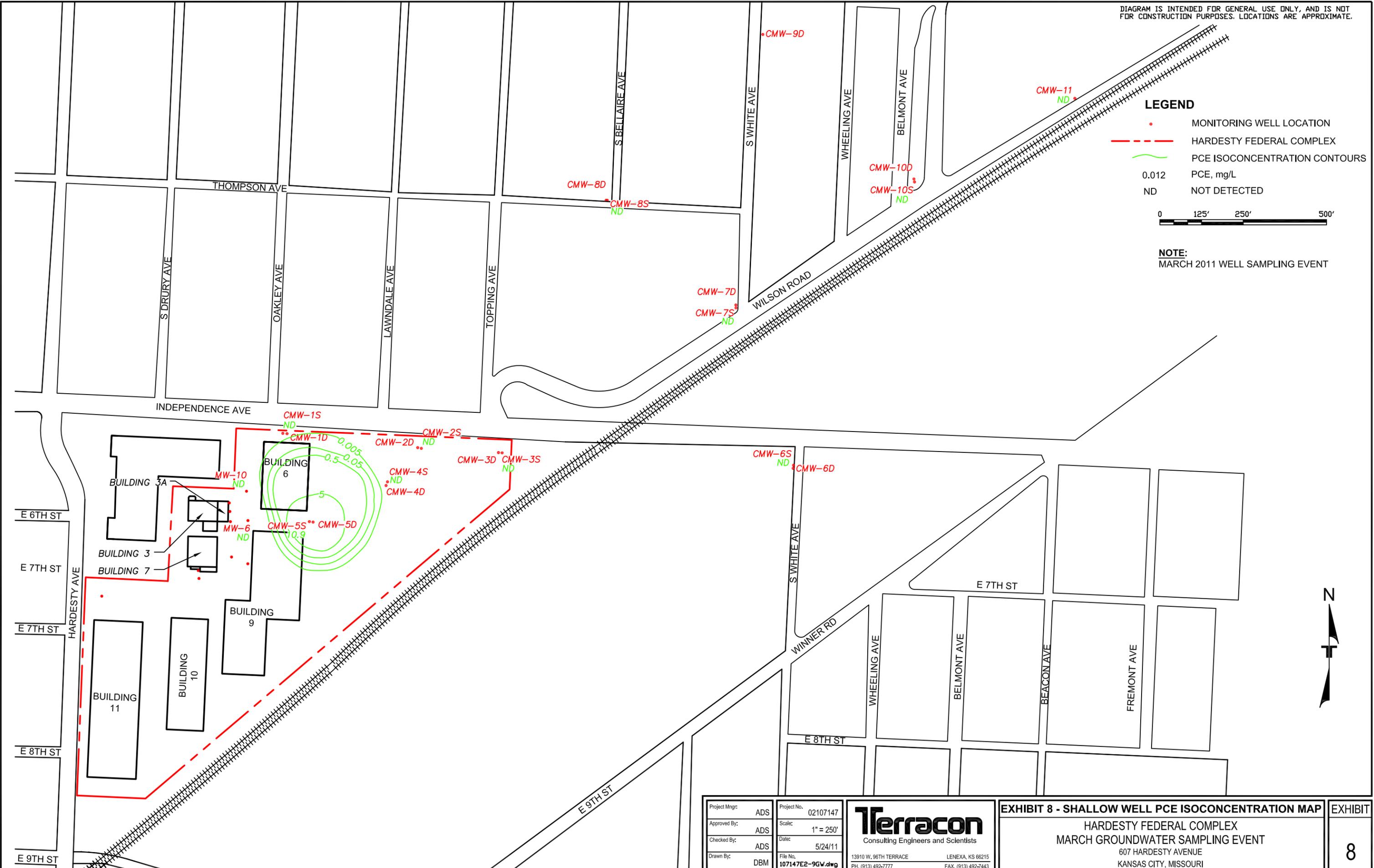
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- PCE ISOCONCENTRATION CONTOURS
- 0.012 PCE, mg/L
- ND NOT DETECTED



NOTE:
MARCH 2011 WELL SAMPLING EVENT

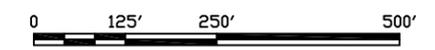


Project Mngr: ADS	Project No. 02107147	<p>Consulting Engineers and Scientists</p> <p>13910 W. 96TH TERRACE LENEXA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443</p>	<p>EXHIBIT 8 - SHALLOW WELL PCE ISOCONCENTRATION MAP</p> <p>HARDESTY FEDERAL COMPLEX MARCH GROUNDWATER SAMPLING EVENT</p> <p>607 HARDESTY AVENUE KANSAS CITY, MISSOURI</p>	<p>EXHIBIT 8</p>
Approved By: ADS	Scale: 1" = 250'			
Checked By: ADS	Date: 5/24/11			
Drawn By: DBM	File No. 107147E2-9GW.dwg			

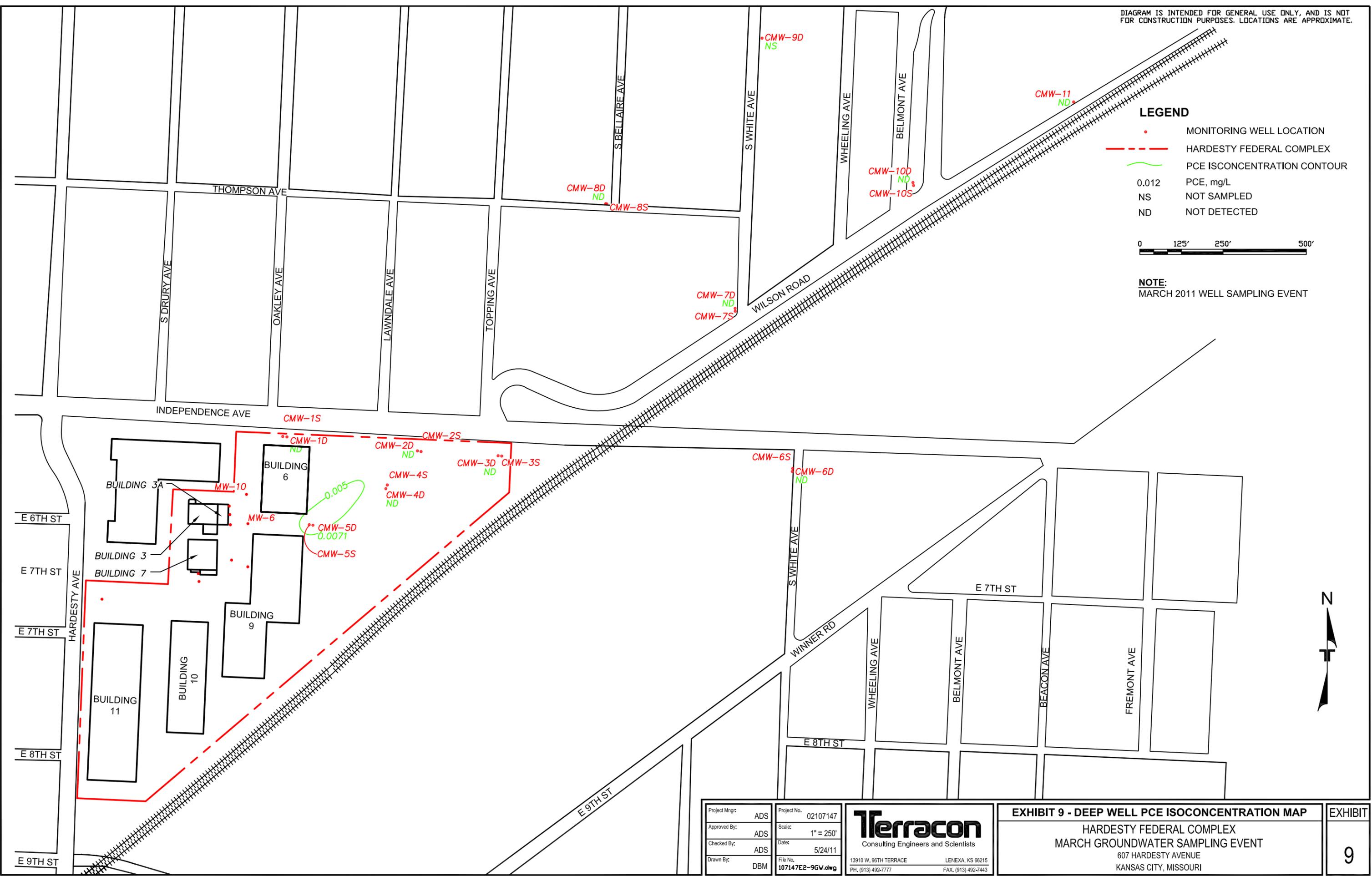
DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- PCE ISOCONCENTRATION CONTOUR
- 0.012 PCE, mg/L
- NS NOT SAMPLED
- ND NOT DETECTED



NOTE:
MARCH 2011 WELL SAMPLING EVENT



Project Mngr:	ADS	Project No.	02107147
Approved By:	ADS	Scale:	1" = 250'
Checked By:	ADS	Date:	5/24/11
Drawn By:	DBM	File No.	107147E2-9GW.dwg

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EXHIBIT 9 - DEEP WELL PCE ISOCONCENTRATION MAP
HARDESTY FEDERAL COMPLEX
MARCH GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

TABLE 4A
 Summary of Groundwater Analytical Data - Regulated and Unregulated Tanks (MRBCA Volatiles and Oxygenates)
 March 2011 Groundwater Sampling Event
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	1,2-Dibromoethane (1,2-EDB)	1,2-Dichloroethane (1,2-EDC)	Benzene	Di-iso-Propyl Ether (DIPPE)	Ethyl-tert-Butyl Ether (ETBE)	Ethylbenzene	Methyl-t-butyl Ether (MTBE)	Naphthalene	tert-Amyl Methyl Ether (TAME)	tert-Butyl Alcohol (TBA)	Toluene	Xylenes (total)	TPH Gasoline Range Organics (GRO)		
			Method	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW-2	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
DUP-3 (MW-2)	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-3	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-4	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-5	3/25/2011		<0.001	<0.001	0.0018	<0.002	<0.002	0.0012	<0.002	0.0038	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-6	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-7	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-8	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-9	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-10	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
CMW-1S	3/24/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
CMW-5S	3/24/2011		<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<25	<0.50	<1.00	486		
MRBCA Default Target Levels (DTLs) - Domestic Use			0.00005	0.005	0.005	0.351	0.0014	0.0700	0.01280	0.00109	0.08280	0.28600	1.0	10.0	18.10		
Residential RBTL: Indoor Inhalation of Vapor Emissions			0.230	0.826	1.0	81.9	99.0	103	181	2.25	20.6	13200	508	11.8	20.80		
Residential RBTL: Dermal Contact*			0.0141	0.353	0.292	34.8	0.500	6.34	23.5	0.0206	18.6	152	8.58	21.3	NA		

Source:

Keystone Laboratories, Inc., 2011.
 Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance, Appendix B, June 2006.

Notes:

- NA = Not available as noted in MRBCA guidance.
- "<" = Not detected above the laboratory analytical detection limit.
- BOLD** = Detected above the laboratory detection limits.
- * = Tier 1 RBTL, Residential Land Use, Soily Type 1.
- Yellow Highlighted** = Detections above MRBCA DTLs.

TABLE 4B
 Summary of Groundwater Analytical Data - Regulated and Unregulated Tanks (Lead, TPH-DRO, TPH-ORO)
 March 2011 Groundwater Sampling Event
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Dissolved lead	Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Total Petroleum Hydrocarbons-Oil Range Organics (TPH-ORO)	
		Method	6010B	8270	8270	
		Units	mg/L	mg/L	mg/L	
MW-2	3/25/2011		<0.010	<0.5	<0.5	
DUP-3 (MW-2)	3/25/2011		<0.010	<0.5	<0.5	
MW-3	3/25/2011		<0.010	<0.4	<0.4	
MW-4	3/25/2011		<0.010	<0.4	<0.4	
MW-5	3/25/2011		<0.010	1.4	<0.4	
MW-6	3/25/2011		<0.010	<0.4	<0.4	
MW-7	3/25/2011		<0.010	<0.4	<0.4	
MW-8	3/25/2011		<0.010	<0.4	<0.4	
MW-9	3/25/2011		<0.010	<0.4	<0.4	
MW-10	3/25/2011		<0.010	<0.4	<0.4	
CMW-1S	3/24/2011		<0.010	<0.5	<0.5	
CMW-5S	3/24/2011		<0.010	<0.4	<0.4	
MRBCA Default Target Levels (DTLs)			0.0015	34.30	31.80	

Source:

Keystone Laboratories, Inc., 2011.

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

"<" = Not detected above the laboratory analytical detection limit.

BOLD = Detected above the laboratory detection limits.

TABLE 4C
 Summary of Groundwater Analytical Data - Regulated and Unregulated Tanks - Polynuclear Aromatic Hydrocarbons (PAH's)
 March 2011 Groundwater Sampling Report
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Anthracene	Acenaphthene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Naphthalene	Pyrene		
			Method	8270	8270	8270	8270	8270	8270	8270	8270	8270	8270	8270	8270	8270
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW-2	3/25/2011		<0.0130	<0.130	<0.0130	<0.0130	<0.0130	<0.0130	<0.0130	<0.0130	<0.0130	<0.0130	<0.0010	<0.013		
DUP-3 (MW-2)	3/25/2011		<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0010	<0.0128		
MW-3	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.0100		
MW-4	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.0100		
MW-5	3/25/2011		0.0105	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0038	<0.0100		
MW-6	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.0100		
MW-7	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.0100		
MW-8	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.0100		
MW-9	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.0100		
MW-10	3/25/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0010	<0.010		
CMW-1S	3/24/2011		<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0128	<0.0010	<0.0128		
CMW-5S	3/24/2011		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.500	<0.0100		
MRBCA Default Target Levels (DTLs) - Domestic Use			0.6960	0.1650	0.0001030	0.0000102	0.0000627	0.000646	0.0103	0.00000421	0.164	0.103	0.00109	0.09610		
Residential RBTL: Indoor Inhalation of Vapor Emissions			2290	1610	110	37.3	7.65	937	312	0.586	14200	3010	2.25	17300		
Residential RBTL: Dermal Contact*			3.17	1.35	0.000174	0.0000102	0.000101	0.00104	0.0174	0.000066	0.300	0.627	0.0206	0.164		

Source:

Keystone Laboratories, Inc., 2011.

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

"<" = Not detected above the laboratory analytical detection limit.

BOLD = Detected above the laboratory detection limits.

* = Tier 1 RBTL, Residential Land Use, Soil Type 1.

Yellow Highlighted = Detections above MRBCA DTLs.

TABLE 5A
Summary of Groundwater Analytical Data - On-site TCE Impact Area
March 2011 Groundwater Sampling Report
Hardesty Federal Complex
Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Vinyl Chloride (VC)	1,1-Dichloroethylene (DCE)	Trichloroethylene (TCE)	1,1,2-Trichloroethane (TCA)	Tetrachloroethylene (PCE)	1,1,2,2-Tetrachloroethane (PCA)
			8260B	8260B	8260B	8260B	8260B	8260B
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CMW - 1S	6/14/2003		ND	ND	0.0456	ND	0.002	0.0165
	10/21/2010		ND	ND	0.242	ND	0.007	ND
	3/24/2011		<0.001	<0.001	0.0138	<0.001	<0.001	0.0036
CMW - 1D	6/14/2003		ND	ND	0.0191	ND	ND	0.0018
	10/21/2010		ND	ND	0.0565	ND	ND	ND
	3/25/2011		<0.001	<0.001	0.0353	<0.001	<0.001	0.0021
CMW - 2S	6/14/2003		0.0023	ND	0.0112	ND	ND	0.001
	10/21/2010		ND	ND	0.0018	ND	ND	ND
	3/24/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CMW - 2D	6/14/2003		ND	ND	0.218	0.0012	0.0027	0.0022
	10/21/2010		ND	ND	0.218	ND	0.0024	ND
	3/24/2011		<0.002	<0.002	0.283	<0.002	<0.002	<0.002
CMW - 3S	6/14/2003		ND	ND	0.0172	ND	ND	ND
	10/21/2010		ND	ND	0.0322	ND	ND	ND
	3/24/2011		<0.001	<0.001	0.0171	<0.001	<0.001	<0.001
CMW - 3D	6/14/2003		0.0017	ND	0.411	ND	ND	ND
	10/21/2010		ND	ND	0.372	ND	ND	ND
	3/24/2011		<0.001	<0.001	0.472	<0.001	<0.001	<0.001
DUP-2 (CMW-3D)	3/25/2011		<0.001	<0.001	0.468	<0.001	<0.001	<0.001
CMW - 4S	6/14/2003		ND	ND	0.212	0.0011	0.0045	0.0204
	10/21/2010		ND	0.001	0.356	ND	0.003	ND
	3/24/2011		<0.001	<0.001	0.196	<0.001	<0.001	0.0075
CMW - 4D	6/14/2003		ND	ND	0.15	ND	0.002	0.001
	10/21/2010		ND	ND	0.0842	ND	0.0011	ND
	3/24/2011		<0.001	<0.001	0.0687	<0.001	<0.001	<0.001
CMW - 5S	6/14/2003		ND	0.0434	12.3	0.198	0.692	25.6
	10/22/2010		<0.2	1.19	294	0.756	7.85	<0.200
	3/24/2011		<0.500	<0.500	250	2.3	10.9	350
CMW - 5D	6/14/2003		ND	ND	2.18	0.0107	0.0526	0.0504
	10/22/2010		ND	0.0027	0.603	ND	0.0095	ND
	3/24/2011		<0.001	<0.001	0.57	<0.001	0.0071	<0.001
MW - 6	6/14/2003		ND	ND	ND	ND	ND	ND
	10/25/2010		ND	ND	0.0037	ND	ND	ND
	3/25/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP - 2 (MW - 6)	10/25/2010		ND	ND	ND	ND	ND	
MW - 10	6/14/2003		ND	ND	0.0037	ND	ND	ND
	10/25/2010		ND	ND	0.0016	ND	ND	ND
	3/25/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP - 1 (MW - 10)	10/25/2010		ND	ND	0.0013	ND	ND	
MRBCA Default Target Levels (DTLs) - Domestic Use			0.002	0.007	0.005	0.005	0.005	0.00689
Residential RBTL: Indoor Inhalation of Vapor Emissions			0.111*	5.83	1.6	1.98	0.338	1.54
Residential RBTL: Dermal Contact			0.0206*	13.4	0.722	0.305	0.00506	0.0645
Non-Residential RBTL: Indoor Inhalation of Vapor Emissions			0.582**	43.3	8.41	10.4	1.77	8.06
Non-Residential RBTL: Dermal Contact			0.0753**	74.4	2.64	1.11	0.0185	0.236
Site Specific Target Levels (SSTLs) ¹			Not Provided	228	49.3	Not Provided	Not Provided	Not Provided

Source:

Keystone Laboratories, Inc., 2010-2011.
Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

ND = Not detected above the laboratory analytical detection limit. See individual lab reports for chemical specific detection limit (<0.001).

BOLD = Detected above the laboratory detection limits.

Yellow Highlighted = Detections above MRBCA DTLs.

Green Highlighted = Detections above Residential RBTL: Indoor Inhalation of Vapor Emissions.

¹ = SSTLs obtained from Off-Site Groundwater Investigation Report dated July 12, 2004 prepared by Burns & McDonnell Engineering Company, Inc.; protective for indoor residents.

* = Value for residential scenario's associated with vinyl chloride.

** = Value for occupational scenario's associated with vinyl chloride.

TABLE 5B
Summary of Groundwater Analytical Data - Off-site TCE Impact Area
March 2011 Groundwater Sampling Report
Hardesty Federal Complex
Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Vinyl Chloride (VC)	1,1-Dichloroethylene (DCE)	Trichloroethylene (TCE)	1,1,2-Trichloroethane (TCA)	Tetrachloroethylene (PCE)	1,1,2,2-Tetrachloroethane (PCA)		
			Method	8260B	8260B	8260B	8260B	8260B	8260B	8260B
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CMW - 6S	10/21/2010		ND	ND	0.0043	ND	ND	ND		
	3/24/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
CMW - 6D	10/21/2010		ND	ND	ND	ND	ND	ND		
	3/24/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
CMW - 7S	10/21/2010		ND	ND	ND	ND	ND	ND		
	3/24/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
CMW - 7D	10/21/2010		ND	ND	0.0032	ND	ND	ND		
	3/24/2011		<0.001	<0.001	0.0054	<0.001	<0.001	<0.001		
CMW - 8S	10/20/2010		ND	ND	ND	ND	ND	ND		
	3/22/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
DUP-1 (CMW-8S)	3/25/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
CMW - 8D	10/20/2010		ND	ND	0.274	ND	ND	ND		
	3/22/2011		<0.001	<0.001	0.198	<0.001	<0.001	<0.001		
CMW-9D	---		Limited Groundwater, unable to sample							
CMW - 10S	10/19/2010		ND	ND	0.0067	ND	ND	ND		
	3/25/2011		<0.001	<0.001	0.0076	<0.001	<0.001	<0.001		
CMW - 10D	10/19/2010		ND	ND	0.033	ND	ND	ND		
	3/22/2011		<0.001	<0.001	0.0355	<0.001	<0.001	0.0014		
CMW - 11	10/19/2010		ND	ND	ND	ND	ND	ND		
	3/24/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
MRBCA Default Target Levels (DTLs) - Domestic Use			0.002	0.007	0.005	0.005	0.005	0.000689		
Residential RBTL: Indoor Inhalation of Vapor Emissions			0.111*	5.83	1.6	1.98	0.338	1.54		
Residential RBTL: Dermal Contact			0.0206*	13.4	0.722	0.305	0.00506	0.0645		
Non-Residential RBTL: Indoor Inhalation of Vapor Emissions			0.582**	43.3	8.41	10.4	1.77	8.06		
Non-Residential RBTL: Dermal Contact			0.0753**	74.4	2.64	1.11	0.0185	0.236		
Site Specific Target Levels ¹			Not Provided	228	49.3	Not Provided	Not Provided	Not Provided		

Source:

Keystone Laboratories, Inc., 2010-2011.

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

ND = Not detected above the laboratory analytical detection limit. See individual lab reports for chemical specific detection limit (<0.001).

BOLD = Detected above the laboratory detection limits.

Yellow Highlighted = Detections above MRBCA DTLs.

¹ = SSTLs obtained from Off-Site Groundwater Investigation Report dated July 12, 2004 prepared by Burns & McDonnell Engineering Company, Inc.; protective for indoor resident

* = Value for residential scenario's associated with vinyl chloride.

** = Value for occupational scenario's associated with vinyl chloride.

APPENDIX A
Previous Investigations

A.11 – July 2011 Groundwater Sampling Report (Terracon)

July 2011 Groundwater Sampling Report

Hardesty Federal Complex
607 Hardesty Avenue
Kansas City, Jackson County, Missouri

September 13, 2011

Terracon Project No. 02107147

Prepared for:

General Services Administration
Kansas City, Missouri

Prepared by:

Terracon Consultants, Inc.
Lenexa, Kansas

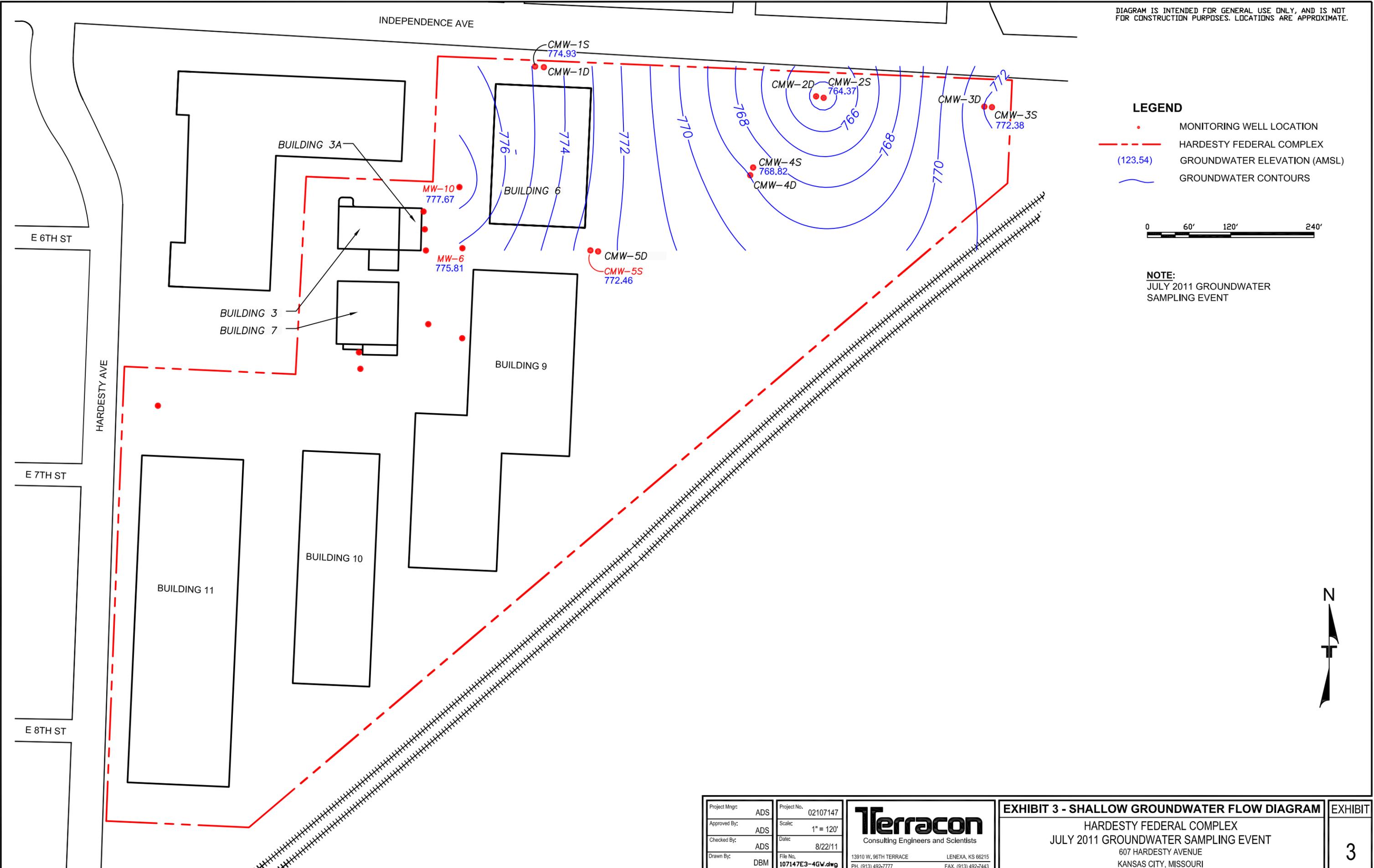
Offices Nationwide
Employee-Owned

Established in 1965
terracon.com

Terracon

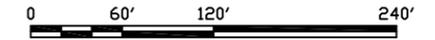
Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.



LEGEND

- MONITORING WELL LOCATION
- HARDESTY FEDERAL COMPLEX
- (123.54) GROUNDWATER ELEVATION (AMSL)
- ~ GROUNDWATER CONTOURS

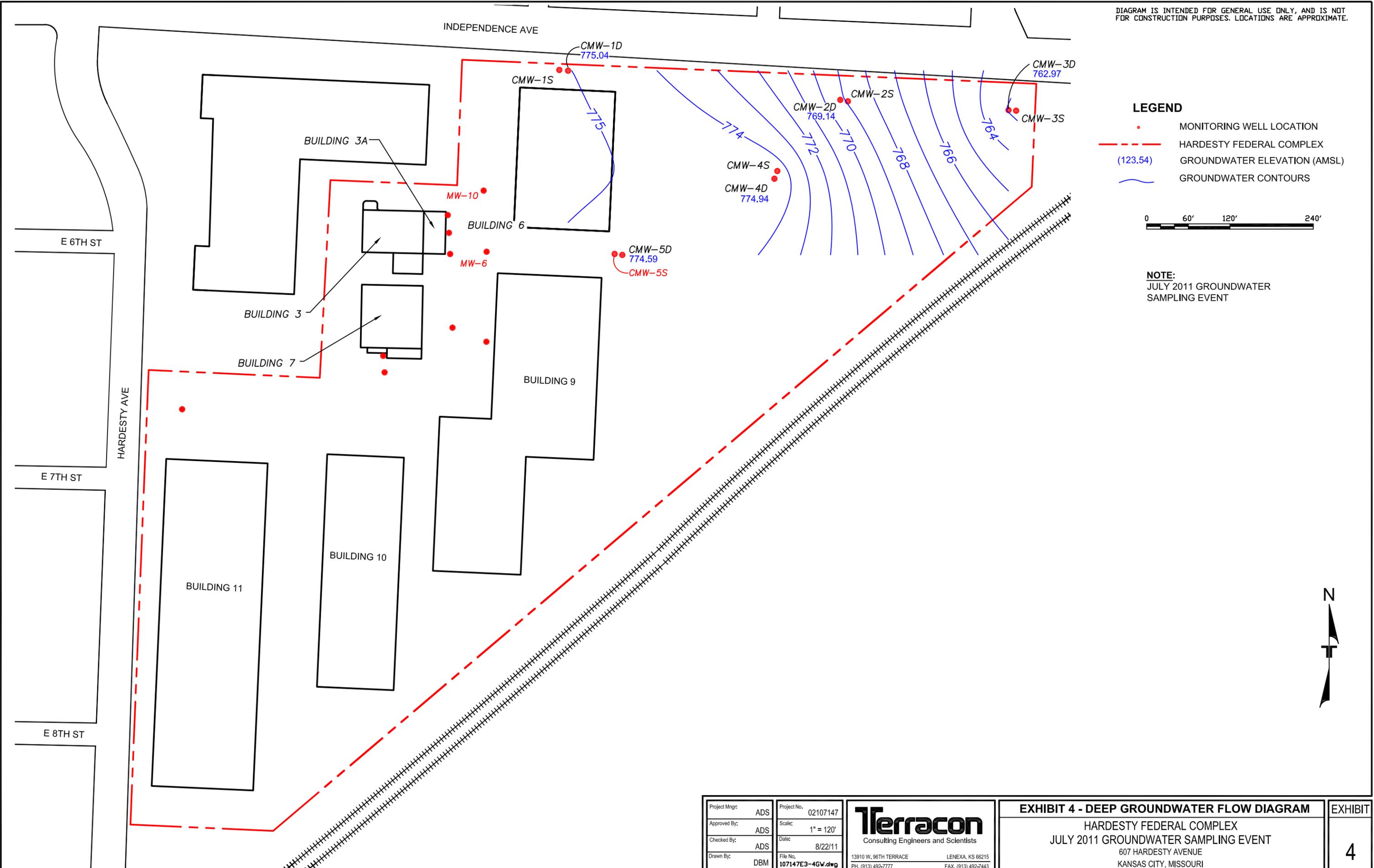


NOTE:
JULY 2011 GROUNDWATER SAMPLING EVENT

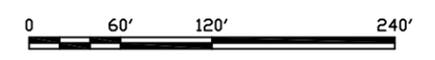


Project Mng'r: ADS	Project No. 02107147	Terracon Consulting Engineers and Scientists 13910 W. 96TH TERRACE LENEKA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443	EXHIBIT 3 - SHALLOW GROUNDWATER FLOW DIAGRAM	EXHIBIT 3
Approved By: ADS	Scale: 1" = 120'			
Checked By: ADS	Date: 8/22/11			
Drawn By: DBM	File No. 107147E3-4GW.dwg			
HARDESTY FEDERAL COMPLEX JULY 2011 GROUNDWATER SAMPLING EVENT 607 HARDESTY AVENUE KANSAS CITY, MISSOURI				

DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.



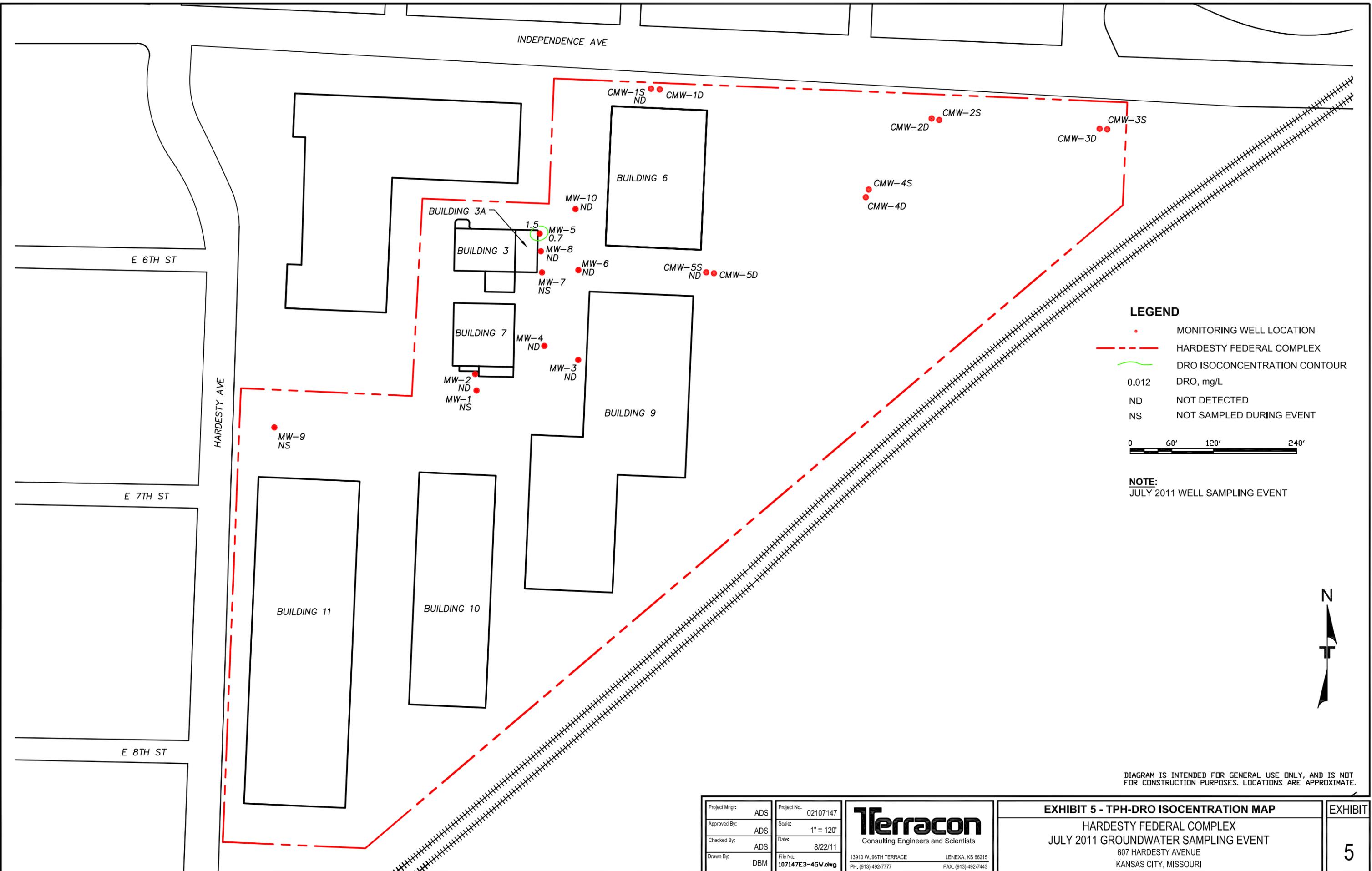
- LEGEND**
- MONITORING WELL LOCATION
 - - - HARDESTY FEDERAL COMPLEX
 - (123.54) GROUNDWATER ELEVATION (AMSL)
 - ~ GROUNDWATER CONTOURS



NOTE:
JULY 2011 GROUNDWATER SAMPLING EVENT



Project Mng'r: ADS	Project No. 02107147	<p>Consulting Engineers and Scientists</p> <p>13910 W. 96TH TERRACE LENEKA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443</p>	<p>EXHIBIT 4 - DEEP GROUNDWATER FLOW DIAGRAM</p> <p>HARDESTY FEDERAL COMPLEX JULY 2011 GROUNDWATER SAMPLING EVENT 607 HARDESTY AVENUE KANSAS CITY, MISSOURI</p>	<p>EXHIBIT 4</p>
Approved By: ADS	Scale: 1" = 120'			
Checked By: ADS	Date: 8/22/11			
Drawn By: DBM	File No. 107147E3-4GW.dwg			



LEGEND

- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- DRO ISOCONCENTRATION CONTOUR
- 0.012 DRO, mg/L
- ND NOT DETECTED
- NS NOT SAMPLED DURING EVENT

0 60' 120' 240'

NOTE:
JULY 2011 WELL SAMPLING EVENT



DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

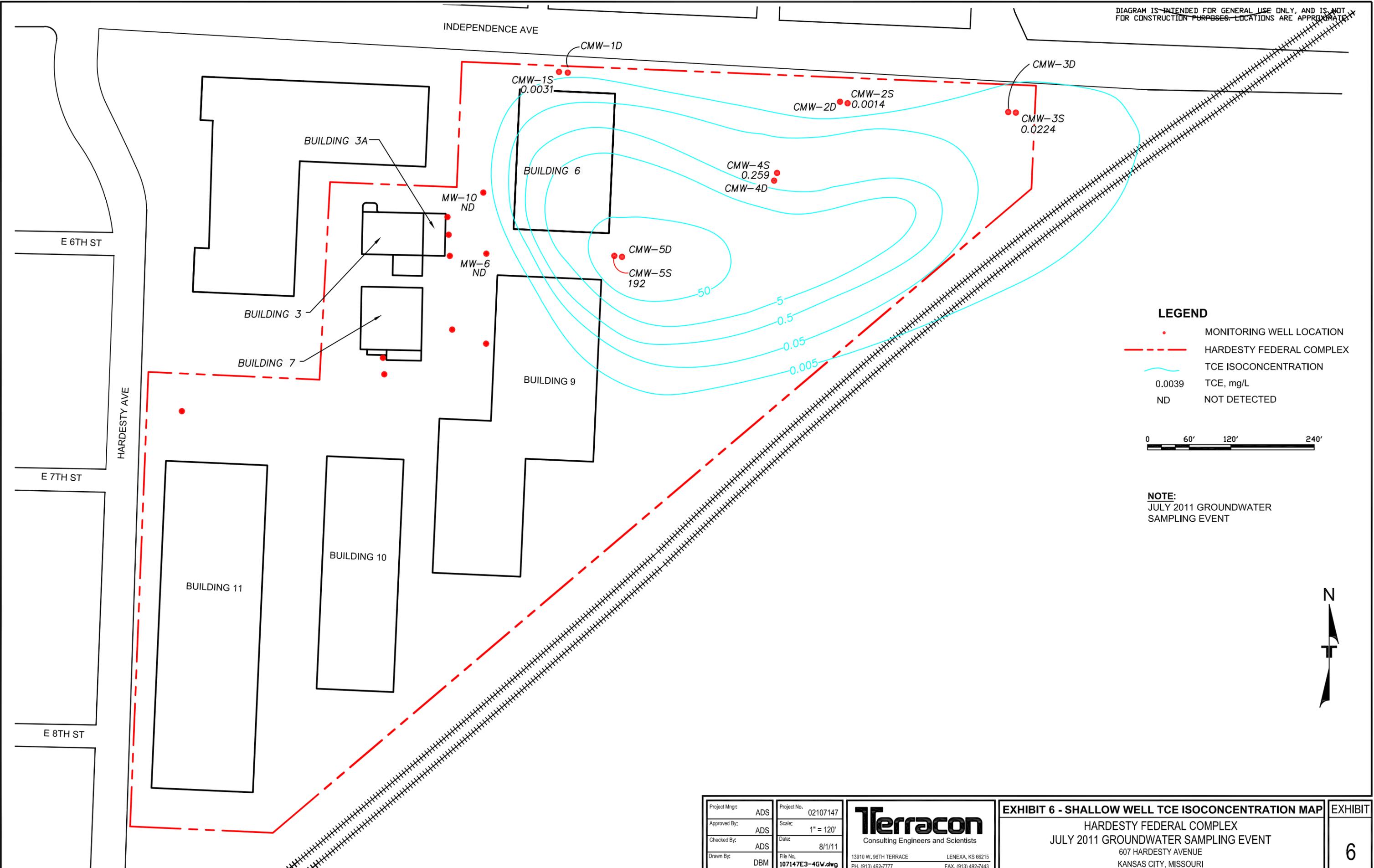
Project Mngr:	ADS	Project No.	02107147
Approved By:	ADS	Scale:	1" = 120'
Checked By:	ADS	Date:	8/22/11
Drawn By:	DBM	File No.	107147E3-4GW.dwg

Terracon
Consulting Engineers and Scientists
13910 W. 96TH TERRACE LENEXA, KS 66215
PH. (913) 492-7777 FAX. (913) 492-7443

EXHIBIT 5 - TPH-DRO ISOCENTRATION MAP
HARDESTY FEDERAL COMPLEX
JULY 2011 GROUNDWATER SAMPLING EVENT
607 HARDESTY AVENUE
KANSAS CITY, MISSOURI

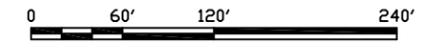
EXHIBIT
5

DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.



LEGEND

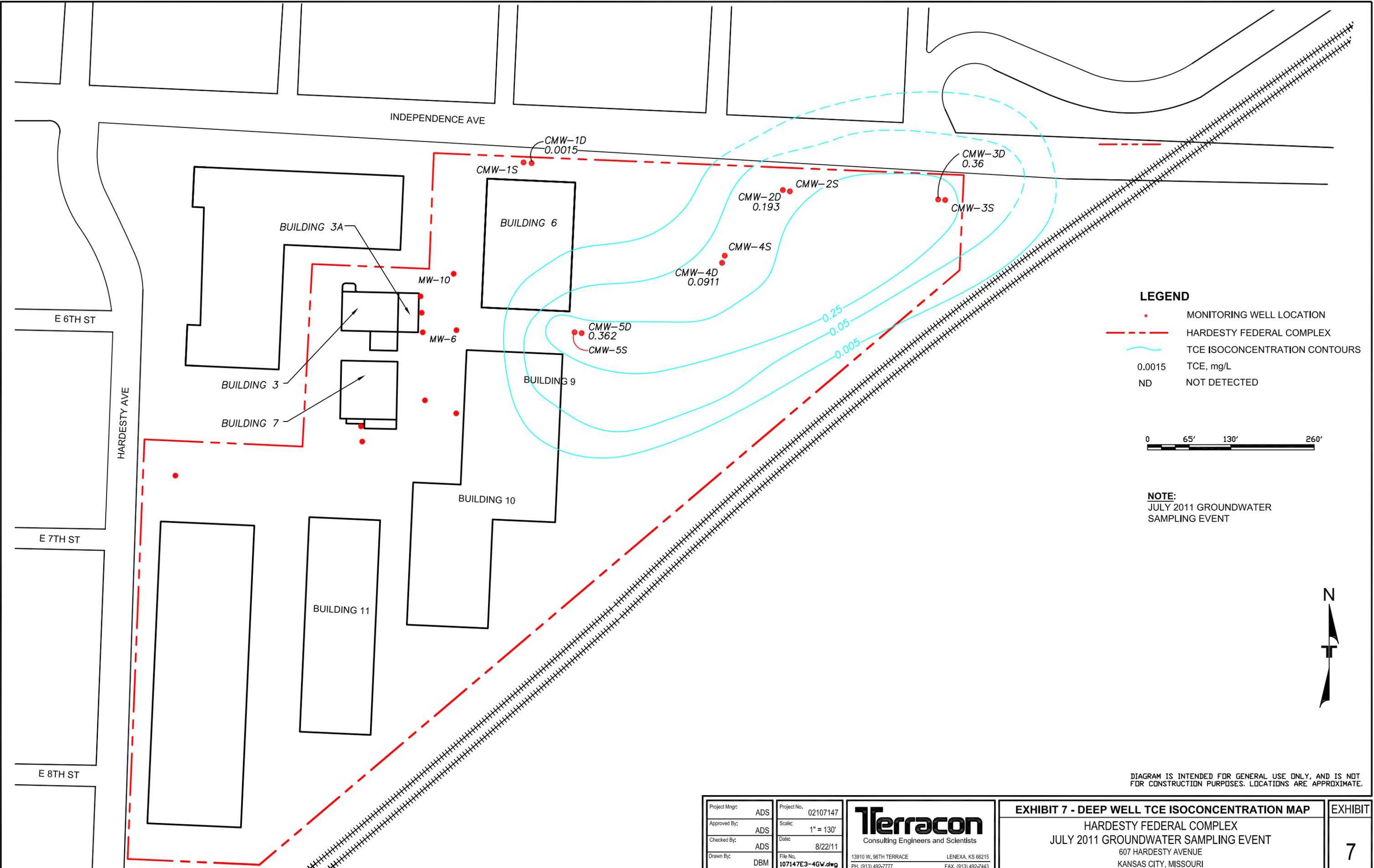
- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- ~ TCE ISOCONCENTRATION
- 0.0039 TCE, mg/L
- ND NOT DETECTED



NOTE:
JULY 2011 GROUNDWATER SAMPLING EVENT

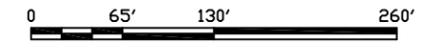


Project Mng'r: ADS	Project No. 02107147	 Consulting Engineers and Scientists 13910 W. 96TH TERRACE LENEKA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443	EXHIBIT 6 - SHALLOW WELL TCE ISOCONCENTRATION MAP HARDESTY FEDERAL COMPLEX JULY 2011 GROUNDWATER SAMPLING EVENT 607 HARDESTY AVENUE KANSAS CITY, MISSOURI	EXHIBIT <div style="text-align: center; font-size: 2em; font-weight: bold;">6</div>
Approved By: ADS	Scale: 1" = 120'			
Checked By: ADS	Date: 8/1/11			
Drawn By: DBM	File No. 107147E3-4GW.dwg			



LEGEND

- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- ~ TCE ISOCONCENTRATION CONTOURS
- 0.0015 TCE, mg/L
- ND NOT DETECTED



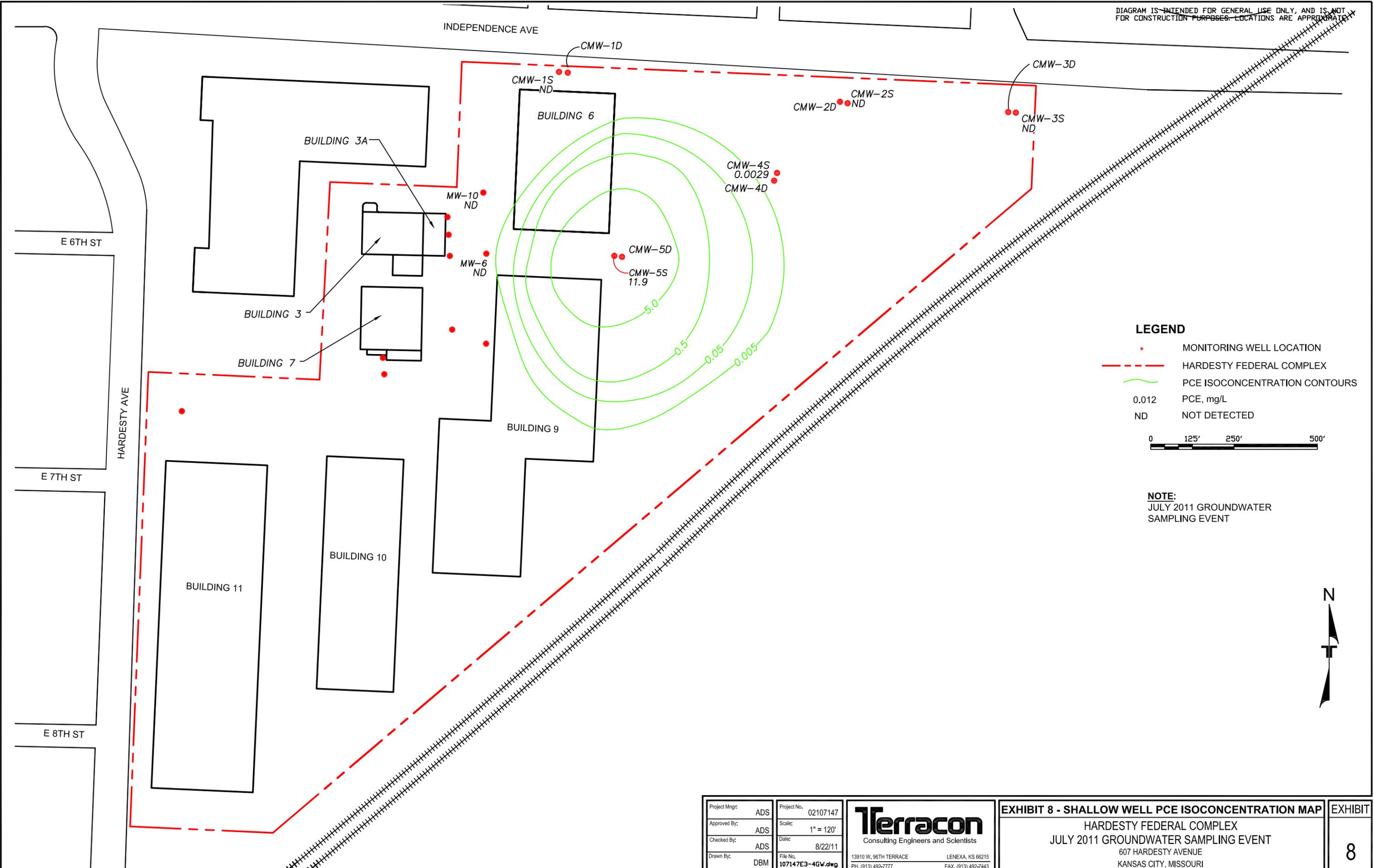
NOTE:
 JULY 2011 GROUNDWATER SAMPLING EVENT



DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

Project Mng'r: ADS	Project No. 02107147	<p>Consulting Engineers and Scientists</p> <p>13910 W. 96TH TERRACE LENEXA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443</p>	<p>EXHIBIT 7 - DEEP WELL TCE ISOCONCENTRATION MAP</p> <p>HARDESTY FEDERAL COMPLEX JULY 2011 GROUNDWATER SAMPLING EVENT 607 HARDESTY AVENUE KANSAS CITY, MISSOURI</p>	<p>EXHIBIT 7</p>
Approved By: ADS	Scale: 1" = 130'			
Checked By: ADS	Date: 8/22/11			
Drawn By: DBM	File No. 107147E3-4GW.dwg			

DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.



LEGEND

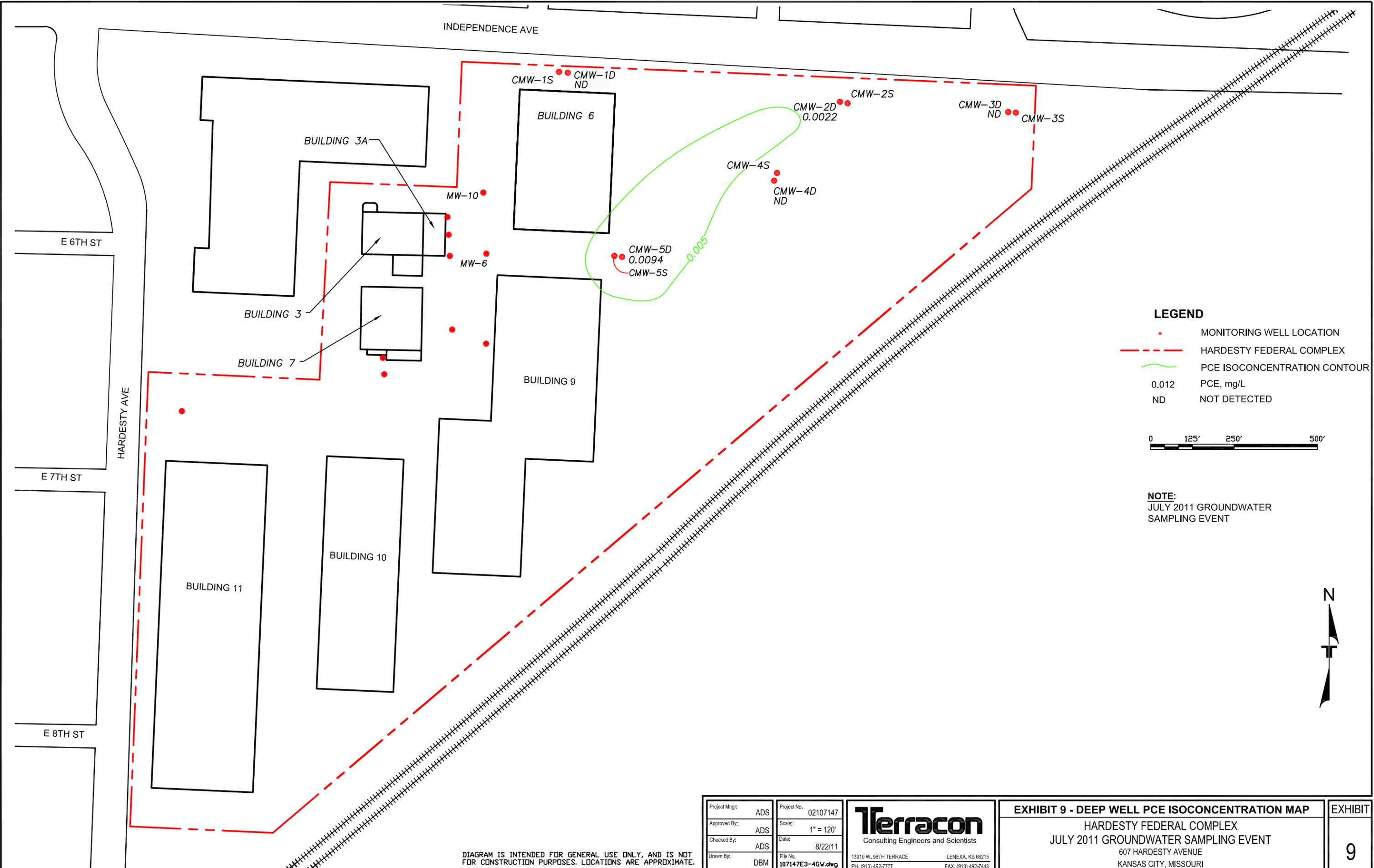
- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- ~ PCE ISOCONCENTRATION CONTOURS
- 0.012 PCE, mg/L
- ND NOT DETECTED

0 125' 250' 500'

NOTE:
JULY 2011 GROUNDWATER SAMPLING EVENT

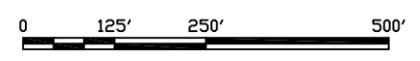


Project Mng'r: ADS	Project No. 02107147	 Consulting Engineers and Scientists 13910 W. 96TH TERRACE LENEKA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443	EXHIBIT 8 - SHALLOW WELL PCE ISOCONCENTRATION MAP HARDESTY FEDERAL COMPLEX JULY 2011 GROUNDWATER SAMPLING EVENT 607 HARDESTY AVENUE KANSAS CITY, MISSOURI	EXHIBIT 8
Approved By: ADS	Scale: 1" = 120'			
Checked By: ADS	Date: 8/22/11			
Drawn By: DBM	File No. 107147E3-4GW.dwg			



LEGEND

- MONITORING WELL LOCATION
- - - HARDESTY FEDERAL COMPLEX
- PCE ISOCONCENTRATION CONTOUR
- 0.012 PCE, mg/L
- ND NOT DETECTED



NOTE:
 JULY 2011 GROUNDWATER
 SAMPLING EVENT



DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

Project Mngr: ADS	Project No. 02107147	<p>Consulting Engineers and Scientists</p> <p>13910 W. 96TH TERRACE LENEKA, KS 66215 PH. (913) 492-7777 FAX. (913) 492-7443</p>	<p>EXHIBIT 9 - DEEP WELL PCE ISOCONCENTRATION MAP</p> <p>HARDESTY FEDERAL COMPLEX JULY 2011 GROUNDWATER SAMPLING EVENT 607 HARDESTY AVENUE KANSAS CITY, MISSOURI</p>	<p>EXHIBIT 9</p>
Approved By: ADS	Scale: 1" = 120'			
Checked By: ADS	Date: 8/22/11			
Drawn By: DBM	File No. 107147E3-4GW.dwg			

TABLE 4A
 Summary of Groundwater Analytical Data - Regulated and Unregulated Tanks (MRBCA Petroleum Volatiles and Oxygenates)
 July 2011 Groundwater Sampling Event
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	1,2-Dibromoethane (1,2-EDB)	1,2-Dichloroethane (1,2-EDC)	Benzene	Di-iso-Propyl Ether (DIPE)	Ethyl-tert-Butyl Ether (ETBE)	Ethylbenzene	Methyl-tert-butyl Ether (MTBE)	Naphthalene	tert-Amyl Methyl Ether (TAME)	tert-Butyl Alcohol (TBA)	Toluene	Xylenes (total)	TPH Gasoline Range Organics (GRO)		
			Method	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B	8260B
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW-2	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/13/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-3	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/13/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-4	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/14/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-5	3/25/2011		<0.001	<0.001	0.0018	<0.002	<0.002	0.0012	<0.002	0.0038	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/14/2011		<0.001	<0.001	0.0031	<0.002	<0.002	0.0018	<0.002	0.0015	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-6	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/14/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
DUP-3 (MW-6)	7/14/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-7	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/14/2011		Well Not Sampled														
MW-8	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/13/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
MW-9	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/14/2011		Well Not Sampled														
MW-10	3/25/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/13/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
CMW-1S	3/24/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
	7/13/2011		<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	<0.1		
CMW-5S	3/24/2011		<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<25	<0.50	<1.00	486		
	7/14/2011		<0.001	0.0173	<0.001	<0.002	<0.002	<0.001	<0.002	<0.001	<0.002	<0.05	<0.001	<0.002	433		
MRBCA Default Target Levels (DTLs) - Domestic Use			0.00005	0.005	0.005	0.351	0.0014	0.0700	0.01280	0.00109	0.08280	0.28600	1.0	10.0	18.10		
Residential RBTL: Indoor Inhalation of Vapor Emissions*			0.230	0.826	1.0	81.9	99.0	103	181	2.25	20.6	13200	508	11.8	20.80		
Residential RBTL: Dermal Contact*			0.0141	0.353	0.292	34.8	0.500	6.34	23.5	0.0206	18.6	152	8.58	21.3	NA		
Non-Residential RBTL: Indoor Inhalation of Vapor Emissions*			1.21	4.52	5.25	659	796	832	946	11.8	166	106000	4080	94.9	167		
Non-Residential RBTL: Dermal Contact*			0.0515	1.29	1.06	193	2.77	35.1	85.8	0.0751	103	844	47.6	118	NA		

Source:

Keystone Laboratories, Inc., 2011.
 Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance, Appendix B, June 2006.

Notes:

NA = Not available as noted in MRBCA guidance.
 "<" = Not detected above the laboratory analytical detection limit.
BOLD = Detected above the laboratory detection limits.
 * = Tier 1 RBTL, Residential Land Use, Soil Type 1.
 Yellow Highlighted = Detections above MRBCA DTLs.

TABLE 4B
 Summary of Groundwater Analytical Data - Regulated and Unregulated Tanks (Lead, TPH-DRO, TPH-ORO)
 July 2011 Groundwater Sampling Event
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Dissolved lead	Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO)	Total Petroleum Hydrocarbons-Oil Range Organics (TPH-ORO)
		Method	6010B	8270	8270
		Units	mg/L	mg/L	mg/L
MW-2	3/25/2011		<0.010	<0.5	<0.5
	7/13/2011		NA	<0.4	<0.4
MW-3	3/25/2011		<0.010	<0.4	<0.4
	7/13/2011		NA	<0.4	<0.4
MW-4	3/25/2011		<0.010	<0.4	<0.4
	7/14/2011		NA	<0.4	<0.4
MW-5	3/25/2011		<0.010	1.4	<0.4
	7/14/2011		NA	0.7	<0.4
MW-6	3/25/2011		<0.010	<0.4	<0.4
	7/14/2011		NA	<0.4	<0.4
DUP-3 (MW-6)	7/14/2011		NA	<0.4	<0.4
MW-7	3/25/2011		<0.010	<0.4	<0.4
	7/14/2011		Well Not Sampled		
MW-8	3/25/2011		<0.010	<0.4	<0.4
	7/13/2011		NA	<0.4	<0.4
MW-9	3/25/2011		<0.010	<0.4	<0.4
	7/14/2011		Well Not Sampled		
MW-10	3/25/2011		<0.010	<0.4	<0.4
	7/13/2011		NA	<0.4	<0.4
CMW-1S	3/24/2011		<0.010	<0.5	<0.5
	7/13/2011		NA	<0.4	<0.4
CMW-5S	3/24/2011		<0.010	<0.4	<0.4
	7/14/2011		NA	<0.4	<0.4
MRBCA Default Target Levels (DTLs)			0.0015	34.30	31.80

Source:

Keystone Laboratories, Inc., 2011.

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

"<" = Not detected above the laboratory analytical detection limit.

BOLD = Detected above the laboratory detection limits.

NA = Not analyzed

TABLE 4C
Summary of Groundwater Analytical Data - On-site TCE Impact Area
July 2011 Groundwater Sampling Report
Hardesty Federal Complex
Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Vinyl Chloride (VC)	1,1-Dichloroethylene (DCE)	Trichloroethylene (TCE)	1,1,2-Trichloroethane (TCA)	Tetrachloroethylene (PCE)	1,1,2,2-Tetrachloroethane (PCA)	
		Method	8260B	8260B	8260B	8260B	8260B	8260B	8260B
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CMW - 1S	6/14/2003		ND	ND	0.0456	ND	0.002	0.0165	
	10/21/2010		ND	ND	0.242	ND	0.007	ND	
	3/24/2011		<0.001	<0.001	0.0138	<0.001	<0.001	0.0036	
	7/13/2011		<0.001	<0.001	0.0031	<0.001	<0.001	<0.001	
CMW - 1D	6/14/2003		ND	ND	0.0191	ND	ND	0.0018	
	10/21/2010		ND	ND	0.0565	ND	ND	ND	
	3/25/2011		<0.001	<0.001	0.0353	<0.001	<0.001	0.0021	
	7/13/2011		<0.001	<0.001	0.0015	<0.001	<0.001	<0.001	
CMW - 2S	6/14/2003		0.0023	ND	0.0112	ND	ND	0.001	
	10/21/2010		ND	ND	0.0018	ND	ND	ND	
	3/24/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	7/13/2011		<0.001	<0.001	0.0014	<0.001	<0.001	<0.001	
CMW - 2D	6/14/2003		ND	ND	0.218	0.0012	0.0027	0.0022	
	10/21/2010		ND	ND	0.218	ND	0.0024	ND	
	3/24/2011		<0.002	<0.002	0.283	<0.002	<0.002	<0.002	
	7/13/2011		<0.001	<0.001	0.193	<0.001	0.0022	<0.001	
DUP-1 (CMW-2D)	7/13/2011		<0.001	<0.001	0.219	<0.001	0.0021	<0.001	
CMW - 3S	6/14/2003		ND	ND	0.0172	ND	ND	ND	
	10/21/2010		ND	ND	0.0322	ND	ND	ND	
	3/24/2011		<0.001	<0.001	0.0171	<0.001	<0.001	<0.001	
	7/13/2011		<0.001	<0.001	0.0224	<0.001	<0.001	<0.001	
DUP - 2 (CMW - 3S)	7/13/2011		<0.001	<0.001	0.0225	<0.001	<0.001	<0.001	
CMW - 3D	6/14/2003		0.0017	ND	0.411	ND	ND	ND	
	10/21/2010		ND	ND	0.372	ND	ND	ND	
	3/24/2011		<0.001	<0.001	0.472	<0.001	<0.001	<0.001	
	7/13/2011		<0.001	<0.001	0.36	<0.001	<0.001	<0.001	
CMW - 4S	6/14/2003		ND	ND	0.212	0.0011	0.0045	0.0204	
	10/21/2010		ND	0.001	0.356	ND	0.003	ND	
	3/24/2011		<0.001	<0.001	0.196	<0.001	<0.001	0.0075	
	7/14/2011		<0.001	<0.001	0.259	0.001	0.0029	0.0076	
CMW - 4D	6/14/2003		ND	ND	0.15	ND	0.002	0.001	
	10/21/2010		ND	ND	0.0842	ND	0.0011	ND	
	3/24/2011		<0.001	<0.001	0.0687	<0.001	<0.001	<0.001	
	7/14/2011		<0.001	<0.001	0.0911	<0.001	<0.001	<0.001	

TABLE 4C
 Summary of Groundwater Analytical Data - On-site TCE Impact Area
 July 2011 Groundwater Sampling Report
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Collection Date	Analyte	Vinyl Chloride (VC)	1,1-Dichloroethylene (DCE)	Trichloroethylene (TCE)	1,1,2-Trichloroethane (TCA)	Tetrachloroethylene (PCE)	1,1,2,2-Tetrachloroethane (PCA)	
		Method	8260B	8260B	8260B	8260B	8260B	8260B	8260B
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
CMW - 5S	6/14/2003		ND	0.0434	12.3	0.198	0.692	25.6	
	10/22/2010		<0.2	1.19	294	0.756	7.85	<0.200	
	3/24/2011		<0.500	<0.500	250	2.3	10.9	350	
	7/14/2011		0.002	0.0133	192	1.66	11.9	113	
CMW - 5D	6/14/2003		ND	ND	2.18	0.0107	0.0526	0.0504	
	10/22/2010		ND	0.0027	0.603	ND	0.0095	ND	
	3/24/2011		<0.001	<0.001	0.57	<0.001	0.0071	<0.001	
	7/14/2011		<0.001	<0.001	0.362	0.0032	0.0094	<0.001	
MW - 6	6/14/2003		ND	ND	ND	ND	ND	ND	
	10/25/2010		ND	ND	0.0037	ND	ND	ND	
	3/25/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	7/14/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
MW - 10	6/14/2003		ND	ND	0.0037	ND	ND	ND	
	10/25/2010		ND	ND	0.0016	ND	ND	ND	
	3/25/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	7/14/2011		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
MRBCA Default Target Levels (DTLs) - Domestic Use			0.002	0.007	0.005	0.005	0.005	0.000689	
Residential RBTL: Indoor Inhalation of Vapor			0.111*	5.83	1.6	1.98	0.338	1.54	
Residential RBTL: Dermal Contact			0.0206*	13.4	0.722	0.305	0.00506	0.0645	
Non-Residential RBTL: Indoor Inhalation of Vapor			0.582**	43.3	8.41	10.4	1.77	8.06	
Non-Residential RBTL: Dermal Contact			0.0753**	74.4	2.64	1.11	0.0185	0.236	
Site Specific Target Levels (SSTLs) ¹			Not Provided	228	49.3	Not Provided	Not Provided	Not Provided	

Source:

Keystone Laboratories, Inc., 2010-2011.

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

ND = Not detected above the laboratory analytical detection limit. See individual lab reports for chemical specific detection limit (<0.001).

BOLD = Detected above the laboratory detection limits.

Yellow Highlighted = Detections above MRBCA DTLs.

Green Highlighted = Detections above Residential RBTL: Indoor Inhalation of Vapor Emissions.

¹ = SSTLs obtained from Off-Site Groundwater Investigation Report dated July 12, 2004 prepared by Burns & McDonnell Engineering Company, Inc.; protective for indoor residents.

* = Value for residential scenario's associated with vinyl chloride.

** = Value for occupational scenario's associated with vinyl chloride.

TABLE 5
 Summary of Groundwater Analytical Data - Geochemical Parameters
 July 2011 Groundwater Sampling Event
 Hardesty Federal Complex
 Terracon Project No. 02107147

Sample ID	Location	Collection Date	Analyte	Dissolved Nitrates	Sulfates	Total Dissolved Solids (TDS)	Maganese	Methane	Dissolved Oxygen	Ferrous Iron
			Method	9056	9056	2540C	SW6010B	RDK175	Measurement	Measurement
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW-4	Area of Former USTs	7/14/2011		<0.1	147	556	0.338	<0.002	1.51	0.00
MW-5		7/14/2011		<0.1	<0.1	668	15.1	2.51	0.32	3.30
MW-6		7/14/2011		<0.1	<0.1	676	14.9	0.108	0.58	3.30
CMW-4S	TCE Wells	7/14/2011		10	34.8	324	0.063	0.008	1.28	0.07
CMW-4D		7/14/2011		3.1	87.7	423	0.02	<0.002	1.08	0.00
CMW-5S		7/14/2011		2.3	93.2	515	0.144	<0.001	5.56	0.00
CMW-5D		7/14/2011		2.5	93.2	422	0.035	<0.002	0.38	0.01

Source:

Keystone Laboratories, Inc., 2011.

Missouri Department of Natural Resources (MDNR) Missouri Risk-Based Technical Guidance Corrective Action (MRBCA), Appendix B, June 2006.

Notes:

"<" = Not detected above the laboratory analytical detection limit.

APPENDIX A
Previous Investigations

A.12 – Clean-up of Firing Range Report (Terracon)

Revised Cleanup of Firing Range Report

Hardesty Federal Complex
Building 9
607 Hardesty Avenue
Kansas City, Jackson County, Missouri

May 1, 2012
Terracon Project No. 02117087

Prepared for:
General Services Administration
Kansas City, Missouri

Prepared by:
Terracon Consultants, Inc.
Lenexa, Kansas

Offices Nationwide
Employee-Owned

Established in 1965
terracon.com

Terracon

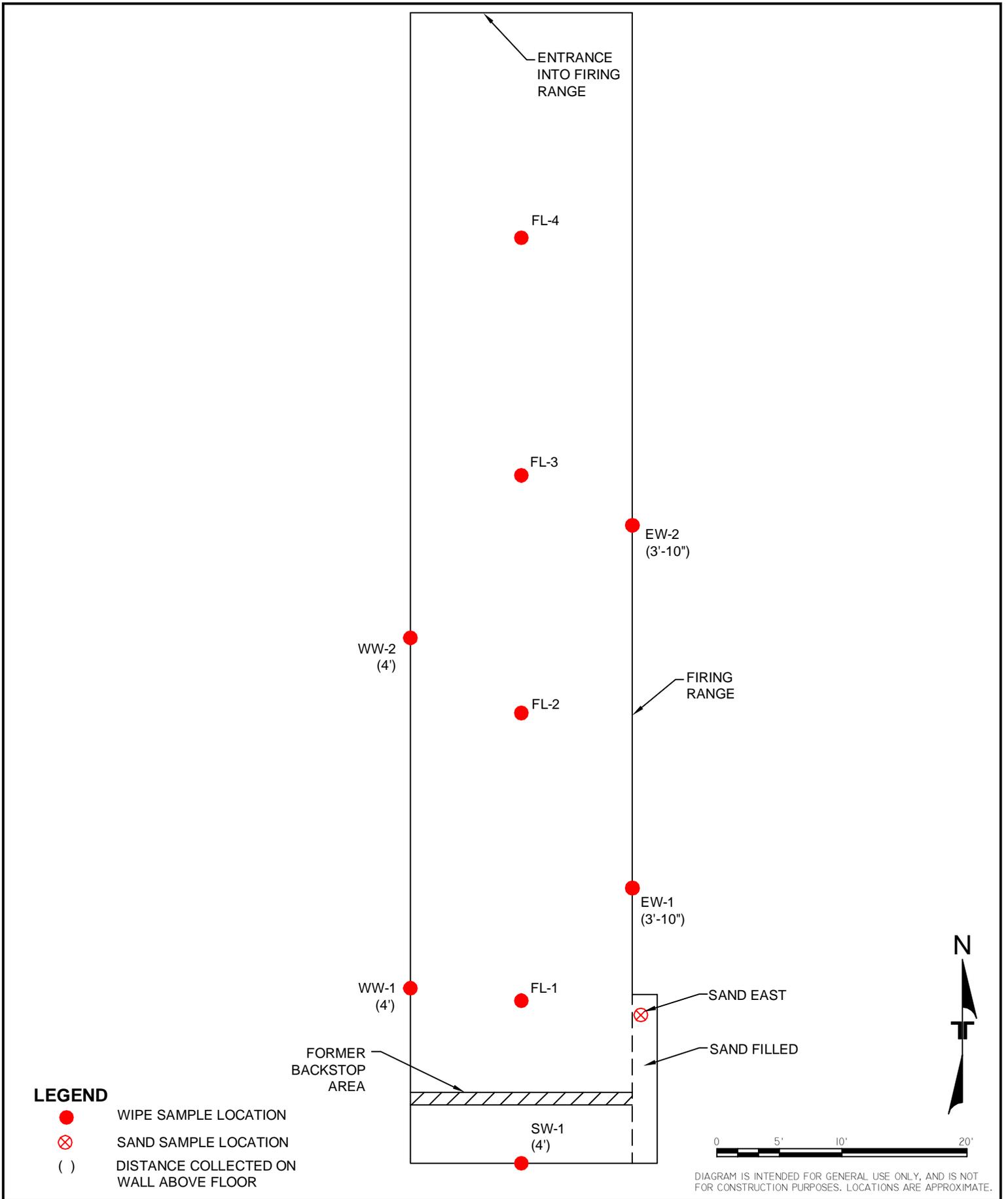


DIAGRAM IS INTENDED FOR GENERAL USE ONLY, AND IS NOT FOR CONSTRUCTION PURPOSES. LOCATIONS ARE APPROXIMATE.

Project Mng:	ADS	Project No.	02117087
Approved By:	ADS	Scale:	1" = 150'
Checked By:	ADS	Date:	11/3/11
Drawn By:	DBM	File No.	117087E3.DWG

Terracon
 Consulting Engineers and Scientists
 13910 W. 96TH TERRACE LEXENA, KS 66215
 PH. (913) 492-7777 FAX. (913) 492-7443

EXHIBIT 3 - SAMPLE LOCATION DIAGRAM
 HARDESTY FEDERAL COMPLEX
 FIRING RANGE - BUILDING 9
 607 HARDESTY AVE
 KANSAS CITY, MISSOURI

EXHIBIT
3

Table 1
Analytical Result - East Sand Wall
Hardesty Federal Complex
Kansas City, Missouri
Terracon Project No. 02107087

Sample ID	Collection Date	Analyte	Lead	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
		Method	6010	6010 - TCLP	7470 - TCLP						
		Units	mg/kg	mg/L							
SAND-EAST	10/11/2011		5.20	<0.50	<2.5	<0.050	<0.10	<0.50	<0.50	<0.10	<2.0

Source:

Pace Analytical Services, Inc.

Notes:

mg/kg milligrams per kilogram

mg/L milligrams per liter

"<" Detected below the laboratory analytical detection limit

Table 2
Analytical Results - Final Clearance Samples
Hardesty Federal Complex
Kansas City, Missouri
Terracon Project No. 02107087

Sample ID	Collection Date	Sample Type	Total Lead	Lead Concentration
			µg	µg/ft ²
Clearance Samples				
FL-1	10/21/2011	Wipe	<10.0	<14.5
FL-2	10/21/2011	Wipe	<10.0	<14.5
FL-3	10/21/2011	Wipe	<10.0	<14.5
FL-4	10/21/2011	Wipe	<10.0	<14.5
SW1	10/21/2011	Wipe	<10.0	<14.5
EW-1	10/21/2011	Wipe	<10.0	<14.5
EW-02	10/21/2011	Wipe	<10.0	<14.5
WW-1	10/21/2011	Wipe	<10.0	<14.5
WW-2	10/21/2011	Wipe	<10.0	<14.5
Field Blank				
FB-1	10/21/2011	Wipe-Blank	<10.0	<14.5

Source:

Schneider Laboratories Global, Inc.

Notes:

- µg micrograms
- µg/ft² micrograms per square foot
- "<" Detected below the laboratory analytical detection limit

APPENDIX B
Supporting Documentation



ELECTRONICALLY RECORDED
JACKSON COUNTY, MISSOURI
09/19/2011 02:14:09 PM
QCD FEE: \$ 45.00 9 Pages

INSTRUMENT NUMBER:
2011E0086320

QUITCLAIM DEED

STATE OF MISSOURI X
COUNTY OF JACKSON X

KNOW ALL BY THESE PRESENTS:

THIS QUITCLAIM DEED is made this 13th day of September, 2011, by and between the **United States of America** (herein sometimes referred to as the "Government"), acting by and through the Administrator of General Services Administration (hereinafter referred to as "Grantor"), under and pursuant to authority of 40 U.S.C. § 541, et. seq., as amended, and rules, orders, and regulations issued pursuant thereto, and **Hardesty Renaissance Economic Development Corporation, a Missouri non-profit corporation, 607 Hardesty Avenue, Kansas City, MO 64124** (hereinafter referred to as "Grantee"). The terms used to designate any of the parties herein shall include their respective representatives, successors and assigns of said parties.

I. Quitclaim of the Fee Estate

Grantor, for and in consideration of: (i) the sum of Five Hundred Thousand Dollars (\$500,000.00), duly paid by the Grantee, the receipt of which is hereby acknowledged, and (ii) the specific agreements hereinafter made by Grantee, for itself, and its successors and assigns, to abide by and take subject to all reservations, restrictions, covenants, exceptions, notifications, conditions and agreements hereinafter set forth in this Quitclaim Deed, does hereby grant, convey, remise, release and forever quitclaim to the Grantee, its successors and assigns, pursuant to the reservations, restrictions, covenants, exceptions, notifications, conditions and agreements hereinafter set forth, fee simple, in and to, that certain real property known as the former National Bellas Hess Property, Jackson County, Missouri, (hereinafter referred to as the "Property"), and described in detail as follows:

Legal Description – Surface Estate Only

All the land lying between Independence Avenue on the North, Hardesty Avenue on the West, the Kansas City Terminal right-of-way on the Southeast, and the central line of Topping Avenue (as originally located) on the East, being 21.593 acres, more or less (corrected by government survey 21.795 acres, more or less), formerly known as the National Bellas Hess Property and more particularly described in the legal description of said Property herein, to-wit:

ALL that part of the Northeast quarter of the Northeast quarter of Section 2, Township 49, Range 33, in Kansas City, Jackson County, Missouri, lying north and west of a strip of ground 75 ft. wide, extending in a northeasterly and southwesterly direction across said quarter (1/4) quarter (1/4) Section, being the right-of-way of Property conveyed to Kansas City Belt Railway Company by deed dated October 20, 1882, and recorded in Book B80 at page 266, in the office of the Recorder of Deeds of Jackson County, Missouri, at Kansas City; and also lying north of a strip of ground 100 ft. wide cutting and partly upon the Southwest corner of said quarter (1/4) quarter (1/4) Section (and north and west of right-of-way of said Kansas City Belt Railway Company above described), being the right-of-way of Kansas City and Independence Rapid Transit Railway Company; afterward Kansas City Cable Railway Company, and being Property conveyed to Kansas City Cable Railway Company by deed dated October 6, 1894, and recorded in Book B 571, page 513, in the office of the Recorder of Deeds, of Jackson County, Missouri, at Kansas City; except the following portions thereof, to-wit: (a) a strip of ground thirty (30) feet wide off of the west side thereof, being the east half of Hardesty Avenue, a street in Kansas City, Missouri; (b) a strip of ground forty (40) feet wide off of the north side thereof; being the south half of Independence Avenue, a street in Kansas City, Missouri; (c) a strip of ground (30) feet wide off the east side thereof, being the west half of Topping Avenue, a street in Kansas City, Missouri as originally established; being the same land heretofore conveyed to NATIONAL IMPROVEMENT COMPANY by Trackage Realty Company by deed dated June 24, 1919 filed for record, and duly recorded in the Office of the Recorder of Deeds of Jackson County, Missouri, at Kansas City, in Book Series B 1966, Page 554 on June 25, 1919, and by said National Improvement Company to party of the first part by deed dated December 14, 1935 filed for record and duly recorded in the office of the Recorder of Deeds of Jackson County, Missouri at Kansas City, in Book Series B 3228, page 601 on December 31, 1935.

PLEASE RETURN DOCUMENT TO:

**First American Title Insurance Company
National Commercial Services
811 Main, Suite 2500, Kansas City, MO 64105
Attention: Robert L. Patterson
FILE NO. 501077**

Together with the buildings thereon, appurtenances thereto, and easements and rights of way, if any, whether by grant, prescription, estoppel, use or otherwise, now owned, and/or used or enjoyed by the party of the first part in respect of and/or in connection with the described premises.

LESS AND EXCEPT:

All that part of the Northeast Quarter of the Northeast Quarter of Section 2, Township 49, Range 33, in Kansas City, Jackson County, Missouri, described as follows:

Beginning at the intersection of the South line of Independence Avenue and the East line of Hardesty Avenue, as said avenues are now established; thence East along said South line, 455.05 feet; thence South, deflecting 90°04'20" right from the last described course, 18 feet; thence East, parallel with the South line, of Independence Avenue, 15 feet; thence South, deflecting 90°04'20" right from the last described course, 165.77 feet; thence West, perpendicular to the last described course, 213.97 feet; thence South, perpendicular to the last described course, 266.43 feet thence West perpendicular to the East line of Hardesty Avenue, 252.72 feet to a point on said East line; thence North along said East line, 451.50 feet to the point of beginning.

The above described tract of land containing 3.528 acres, more or less (hereinafter referred to as the "Property").

TO HAVE AND TO HOLD the Property, together with all improvements, hereditaments, appurtenances, therein and all reversions, remainders, issues, profits and other rights belonging or related thereto, and subject all reservations, restrictions, covenants, exceptions, notifications, conditions, and agreements herein set forth in this Quitclaim Deed, either in law or in equity, for the use, benefit, and behalf of the Grantee, its successors and assigns forever.

II. SPECIAL AND GENERAL EXCEPTIONS AFFECTING THE PROPERTY

This Quitclaim Deed covering the Property is expressly made subject to the following matters to the extent and only to the extent the same are valid and subsisting and affect the Property:

A. All existing licenses, permits, servitudes and right-of-way including, but not limited to State highway department driveway permits, easements and rights-of-way for public streets, roads and highways, public utilities, electric power lines, electric transmission facilities, railroads, pipelines, ditches, conduits and canals on, over and across said land, whether or not of record, including, but not limited to Easements reserved in Quit Claim Deed recorded as Instrument Number 2007E0069815 in the County Clerk's office of Jackson County, Missouri dated May 26, 1981, reserving easements for rail spur lines, gas line, and mutual easement for surface water drainage, and a non-exclusive easement for emergency and service vehicle access.

B. All existing interest(s) reserved to or outstanding in third parties in and to water rights, ditch and reservoir rights, as well as oil, gas, and/or minerals, whether or not of record.

C. All other existing interests reserved by any grantor(s) in chain of title unto said grantor(s), their respective successors and assigns, which affect any portion of the Property interest(s) hereinabove described, whether or not of record.

D. Any survey discrepancies, conflicts, or shortages in area or boundary lines, or any encroachments, or protrusions, or any overlapping of improvements which may affect the subject Property.

E. Existing ordinances or resolutions, special purpose district rules and regulations, including soil conservation district rules and regulations and water conservancy district rules and regulations, filed of public record and affecting all or any portion of the subject Property.

III. RESERVATIONS/COVENANTS COVERING THE PARCELS

This Quitclaim Deed covering the Property is expressly made subject to the following reservations in favor of Grantor, and its assigns.

SAVE AND EXCEPT and there is hereby reserved unto Grantor, and its assigns, all rights and interests which have been previously reserved to the United States in any Patent(s) which cover(s) the Property.

SAVE AND EXCEPT, and there is hereby excepted and reserved unto the UNITED STATES OF AMERICA, and its assigns, all right, title and interest in and to all oil, gas, hydrocarbons, and other minerals that may be produced in and under the Property; including, but not limited to the following attributes in connection with its right to take, develop and produce such oil, gas, hydrocarbons, and minerals: (1) the right of ingress and egress to the Property, (2) the right to lease, (3) the right to receive bonus payments, (4) the right to receive delay rentals, and (5) the right to receive royalty payments.

IV. CERCLA NOTICES, COVENANTS AND RESERVATIONS

This Quitclaim Deed is expressly made subject to the following CERCLA information and specific reservations, covenants and agreements in favor of Grantor, and its assigns.

Notice of Hazardous Substance Activity. Pursuant to 40 CFR §373.2 and Section 120(h)(3)(A)(i) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA)(42 U.S.C. §9620(h)(3)(A)(i)), and based upon a complete search of agency files, the United States of America gives notice that **Attachment "A"** provides the following information: (1) the type and quantity of hazardous substances that were known to have been released or disposed of or stored for one year or more on the Property; (2) the time such storage, release or disposal took place; and (3) a description of remedial action taken, if any.

NOTICE Regarding Hazardous Substance Activity

A. Deferred CERCLA Covenant.

Grantor warrants to Grantee, its successors and assigns, that it shall take, or cause to be taken, all response action found to be necessary by the appropriate federal and state environmental regulatory authorities after the date of this conveyance regarding hazardous substances located on the Property on the date of this conveyance. When all response action necessary to protect human health and the environment with respect to such hazardous substances remaining in, on or under the Property as of the date of this conveyance has been taken, Grantor shall thereafter execute and deliver to Grantee, or its successors and assigns, its written CERCLA Covenant that all such response action has been taken, together with the making of Grantor's warranty to satisfy the governmental requirements set forth in 42 U.S.C. 9620(h)(3)(A)(ii)(I).

- 1) The CERCLA Section 9620(h)(3)(A)(ii) covenant shall not apply:
 - a) to the extent that Grantee, its successor(s) or assign(s), or any successor in interest to the Property or part thereof is a Potentially Responsible Party (PRP) with respect to the Property immediately prior to the date of this conveyance.
 - b) to the extent that such additional response action or part thereof found to be necessary is the result of an act or failure to act of the Grantee, its successor(s) or assign(s), or any party in possession after the date of this conveyance that either:
 - i. Results in a release or threatened release of a hazardous substance that was not located in, under, or on the Property on the date of this conveyance; or
 - ii. causes or exacerbates the release or threatened release of a hazardous substance; or
 - iii. in the case of a hazardous substance(s) previously unknown by Grantor and Grantee as of the date of this conveyance but which is hereafter discovered by Grantee, its successor(s) or assign(s), or any party in possession and where after discovery and knowledge of the existence of the hazardous substance, Grantee, its successor(s) or assign(s), or any party in possession causes or exacerbates a release or threatened release of such hazardous substance(s).
 - c) In the event Grantee, its successor(s) or assign(s), seeks to have Grantor conduct any additional response action, and, as a condition precedent to Grantor incurring any additional cleanup obligation or related expenses, the Grantee, its successor(s) or assign(s), shall provide Grantor at least 45 days written notice of such a claim. In order for the 45-day period to commence, such notice must include credible evidence that:
 - i. the contamination existed prior to the date of this conveyance; and
 - ii. the need to conduct any additional response action or part thereof was not the result of any act or failure to act by the Grantee, its successor(s) or assign(s), or any party in possession described in Section II B.I(b).

B. Response Action Access Easement

Grantor reserves for itself, the United States Government, and its officers, agents, employees, contractors and subcontractors, a non-exclusive limited right of access to and of entry upon all portions of the Property to the extent reasonably necessary for environmental investigation,

remediation or other corrective action. This reservation includes the no cost right of access to the Property. The use of available utilities at reasonable costs to Grantor is further reserved. Grantor shall use these rights only in the event that response action by Grantor or the United States Government is found to be necessary by the Missouri Department of Natural Resources ("MDNR") or the Environmental Protection Agency ("EPA") with respect to the Property after the date of this quitclaim of the Property, or if access to the Property is necessary to carry out response action found to be necessary by MDNR or EPA with respect to adjoining property. These actions may include but are not limited to investigations and surveys, to include drilling, test-pitting, borings, data and records compilation and other activities related to environmental investigation, and to carry out any remedial or removal actions required by MDNR or EPA, including but not limited to the installation and operation of monitoring wells, pumping wells, and treatment facilities. Any such entry, including such activities, responses or remedial actions, shall be coordinated with record title owner(s), shall be performed in a manner that minimizes interruption with activities of authorized occupants, and shall not unreasonably interfere with the conduct of business on the Property and shall repair any damage to the property, including improvements thereon, resulting from such entry to the condition existing immediately before its entry thereon. The foregoing described easement is hereinafter referred to as the "Response Action Access Easement."

C. Non-Interference with Response Action

Grantee, its successors and assigns and every successor in interest to the Property, or part thereof, while in possession of the Property, shall not disrupt or prevent the United States of America, its officers, employees, agents, contractors and subcontractors, and any other authorized party or entity from proper use of the Response Action Access Easement as provided in Subsection 3, above.

V. OTHER ENVIRONMENTAL NOTICES, COVENANTS, AND AGREEMENTS

A. ASBESTOS CONTAINING MATERIALS

- 1) Grantee is warned that the Property may contain asbestos-containing materials. Unprotected or unregulated exposures to asbestos in product manufacturing, shipyard, and building construction workplaces have been associated with asbestos-related diseases. Both the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) regulate asbestos because of the potential hazards associated with exposure to airborne asbestos fibers. Both OSHA and EPA have determined that such exposure increases the risk of asbestos-related diseases, which include certain cancers and which can result in disability or death.
- 2) No warranties either express or implied are given with regard to the condition of the Property including, without limitation, whether the Property does or does not contain asbestos or is or is not safe for a particular purpose. The failure of any bidder to inspect, or to be fully informed as to the condition of all or any portion of the Property offered, will not constitute grounds for any claim or demand for adjustment or withdrawal of a bid or offer after its opening or tender.
- 3) The description of the Property set forth in this Quitclaim Deed and any other information provided therein with respect to said Property is based on the best information available to the disposal agency and is believed to be correct, but an error or omission, including but not limited to the omission of any information available to the agency having custody over the Property and/or any other Federal agency, shall not constitute grounds or reason for nonperformance of the contract of sale, or any claim by the Purchaser against the Government including, without limitation, any claim for allowance, refund, or deduction from the purchase price.
- 4) The Government assumes no liability for damages for personal injury, illness, disability or death, to the Grantee, or to the Grantee's successors, assigns, employees, invitees, licensees, or any other person subject to Grantee's control or direction, or to any other person, including members of the general public, arising from or incident to the purchase, transportation, removal, handling, use, disposition, or other activity causing or leading to contact of any kind whatsoever with asbestos on the Property which is the subject of this sale, whether the Grantee, its successors or assigns has or have properly warned or failed properly to warn the individual(s) injured.
- 5) The Grantee further agrees that in its use and occupancy of the Property it will comply with all Federal, state, and local laws relating to asbestos.

B. LEAD-BASED PAINT

The Grantee, its successors and assigns understand that any interest in real property on which a building was built prior to 1978 is notified that such property may present exposure to lead from lead-based paint that may place young children at risk of developing lead poisoning. Lead poisoning in young children may produce permanent neurological damage, including learning disabilities, reduced intelligence quotient, behavioral problems, and impaired memory. Lead poisoning also poses a particular risk to pregnant women. The seller of any interest in residential real property is

required to provide the buyer with any information on lead-based paint hazards from risk assessments or inspections in the seller's possession and notify the buyer of any known lead-based paint hazards. A risk assessment or inspection for possible lead-based paint hazards is recommended prior to converting the Property to a residential dwelling.

C. NOTICE OF PESTICIDE APPLICATION

The Grantee is notified that the Property may contain the presence of pesticides that have been applied in the management of the property. The United States knows of no use of the registered pesticide in a manner inconsistent with its labeling, and believes that all applications were made in accordance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA – 7 U.S.C. Sec. 136, et seq.), its implementing regulations, and according to the labeling provided with such substances. Furthermore, that in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA – 42 U.S.C. Sec. 9601, et seq.), the use of such substances is not a “release” (as defined in CERCLA, 42 U.S.C. Sec. 9601 (22)), but instead the use of a consumer product in consumer use (42 U.S.C. Sec. 9601 (9)), and the application of a pesticide product registered under FIFRA for which recovery for response costs is not allowed (42 U.S.C. Sec. 9607 (i)).

D. NOTICE OF SUBSURFACE STRUCTURES SUSCEPTIBLE TO FLOODING

The Grantee is hereby notified that there are subsurface structures that may be susceptible to flooding. The Government maintained the use of sump pumps in subsurface tunnels to prevent damage to those areas. Grantee, for itself and its successors and assigns, and every successor-in-interest to the Property, or any part thereof, covenant and agree to indemnify, protect, defend, save and hold harmless the Government, and its employees, officers, representatives, attorneys and agents, from and against any and all debts, duties, obligations, liabilities, suits, claims, demands, causes of action, damages, losses, cost and expenses (including without limitation, attorneys' fees and expenses and court costs) in any way relating to, connected with, and/or arising from water damage of any kind.

E. INDOOR AIR EXPOSURE PATHWAY EVALUATION FOR BUILDINGS 6 AND 9

The following clauses shall be incorporated into any transfer of such portions of the property as an institutional control established to protect human health and the environment:

- 1) In the event Grantee, its successor(s) or assign(s), desires to use the Property for any use that would involve indoor occupancy of any structure, then Grantee, its successor(s) or assign(s), shall perform indoor air exposure pathway evaluation for building 6 and 9 as prescribed by the Missouri Department of Natural Resources and shall further comply with all laws, rules, regulations and ordinances pertaining thereto, including but not limited to zoning requirements and the requirements of all applicable regulatory authorities.
- 2) In the event Grantee, its successor(s) or assign(s), desires to conduct or permit any use inconsistent with this restriction, prior to the completion of all necessary remedial action that may contribute to adverse indoor air quality, then Grantee, its successor(s) or assign(s), at its sole cost and expense shall be required to obtain written permission of the applicable federal, state and/or local regulatory authorities for such other uses and shall further comply with all laws, rules, regulations and ordinances pertaining thereto, including but not limited to zoning requirements and the requirements of all applicable regulatory authorities.
- 3) Upon written request by Grantee, its successor(s) or assign(s), and without any payment of funds by Grantor, Grantor, by and through the General Services Administration, agrees that upon completion of any additional remedial action performed by Grantee, its successor(s) or assign(s), under this paragraph, to cooperate with Grantee, its successor(s) or assign(s), in any application, permit, order, or effort to obtain approval from appropriate regulators for the removal or revision of this restriction, subject to any necessary restrictions related to indoor air quality monitoring to be recorded in the records of the Recorder of Deeds, Office of County Clerk for Jackson County, Missouri.

VI. LAND USE RESTRICTIONS

A. Groundwater Use Restrictions

Grantee covenants and agrees for itself, its successors and assigns, and every successor-in-interest to the Property, or part thereof, that it shall not construct or permit to be constructed any well, and shall not extract, utilize, consume or permit to be extracted, any water from the aquifer below the surfaces of the ground within the boundary of the Property for the purpose of human consumption, or other use, unless such groundwater has been tested and found to meet applicable standards for human consumption, or such other use, and such owner or occupant shall first have obtained written approval of GSA and the appropriate agencies of the State of Missouri, including, but not limited to, MDNR. The costs associated with obtaining use of such water, including, but not limited to, the costs of permits, studies,

analysis, or remediation, shall be the sole responsibility of the Grantee, its successors and assigns, or any successor-in-interest to the Property, without cost whatsoever to the Grantor.

B. Non-Residential Use Restrictions

Grantee covenants and agrees for itself, its successors and assigns, and every successor-in-interest to the Property, or part thereof, that use of the Property shall be limited to nonresidential industrial uses except for any office or similar use incidental to industrial use if such incidental use is permitted by applicable regulatory authorities without requiring further environmental remediation beyond that required for industrial use. Prohibited residential uses include, but are not limited to, any child care, pre-school, playground, and any form of housing. In the event the Grantee, or its successors or assigns, or any successor-in-interest to the Property, or part thereof, desire to use the Property for any use other than industrial use, then Grantee, or its successors or assigns, or any successor-in-interest to the Property, or part thereof, shall perform all additional Response Action, or other corrective action, required by Federal, state and local Environmental Laws or applicable regulatory authorities for such other uses, and shall further comply with all other Federal, state and local Laws, rules, regulations, and ordinances pertaining thereto, including but not limited to zoning requirements and the requirements of all applicable regulatory authorities. All costs associated with any such Response Action, or other corrective action necessary for other than industrial use shall be the sole responsibility of the Grantee, its successors and assignees, or any successor-in-interest to the Property, without cost whatsoever to the Grantor.

C. Ground Disturbance Restriction

Grantee covenants and agrees for itself, its successors and assigns, and every successor-in-interest to the Property, or part thereof, that use of the Property shall be limited by restricting the ability to disturb contaminated soil or conduct excavation activities involving such contaminated soil, without obtaining the prior approval of MDNR. All costs associated with any such disturbing activity including obtaining prior approval, shall be the sole responsibility of the Grantee, its successors and assignees, or any successor-in-interest to the Property, without cost to Grantor.

- D.** In the event Grantee, its successors or assigns, or any successors-in-interest of the Property, or part thereof, desire to seek the modification or removal of the specific restrictions and covenants specified above from the Property, or any portion thereof, then Grantee, its successors or assigns, or the successors-in-interest of the Property, or part thereof (hereinafter referred as the Record Title Owner”, whether one or more) shall perform or complete all environmental investigations, Response Action, or other corrective action, necessary in order to obtain consent to the modification or termination of such environmental land use restrictions from the applicable Federal and state environmental regulatory authorities. All costs associated with any such required environmental investigation, Response Action, or other corrective action, shall be the sole responsibility of the Record Title Owner, and shall be performed without any payment of funds by Grantor.
- E.** The Record Title Owner may be required to submit a work plan to the applicable Federal and State regulatory authorities to perform and complete any environmental investigations, Response Action, or other corrective action needed to seek the modification or removal of the specific restrictions and covenants specified above, or any portion thereof. Upon approval of any such work plan, and any condition imposed therein, the Record Title Owner will complete all environmental investigation, Response Action, or other corrective action, as may be required, if any, in accordance with applicable Environmental Laws.
- F.** The Record Title Owner may be required by the applicable Federal and State regulatory authorities to post a completion bond or such other financial assurances in a form reasonably acceptable to the applicable Federal and State regulatory authorities that the Record Title Owner will complete any necessary environmental investigation, Response Action, or other corrective action on the Property, or part thereof. Upon completion of such necessary environmental investigation, Response Action, or other corrective action, the completion bond and other financial assurances, if applicable, may be released pursuant to the rules and regulations of the applicable regulatory authority.
- G.** Upon completion of any required environmental investigation, Response Action, or other corrective action, the Record Title Owner may be required to submit a close-out report and certification of completion to the applicable Federal and State regulatory authorities.
- H.** If the Record Title Owner: (1) is required to comply with the procedures set forth in paragraphs (A) through (G) above, and obtains from the applicable Federal and State regulatory authorities a written certification or other evidence in a form acceptable for filing with the county clerk where the Property is located, certifying that all required environmental investigation, Response Action, or other corrective action, for the Property, or any portions thereof, have been completed; or (2) is not required to comply with the procedures set forth in paragraphs (A) through (G) above, and obtains a written certification from the applicable Federal and State regulatory authorities or other evidence in a form acceptable for filing with the county clerk where the Property is located certifying that no environmental investigation, Response Action, or other corrective action, is necessary for the Property, or any portions thereof, in order to release the use restriction, then the Record Title Owner may record the applicable written certification in the office of the county clerk where the Property is located, and a copy of the same will be sent to the GSA.

- I. Upon the approval and completion of all environmental remediation or corrective action called for above, and upon the recording of the final environmental certification or evidence in a form suitable for filing with the county clerk where the Property is located, as referenced above, the specific restrictions and covenants shall thereafter be modified or removed, as applicable, from the title record of the Property, or the designated part thereof.

VII. MISCELLANEOUS NOTICES, TERMS, CONDITIONS, AGREEMENTS, AND COVENANTS

Except as otherwise provided by 42 U.S.C. 9620(h)(3), Grantee covenants for itself, its heirs, assigns and every successor in interest to the Property herein described or any part thereof that it shall abide by each of the following covenants, each of which will be covenants running with the land. In addition, the United States of America shall be deemed a beneficiary of each of the following covenants without regard to whether it remains the owner of any land or interest therein in the locality of the Property hereby conveyed and shall have a right to enforce each of the covenants herein in any court of competent jurisdiction; provided, however, the United States of America shall have no affirmative duty to any successor in title to this conveyance to enforce any of the following covenants herein agreed.

A. Except as listed on the Notice of Hazardous Substance Activity (**Attachment A**) attached hereto, Grantee has inspected the herein above described and conveyed property and has satisfied him/her/itself that the property is free of any hazardous substance(s) or petroleum products or their derivatives, and Grantee, its heirs, successors and assigns, will indemnify, protect, defend, save and hold harmless Grantor, and Grantor's employees, officers, representatives, attorneys and agents, from and against any and all debts, duties, obligations, liabilities, suits, claims, demands, causes of action, damages, losses, cost and expenses (including without limitation, costs associated with any investigation, monitoring, sampling, testing or removal of hazardous substance(s), attorneys' fees and expenses and court costs) in any way relating to, connected with, and/or arising out of the discovery of any hazardous substance(s) or petroleum product(s) or their derivatives which may have contaminated the hereinabove and conveyed property after the date of this Deed.

B. As a material part of the Consideration for this deed, Grantor and Grantee agree that Grantee is taking the Property "AS IS" with any and all latent and patent defects and that there is no warranty by Grantor that the Property has a particular financial value or is fit for a particular purpose. Grantee acknowledges and stipulates that Grantee is not relying on any representation, statement, or other assertion with respect to the Property condition but is relying on Grantee's examination of the Property. Grantee takes the Property with the express understanding and stipulation that there are no express or implied warranties.

C. FAA Clause Grantee covenants for itself, its heirs, successors and assigns and every successor in interest to the property herein described, or any part thereof, that any construction or alteration is prohibited unless a determination of no hazard to air navigation is issued by the FAA in accordance with Title 14, Code of Federal Regulations, Part 77, entitled "Objects Affecting Navigable Airspace," or under the authority of the Federal Aviation Act of 1958, as amended.

D. DOCUMENT BOX At such time as the building is demolished, if any document box is found, which should be located behind the cornerstone, it shall remain the property of the Government and shall be delivered, unopened to the National Archives and Records Service, Washington, DC.

IN WITNESS WHEREOF, the United States of America has caused these presents to be executed this 13 day of September, 2011.

UNITED STATES OF AMERICA
Acting by and through the
Administrator of General Services

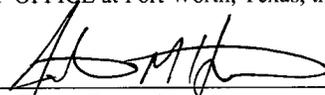
By:  _____

JOHN A. ROBINSON
Branch Chief
Real Property Utilization & Disposal Division
Greater Southwest Region
General Services Administration

THE STATE OF TEXAS X
COUNTY OF TARRANT X

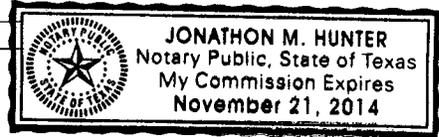
BEFORE ME, a Notary Public in and for the State of Texas, on this day personally appeared JOHN A. ROBINSON , known to me to be the person whose name is subscribed to the foregoing quitclaim deed, and known to me to be the Branch Chief, Real Property Utilization & Disposal Division, Greater Southwest Region, General Services Administration, Fort Worth, Texas, and acknowledged to me that the same was the act and deed of the United States of America and of the Administrator of General Services and that he executed the same as the voluntary act of the United States of America and of the Administrator of General Services for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE at Fort Worth, Texas, this 13 day of September, 2011.



Notary Public State of Texas

Notary's Name: _____
My Commission Expires: _____



ATTACHMENT A

NOTICE OF HAZARDOUS SUBSTANCE ACTIVITY

Former Federal Complex
607 Hardesty Avenue
Kansas City, Missouri

Based upon environmental records held by the General Services Administration, the following information is provided on hazardous substances that were known to have been released, disposed of, or stored for one year or more on the Property.

1. **Trichloroethylene.** During World War II, the U.S. Army operated the property as a Quartermaster Depot. As part of the operations on-site, the Army utilized Building 6 researching clothing treatment processes which would protect soldiers from the effects of chemical warfare agents. Process chemicals were stored in above ground storage tanks (ASTs) exterior to Building 6 and piped into the building. It is believed the trichloroethylene (TCE) discovered in the soil and groundwater immediately adjacent to Building 6 originated from those research activities. The dates of such releases are unknown, but are expected to have occurred between 1940 and 1945. However, the quantities involved are unknown. Investigations of the nature and extent of the groundwater contamination have been completed; additional investigation concerning the soil contamination is yet needed to be completed, in conjunction with MDNR. *A remediation plan has been submitted to and approved by the Missouri Department of Natural Resources (MDNR).*
2. **Petroleum Products,** such as diesel fuel, fuel oil, and gasoline, were stored in underground storage tanks (USTs) have been used throughout the history of the former Federal Complex. Fuel oil was used in Building 3 (Boiler House) to fire the boilers. Diesel fuel and gasoline were used for refueling vehicles used on-site from fuel pumps associated with the former Building 4 (Garage, which was demolished several years ago). Eventually, the USTs developed leaks and/or spills occurred; the dates and quantities of such occurrences are unknown. As of this time, the USTs have been removed; however, the petroleum contamination yet exists in sub-surface soils and groundwater. Investigations of the nature and extent of the contamination have been completed. *A remediation plan has been submitted to and approved by MDNR.*
3. **Lead.** Operation of firing ranges results in contamination by lead, which is found in the bullets' projectile as well as the primer charge. A firing range, located in the basement of Building 9, was operated on-site, although the dates it was in operation are unknown. Environmental investigations have revealed the interior of the firing range is contaminated with lead dust. Because of the source of the contamination (weapons firing), the quantity of the lead released cannot be determined. *A remediation plan has been submitted to and approved by the MDNR.*
4. **Polychlorinated Biphenyls (PCBs).** Due to the age of the property, various electrical transformers and breakers located on-site, as well as insulation surrounding high-voltage wiring, was found to contain PCBs. In several instances, the PCB-laden oil had leaked from the electrical equipment. The dates of such leakage and the exact quantities are unknown. In 2003, GSA undertook a project to identify all electrical equipment which showed signs of leakage. This project included all buildings currently existent on-site, except Building 13 (i.e., Buildings 3, 6, 7, 9, 10, and 11). Building 13 was not included because it is currently operated and maintained by Kansas City Power and Light. When leakage was identified, the material was tested to determine if it contained PCBs above the U.S. Environmental Protection Agency's action limit of 50 parts per million (ppm). Any leakage found exceeding 50 ppm was remediated; this was completed by 8 January 2004. Reports of these activities were submitted to and approved by MDNR. Currently, there are no known quantities of PCBs exceeding 50 ppm on-site.



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HISTORICAL
INFORMATION
GATHERERS, INC.

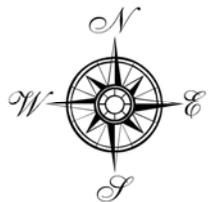
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

2009

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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HISTORICAL
INFORMATION
GATHERERS, INC.

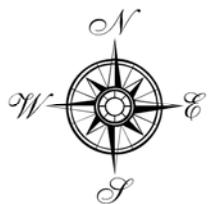
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

2003

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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HISTORICAL
INFORMATION
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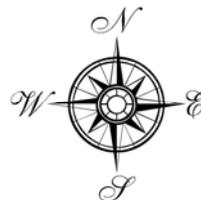
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1997

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Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





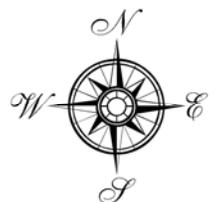
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1990

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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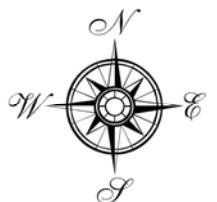
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1983

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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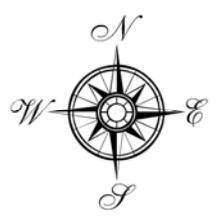
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1979

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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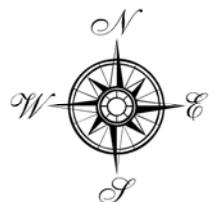
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1976

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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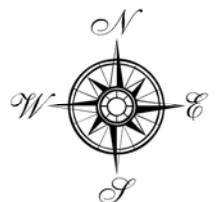
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1969

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





www.historicalinfo.com



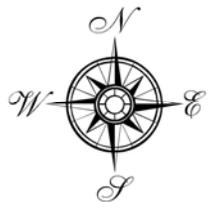
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1965

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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INFORMATION
GATHERERS, INC.

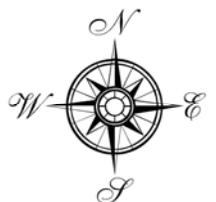
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1957

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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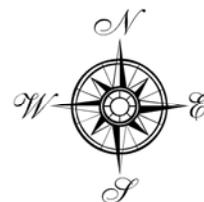
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1952

HIG Project Number: 02107147

Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')





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HISTORICAL
INFORMATION
GATHERERS, INC.

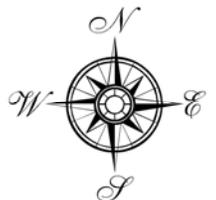
Hardesty Federal Complex
607 Hardesty Ave
Kansas City, MO

1940

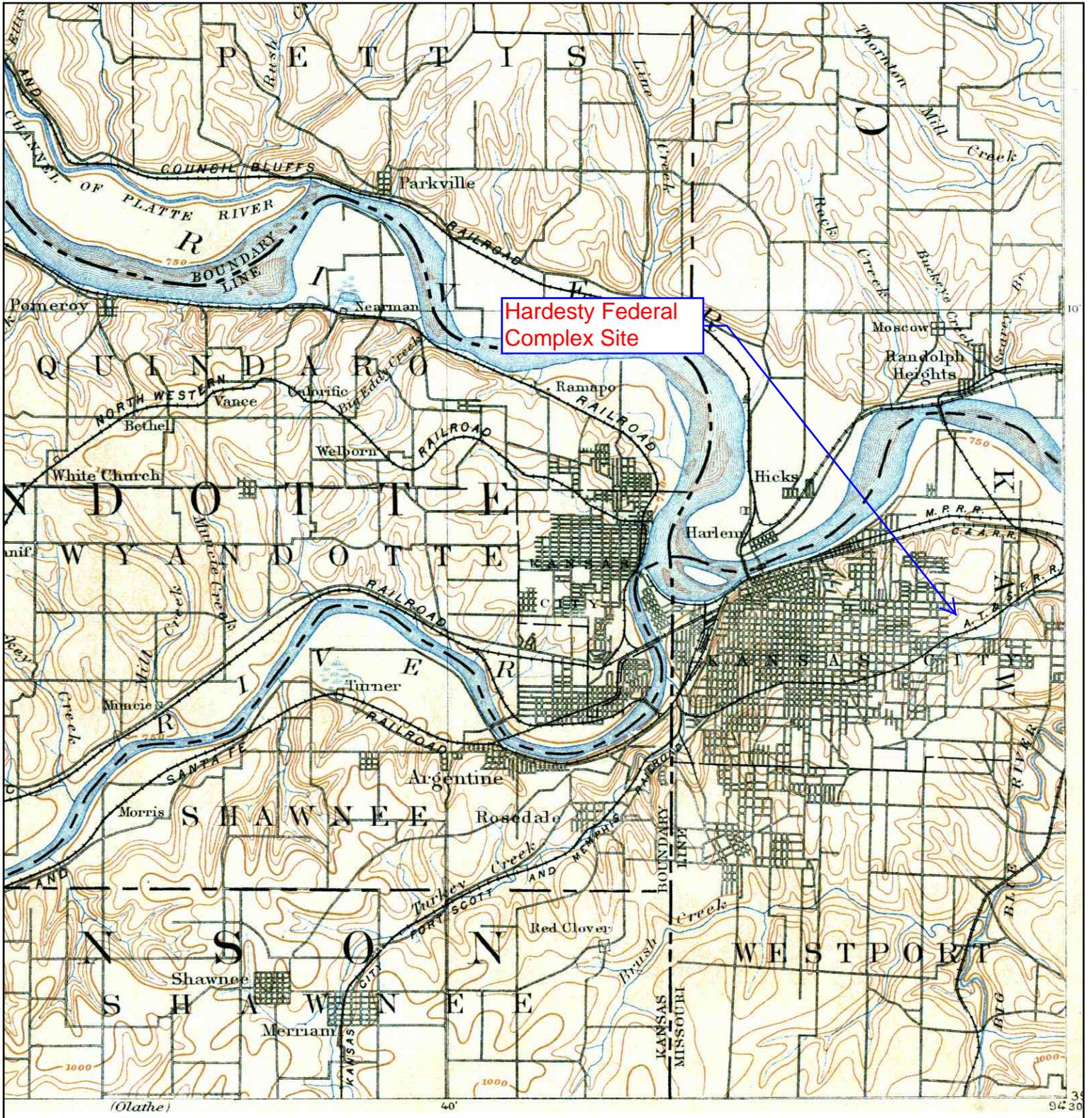
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Client Project Number: 02107147

Approximate Scale 1:6000 (1"=500')

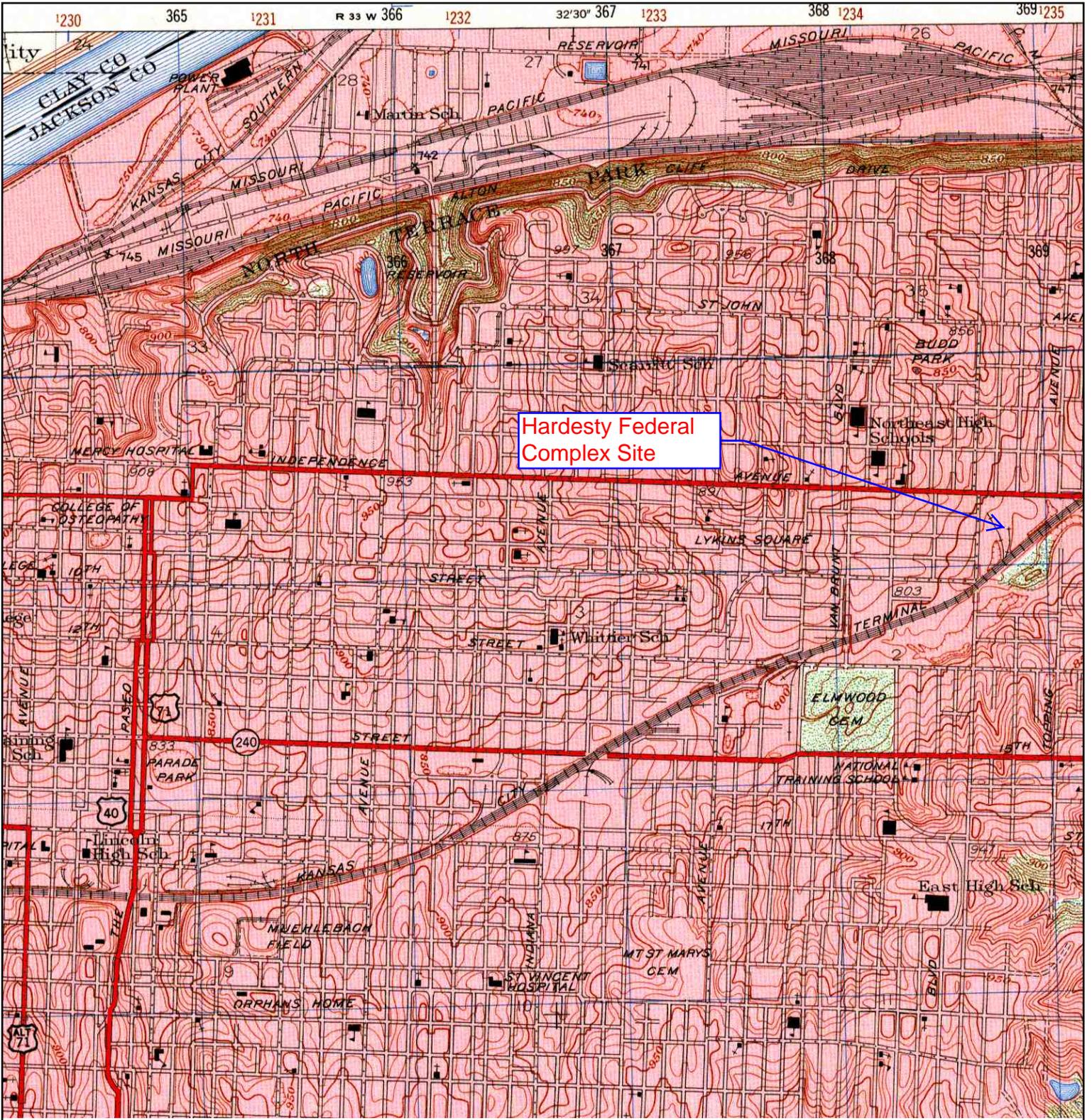


Historical Topographic Map



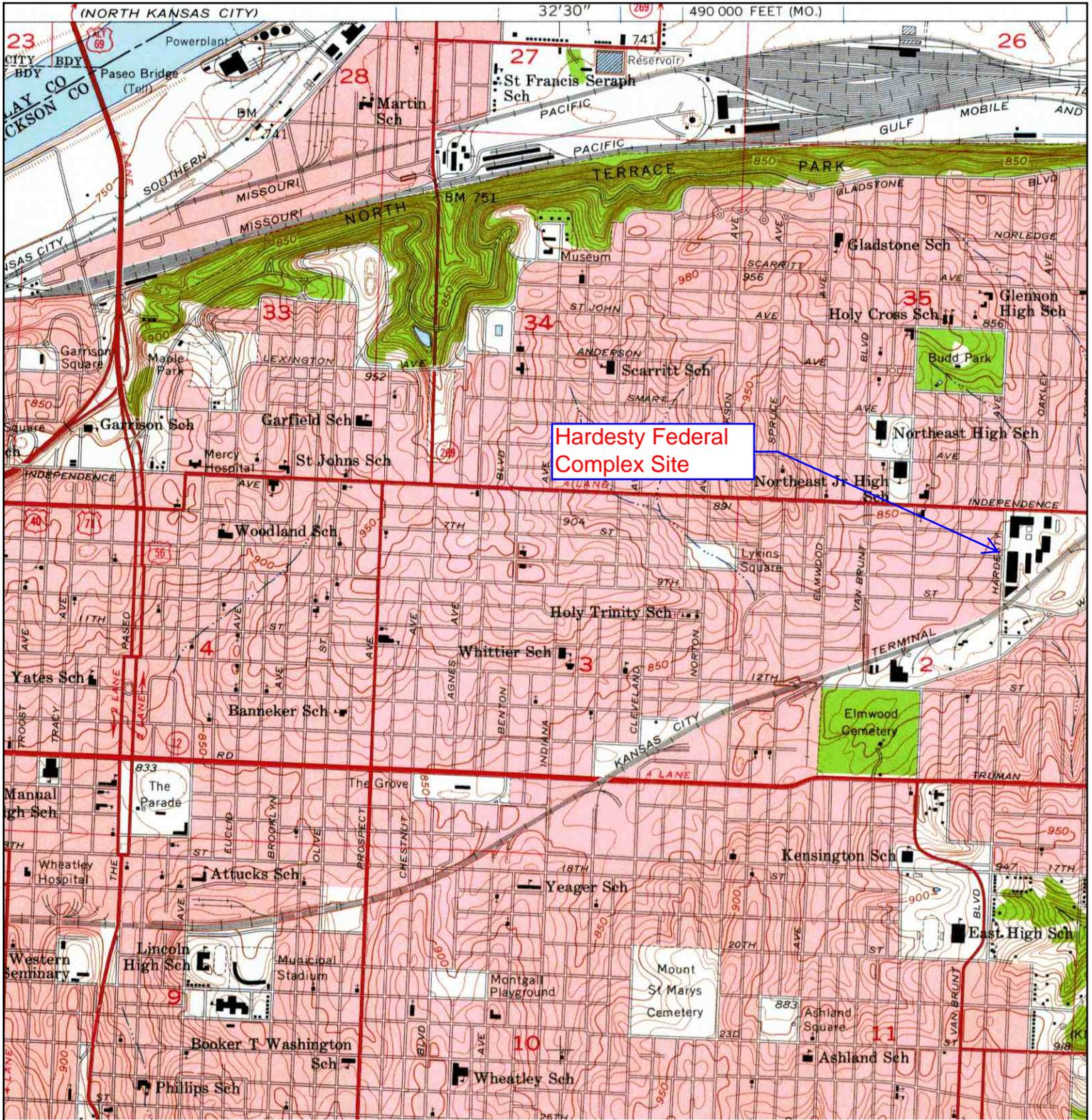
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	MAP YEAR: 1894
	SERIES: 30
	SCALE: 1:125000

Historical Topographic Map

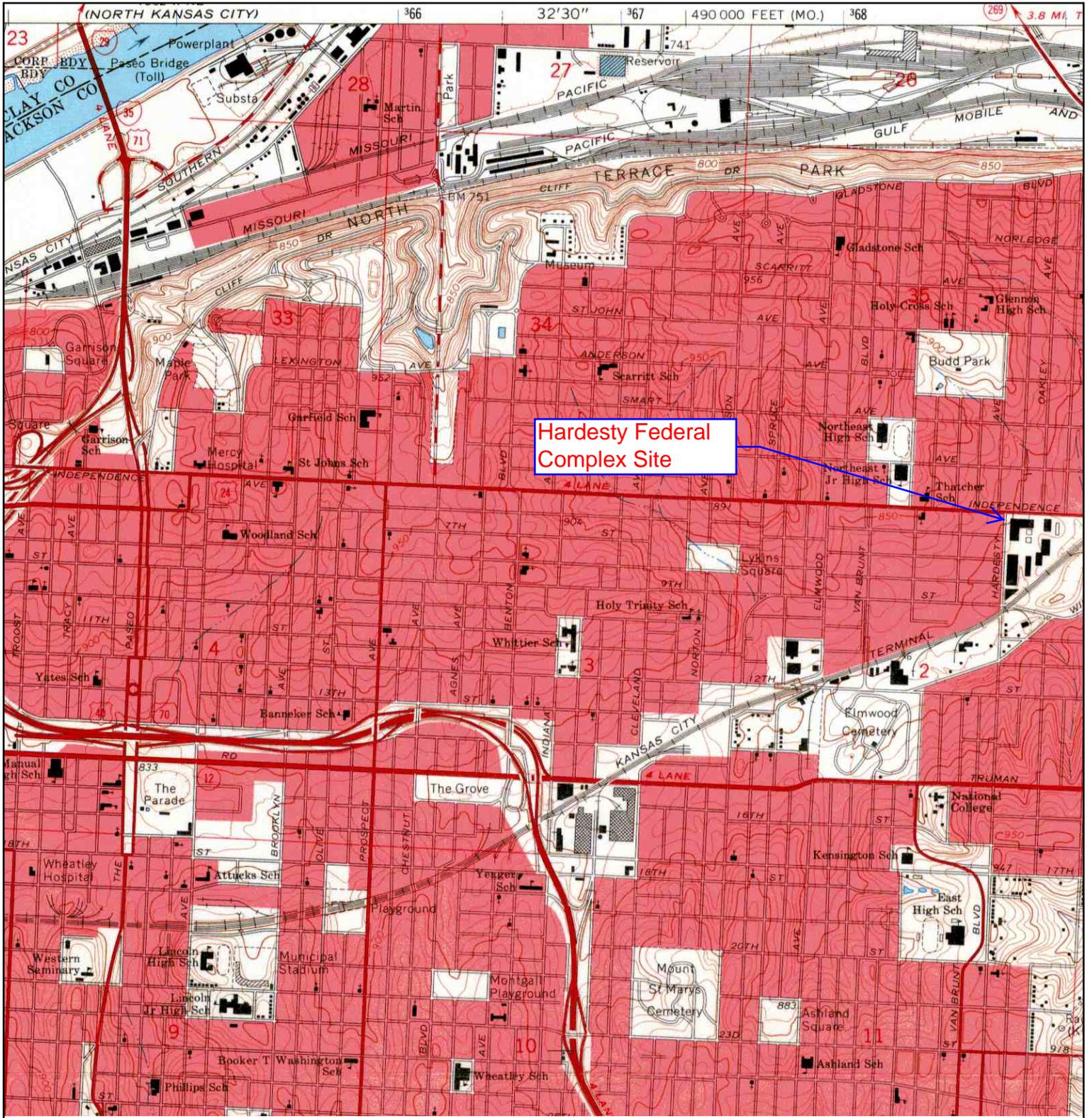


	TARGET QUAD
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	MAP YEAR: 1948
	SERIES: 7.5
	SCALE: 1:25000

Historical Topographic Map

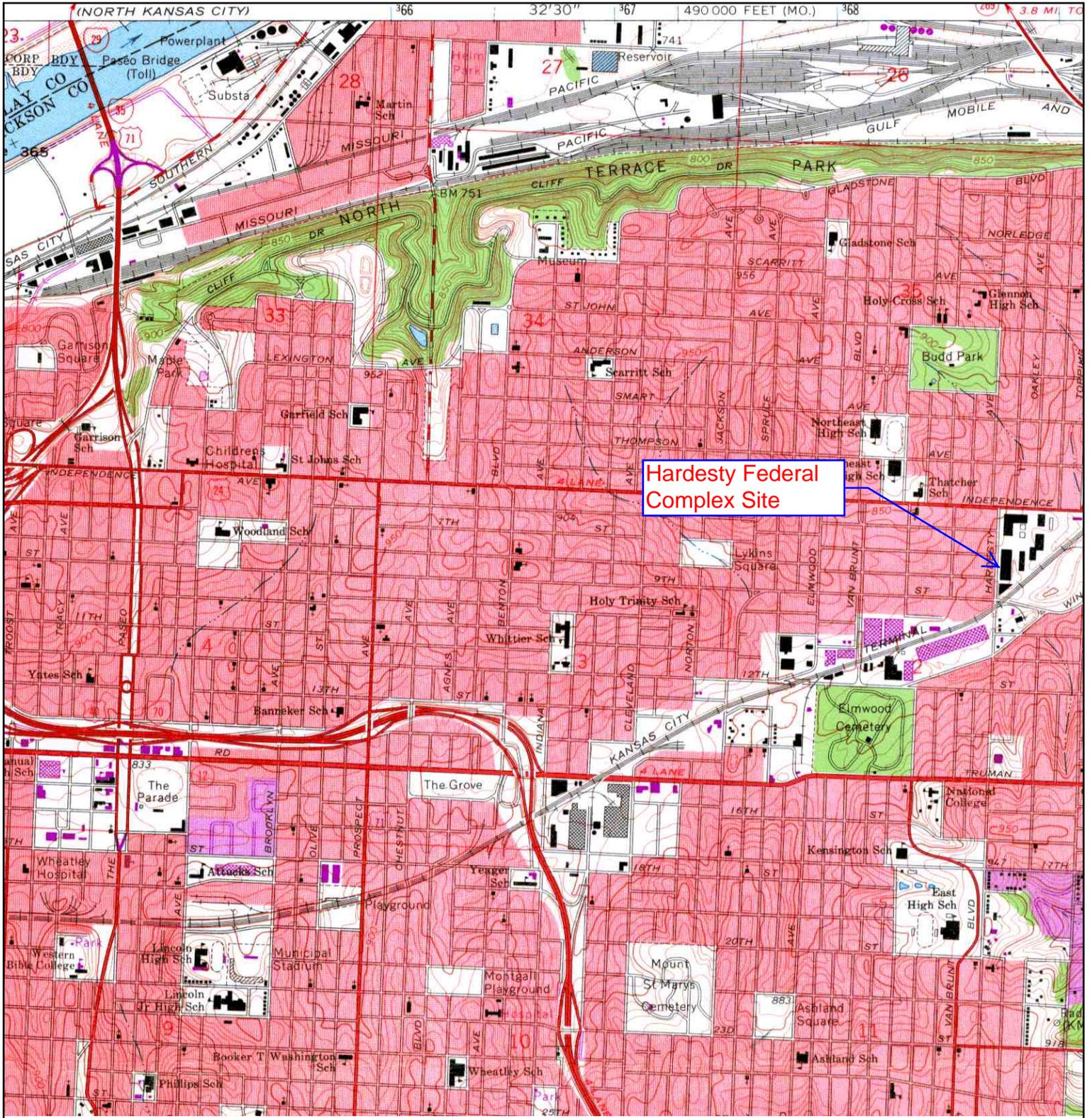


Historical Topographic Map



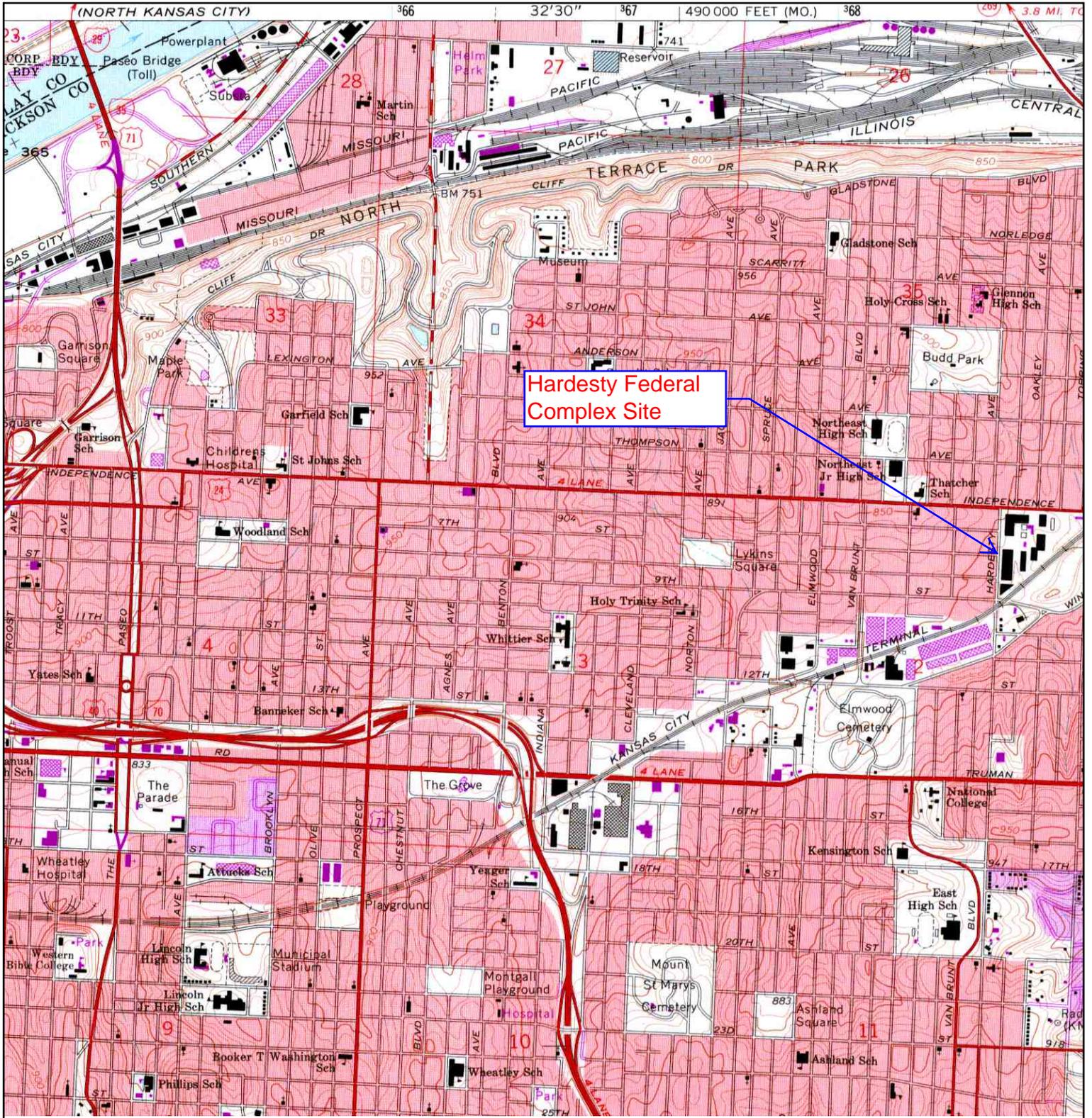
	TARGET QUAD
	NAME: KANSAS CITY
	MAP YEAR: 1964
	SERIES: 7.5
	SCALE: 1:24000

Historical Topographic Map



	TARGET QUAD
	NAME: KANSAS CITY
	MAP YEAR: 1970
	PHOTOREVISED: 1964
	SERIES: 7.5
	SCALE: 1:24000

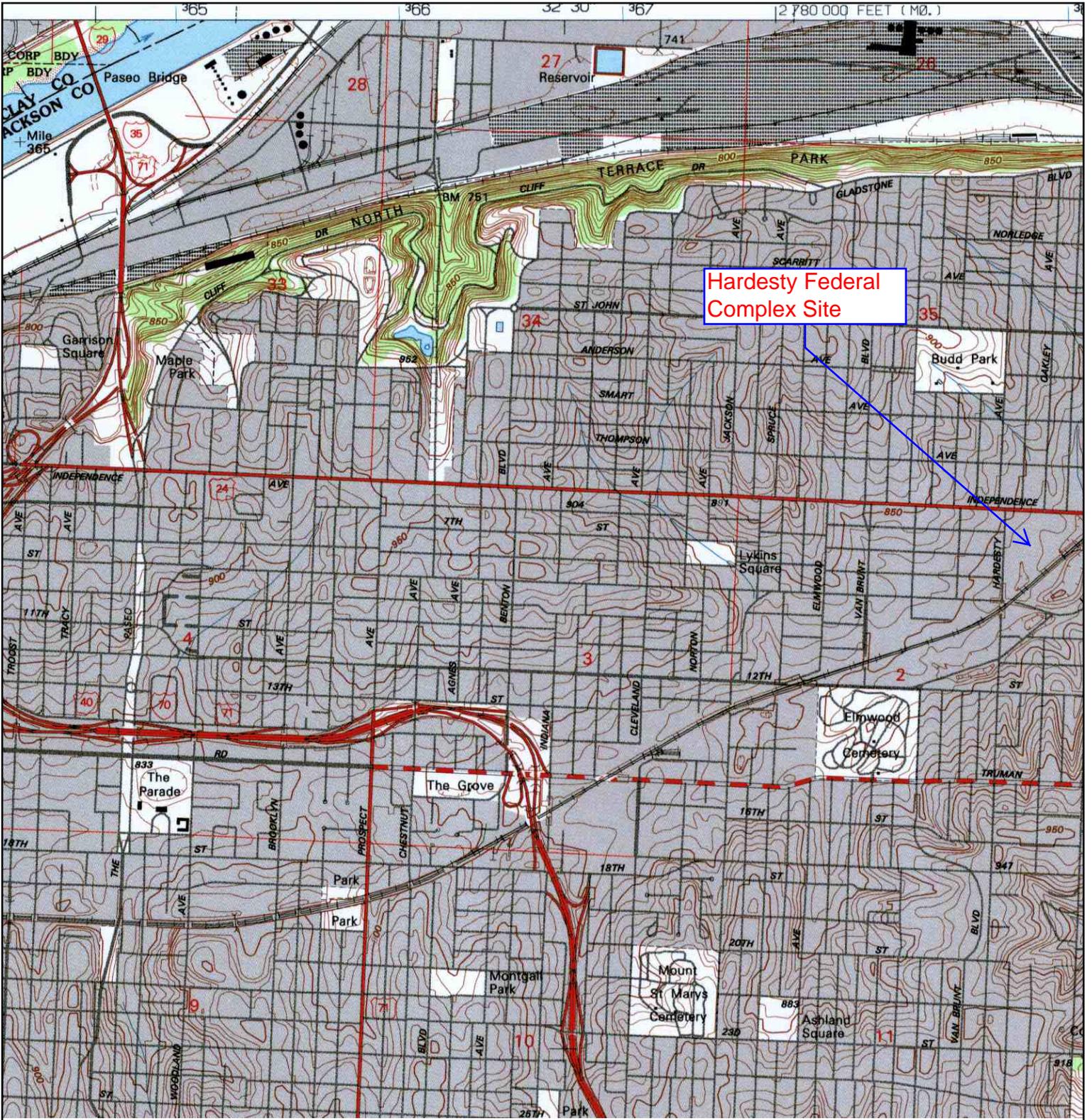
Historical Topographic Map



Hardesty Federal
Complex Site

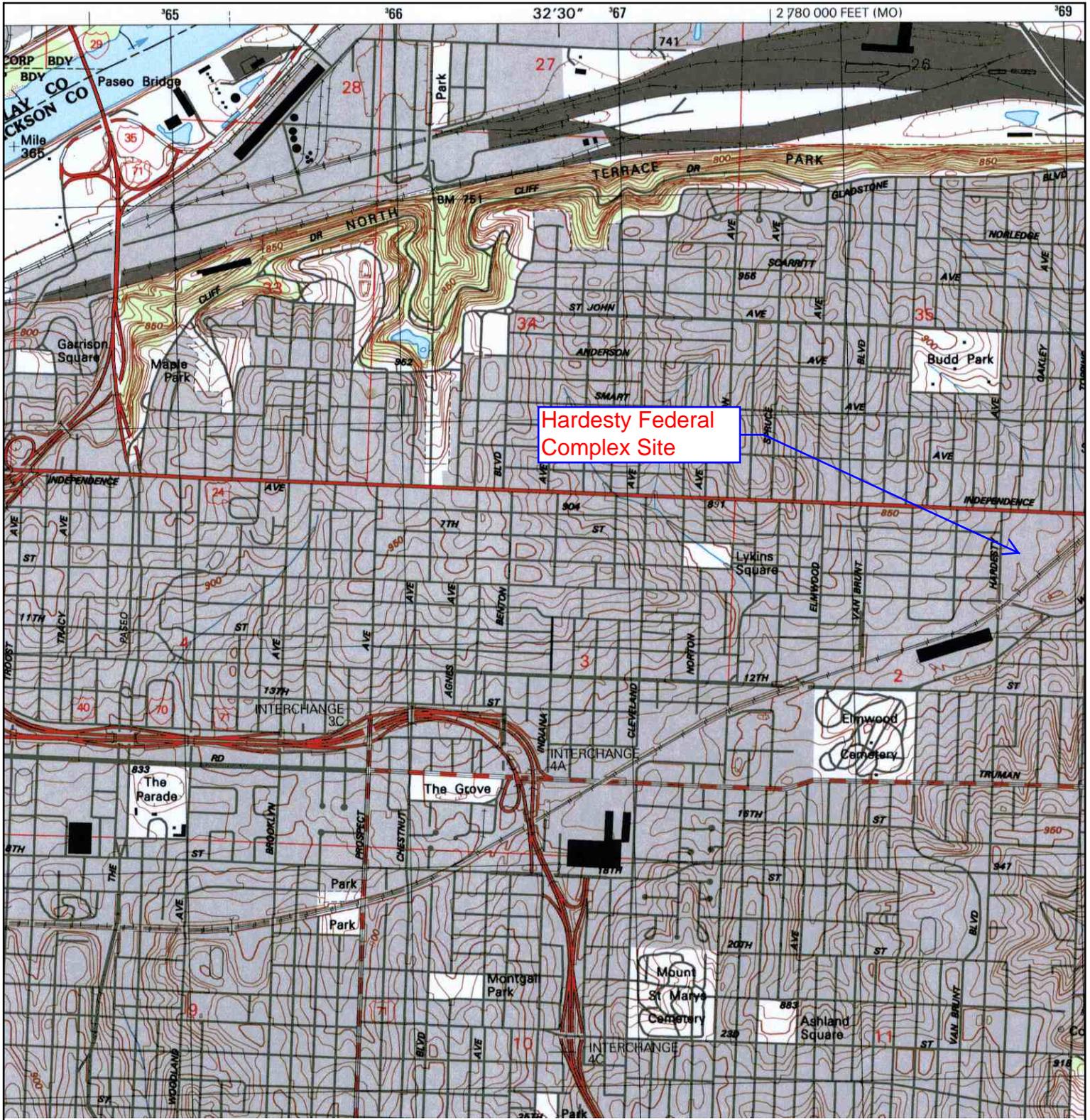
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	MAP YEAR: 1975
	PHOTOREVISED: 1964
	SERIES: 7.5
	SCALE: 1:24000

Historical Topographic Map



	TARGET QUAD
	NAME: KANSAS CITY
	MAP YEAR: 1991
	SERIES: 7.5
	SCALE: 1:24000

Historical Topographic Map



	TARGET QUAD
	NAME: KANSAS CITY
	MAP YEAR: 1996
	SERIES: 7.5
	SCALE: 1:24000

MEGA 2007 Water Well Search



● Private Well ● Public Well

Information obtained from Missouri Department of Natural Resources (MDNR) Geological Survey and Resource Assessment Division (GSRAD) Missouri Environmental Geology Atlas (MEGA), 2007.

MEGA 2007 Water Well Search

Information associated with the domestic well located at the intersection of St. John Avenue and Bennington Avenue.

Field	Value
REFNUM	0214648A
WELL_NO	
OWNER_LAST	
OWNER_FRST	
REC_TYPE	W
USE	D
DATE_COMPL	Jul 9, 1999 12:00:00 AM
COUNTY	095
TOTAL_DPTH	63.0
ELEV	750.0
SWL	16.0
W_CASING_L	60.0
W_TEST_YLD	80
FROM_1	0.0
TO_1	16.0
FROM_2	16.0
TO_2	63.0
FROM_3	0.0
TO_3	0.0
FROM_4	0.0
TO_4	0.0
FROM_5	0.0
TO_5	0.0
FROM_6	0.0
TO_6	0.0
FORM_1	SOIL/CLY
FORM_2	SND/GRVL
FORM_3	
FORM_4	
FORM_5	
FORM_6	

Information obtained from Missouri Department of Natural Resources (MDNR) Geological Survey and Resource Assessment Division (GSRAD) Missouri Environmental Geology Atlas (MEGA), 2007.