

Former Kincheloe Air Force Base, Kinross Township, Chippewa County, Michigan

Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10) Decision Document

Final

September 2020

U.S. Army Corps of Engineers, Louisville District
600 Dr. Martin Luther King, Jr. Place
Louisville, KY 40202-2239

FUDS Property Number E05MI0025



**US Army Corps
of Engineers®**

ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
CELRL	U.S. Army Corps of Engineers–Louisville District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COPC	contaminant of potential concern
DoD	Department of Defense
EGLE	Michigan Department of Environment, Great Lakes and Energy
FS01	Fuel Storage Area 01
FUDS	Formerly Used Defense Site
HHRA	Human Health Risk Assessment
KAFB	Kincheloe Air Force Base
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SVOC	semivolatile organic compound
TAL	Target Analyte List
U.S.	United States
US10	Underground Storage Tank 10
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

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FINAL DECISION DOCUMENT EXECUTIVE SUMMARY & APPROVAL SIGNATURE FUDS E05MI0025-51

The Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10) project sites at the former Kincheloe Air Force Base (KAFB) are located in Kinross Township, in Chippewa County, Michigan. The former KAFB was operated from 1942 to 1945 and from 1952 to 1977 by the United States under the jurisdiction of the Secretary of the Department of Defense (DoD). The former KAFB was transferred from DoD control prior to October 17, 1986 and meets the definition of a Formerly Used Defense Site (FUDS). The United States (U.S.) Army has been designated as the Executive Agent on behalf of the DoD for execution of an environmental restoration program at facilities under the jurisdiction of the Secretary; this program is implemented in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments Reauthorization Act of 1986 (SARA). The U.S. Army Corps of Engineers (USACE)–Louisville District is responsible for this project in accordance with the Defense Environmental Restoration Program. DoD and has determined that No Action is warranted.

Based on the findings of the Remedial Investigation (RI) conducted at the FS01 and US10 project sites, there is no unacceptable risk to human health and the environment; therefore, the U.S. Army, in coordination with the Michigan Department of Environment, Great Lakes and Energy (EGLE) determined that No Action is needed for the site to be protective of human health and the environment. No additional environmental investigation or remediation will be performed by the U.S. Army.

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1. DECLARATION

1.1 Site Name and Location

This Decision Document announces the USACE's determination that no remedial action is needed for the former Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10) project sites located at the former Kincheloe Air Force Base (KAFB), in Kinross Township, Chippewa County, Michigan. The location of the former FS01 and US10 project sites are depicted on Figure 1.

1.2 Statement of Basis and Purpose

The FS01 and US10 project sites are identified as Formerly Used Defense Site (FUDS) Property Number E05MI0025, Project Number E05MI0025-51. A FUDS is a real property that was owned by, leased to, or otherwise possessed by the United States (U.S.) under Department of Defense (DoD) jurisdiction at the time of actions leading to contamination by hazardous substances and transferred from DoD control before October 17, 1986 (DoD 2004).

The former KAFB was located on real property that was formerly owned (FS01 project site) or leased (US10 project site) by the U. S. Government under the jurisdiction of the DoD from 1942 to 1945 and from 1952 to 1977. The property was disposed by a quit claim deed to Chippewa County in July 1978. Based on the property being owned by the United States under DoD jurisdiction and subsequently disposed prior to October 17, 1986, the FS01 and US10 project sites are FUDS eligible. The FUDS program follows the remedial process outlined in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA, 42 USC §9601 et seq.), as amended by the Superfund Amendments Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). Pursuant to Executive Order 12580, DoD has delegated its lead agency authority for implementing the FUDS program to USACE, who works in coordination with the Michigan Department of Environment, Great Lakes and Energy (EGLE) for environmental restoration of FUDS properties in Michigan.

In accordance with the CERCLA process, USACE has determined that No Action is necessary for the FS01 and US10 project sites on the former KAFB. The determination is supported by the findings of the final *Revised Remedial Investigation Report Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10), Former Kincheloe Air Force Base, Chippewa County, Michigan* (CH2M 2019) (RI).

Information not specifically summarized in this Decision Document or its references, but contained in the Administrative Record, has been considered and supports the selection of the No Action Decision for the FS01 and US10 project sites.

1.3 Description of Selected Remedy

No CERCLA Action is necessary for the former FS01 and US10 project sites. This Decision Document declares that No CERCLA Action is necessary to ensure protection of human health

and the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants from the former FS01 and US10 project sites based on the Final RI.

1.4 Statutory Determination

CERCLA §121 statutory determinations are not necessary for the former FS01 and US10 project sites since no remedy is being selected. No remedial action is necessary to ensure protection of human health and the environment for the former FS01 and US10 project sites based on the findings of the RI that determined the concentrations of DoD-related contaminants benzene, toluene, ethylbenzene, xylenes (BTEX) and trimethylbenzenes are below the Part 201 risk-based screening levels.

1.5 Authorizing Signatures

This Decision Document presents the No Action Decision for the former FS01 and US10 project sites, located in Kinross Township, Chippewa County, Michigan. The USACE is the lead agency under the Defense Environmental Restoration Program at the former FS01 and US10 project sites and has developed this Decision Document consistent with CERCLA, as amended, and the NCP. USACE received concurrence from EGLE on January 10, 2020 on the No Action Decision. The public was invited to attend a virtual public meeting (a live meeting was not held due to the COVID-19 pandemic) on July 7, 2020, that presented the No Action Decision recommendation. The public was also given an opportunity to review and provide comments on the No Action Proposed Plan during the public comment period from June 22, 2020, to July 22, 2020. Three public comments were received during the virtual public meeting which are addressed in Section 3, Responsiveness Summary. No other comments were received during the public comment period.

This Decision Document will be incorporated into the larger Administrative Record file for the former KAFB, which is available for public review at the Kinross Township Hall located at 4884 W. Curtis Street, Kincheloe, MI 49788. The document is also available at USACE–Louisville District, 600 Dr. Martin Luther King Jr. Place, Louisville, KY 40202.

This Decision Document determining No Action is warranted at the former FS01 and US10 project sites at the former KAFB is approved by the undersigned, pursuant to memorandum DAIM-ZA, June 24, 2019, Subject: Policy for Staffing and Approving Decision Documents; and to Engineer Regulation 200-3-1, FUDS Program Policy.

Approved:

Stephen G. Durrett, P.E.
Regional Programs Director

Date

2. DECISION SUMMARY

2.1 Site Name, Location, and Description

The former FS01 and US10 project sites are located at the former KAFB, in Kinross Township, Chippewa County, Michigan (Figure 1). At the time of base closure, the former KAFB contained more than 4,000 acres, 175 nonresidential buildings, 1,383 family housing units, and more than 29 miles of paved roads.

The FS01 project site is approximately 7.5 acres in size (Figure 1) and was used for bulk storage of petroleum (primarily aviation fuel) and deicing products (Air Force Center for Environmental Excellence 1998). The bulk products were received by pipe line and rail, unloaded from the rail cars at “offloading racks,” and transferred to various storage structures.

Seven buildings (Buildings 217, 219, 221, 222, 223, 224, and 260), seven underground storage tanks (2, 5, 6, 7, 8, 9, and 49), and three aboveground storage tanks (ASTs) (1, 3, and 4) were located within the FS01 site. Historical FS01 project site features are depicted on Figure 2. Due to the proximity of Building 234 to the FS01 project site, samples were also collected near and beneath the Building 234 slab, which is east of the FS01 site.

The US10 project site (formerly known as the Airport Terminal) is adjacent to the northern side of former Taxiway 6. Historical US10 project site features are depicted on Figure 3. Underground storage tanks 10, 11, and 45 were located on the US10 project site and stored jet fuel for dispensing along Taxiway 6. An 8-inch-diameter pipeline dispensed aviation fuel from the FS01 project site to the US10 project site.

2.2 Site History and Enforcement Activities

There are no former, current, or outstanding federal or state enforcement actions, lawsuits, or other pending actions related to contamination at the former FS01 and US10 project sites. During the delineation of the DoD-related contaminants of potential concern (COPC); (benzene, toluene, ethylbenzene, xylenes (BTEX) and trimethylbenzenes), associated with the FS01 project site, trichloroethylene and tetrachloroethylene were detected but determined to be related to Building 234 rather than the FS01 project site and therefore will be addressed under FUDS Project 57, which includes the motor pool area and Building 234.

The former FS01 and US10 project sites were investigated by USACE for environmental impacts beginning in 1988. Information from the investigations can be found in the following documents prepared on behalf of USACE (ordered chronologically):

- Donahue and Associates. 1988. *Final Report for Confirmation Study*.
- Alpha-Omega Environmental, Inc. (Alpha-Omega). 1995. *Closure Report for Pickling Liquid Pipeline and the Six Fuel Hydrant Laterals Underneath Taxiway 6*.
- Dodson-Stilson, Inc. 1998. *Final UST Removal/Closure Report Building 232*.

- Parsons Engineering Science, Inc. 1998. *Final Summary of Contamination Report*.
- Montgomery Watson. 2000. *Final Comprehensive Action Plan*.
- Young's Environmental Cleanup. 2000. *Soil Berm Sampling, Removal and Disposal Report*.
- MWH Americas, Inc. (MWH). 2008a. *Final Groundwater Flow and Solute Contaminant Fate and Transport Modeling Report, Former Kincheloe Air Force Base, Kinross, Michigan*.
- MWH Americas, Inc. (MWH). 2008b. *Final Underground Storage Tank Research and Reconciliation Report*.
- CH2M. 2012. *Remedial Investigation Report Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10)*. December.
- MWH Americas, Inc. (MWH). 2013. *Final Summary Report—Fuel Storage Area Former Kincheloe AFB*.
- CH2M. 2019. *Revised Remedial Investigation Report Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10), Former Kincheloe Air Force Base, Chippewa County, Michigan*.

2.3 Community Participation

The community relations activities conducted for the former FS01 and US10 project sites are described below:

- A Community Relations Plan was prepared in April 2018. The Community Relations Plan was developed to inform the community about environmental restoration activities associated with the FS01 and US10 project sites and provide the community with an opportunity to comment on the environmental restoration activities.
- A document repository and Administrative Record has been maintained by USACE at the Louisville District office and at the Kinross Township Hall, in Kincheloe, Michigan.
- Upon concurrence with EGLE, the Proposed Plan was finalized on June 2, 2020, and copies were submitted to the document repositories.
- Public comments on the Proposed Plan were solicited through a notice placed in *The Sault News* on May 26, 2020. A public meeting was held virtually (due to the COVID-19 pandemic) at 6:00 p.m. on July 7, 2020. Public comments were accepted during the public meeting and during the public comment period, from June 22 to July 22, 2020. Section 3, Responsiveness Summary, addresses the three comments that were received during the

public meeting. No additional comments were received during the public comment period outside of the public meeting.

2.4 Scope and Role of Operable Unit or Response Action

The USACE serves as DoD Execution Agent for cleanup of FUDS nationwide. USACE–Louisville District (CELRL) is responsible for the environmental restoration program at the former KAFB which includes the former FS01 and US10 project sites. In accordance with the environmental restoration process as prescribed by CERCLA, CELRL has determined that no action is necessary to ensure protection of human health and the environment for the former FS01 and US10 project sites. This determination is supported by the findings of the RI.

The No Action Decision presented in this Decision Document applies to the real property associated with the former FS01 and US10 project sites located at the former KAFB.

2.5 Site Characteristics

The former FS01 and US10 project sites are within the developed portions of the former KAFB. FS01 is approximately 0.25 mile north of the existing airfield, and US10 is located within the existing airfield. The topography near the former FS01 and US10 project sites is relatively flat with elevations ranging from approximately 793 to 798 feet above mean sea level (amsl). The surface water body nearest FS01 and US10 is near the Kinross Township wastewater treatment plant outfall, more than 4,000 feet upgradient to the north-northwest of the former FS01 and US10 project sites.

Drilling conducted at FS01 during the RI extended through the unconsolidated glacial material to the top of bedrock at 240 feet below ground surface (bgs) (553 feet amsl) at well FS01-MW04B and 234 feet bgs (559 feet amsl) at well FS01-MW13B. Drilling conducted at US10 extended to a maximum depth of 115 feet bgs (682 feet amsl) within unconsolidated glacial material at monitoring well US10-MW04B.

Soil in the unconsolidated glacial material at the former FS01 and US10 project sites are primarily fine- to medium-grained sand with varying degree of gravel, silt, and clay fines with scattered cobbles. The Unified Soil Classification System classification for soil types encountered were predominantly fine- to medium-grained sand and fine- to medium-grained sand with gravel. This is consistent with soil lithology at other locations on the former KAFB and with regional geology described in the *Summary of Hydrogeological Conditions by County for the State of Michigan* (U.S. Geological Survey 2006).

During the RI, soil, groundwater and air samples were analyzed for VOCs, including trichloroethylene and tetrachloroethylene and the Target Analyte List (TAL) metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc). The COPCs found to be associated with the FS01 and US10 project sites are BTEX and trimethylbenzene. Trichloroethylene and tetrachloroethylene were detected but determined to be related to Building 234 rather than the FS01 or US10 project sites and therefore will be addressed under FUDS Project 57, which includes the motor pool area and Building 234.

2.5.1 Groundwater Pathway

Historical depth-to-groundwater measurements in the unconfined aquifer at the former FS01 project site ranged from 62 to 65 feet bgs (731 to 728 feet amsl). The unconfined aquifer is approximately 170 feet thick at FS01. Historical groundwater elevation data collected at the former FS01 project site from 2000 to 2008 and 2016 indicates groundwater predominantly flows in a southeasterly direction in the unconfined aquifer.

Historical depth-to-groundwater measurements in the unconfined aquifer at the former US10 project site ranged from 66 to 69 feet bgs (730 to 727 feet amsl). Historical groundwater elevation data collected at the former US10 project site from 2000 to 2008 and 2016 indicates groundwater flows predominantly in an easterly to southeasterly direction in the unconfined aquifer.

From 2000 to 2017, a total of 125 groundwater samples were collected from 20 monitoring wells at the former FS01 project site, including wells located near Building 234. Ninety-two groundwater samples were collected from 12 monitoring wells at the former US10 project site. Figures 4 and 5 depict historical COPC concentrations in groundwater at the former FS01 and US10 project sites, including the most recent groundwater samples collected from FS01 (2017) and US10 (2016).

Groundwater sample analytical results were compared to EGLE applicable Part 201 residential and nonresidential health-based groundwater cleanup criteria (drinking water and groundwater volatilization to indoor air). All COPC concentrations at FS01 have been below applicable Part 201 health-based groundwater cleanup criteria since 2008, and all COPCs concentrations at US10 have been below applicable Part 201 health-based groundwater cleanup criteria since 2005.

2.5.2 Surface Water Pathway

The surface water body nearest the former FS01 and US10 project sites is located near the Kinross Township wastewater treatment plant outfall, over 4,000 feet upgradient to the north-northwest of the FS01/US10 project sites. Groundwater flow at the former FS01 and US10 project sites is to the southeast. The nearest downgradient surface water features are small bogs located to the southeast, approximately 3.75 miles from the former FS01 and US10 project sites. Based on groundwater modeling and the delineation of the FS01 and US10 groundwater plumes, impacted groundwater from the former FS01 and US10 project sites will not discharge to the nearest surface water bodies. Therefore, the groundwater discharging to surface water is not a relevant pathway at the former FS01 and US10 project sites.

2.5.3 Soil Pathways

From 2000 to 2017, a total of 138 soil samples were collected from 34 soil borings at the former FS01 project site, including around Building 234. Sixty-one soil samples were collected from 30 soil borings at the former US10 project site. Soil boring locations are depicted on Figure 6 (FS01) and Figure 7 (US10).

Soil sample analytical results were compared to applicable Part 201 residential and nonresidential health-based generic cleanup criteria (drinking water protection, direct contact cleanup criteria, and soil volatilization to indoor air). There were no exceedances of the applicable cleanup criteria for COPCs in soil associated with the former FS01 or US10 project sites.

2.5.4 Soil Vapor Pathways

To further assess the possibility of project site COPCs in soil or groundwater to impact ambient or indoor air quality, a soil gas survey was conducted at the former FS01 and US10 project sites in 2016. Twenty-eight soil gas samples were collected from 12 soil gas borings, and 8 soil gas samples were collected from 8 subslab vapor pins at the former FS01 project site including inside Building 234. Twelve soil gas samples were collected from five soil gas borings at the former US10 project site in 2016. FS01 soil gas borings, FS01 subslab vapor pin locations, and US10 soil gas borings are depicted on Figures 8, 9, and 10, respectively.

Soil gas sample analytical results were compared to the EGLE residential and nonresidential subslab soil gas concentrations for vapor intrusion. No COPCs associated with the former FS01 and US10 project sites exceeded the EGLE residential and nonresidential subslab soil gas concentrations for vapor intrusion.

2.6 Current and Potential Future Site and Resource Uses

The former FS01 and US10 project sites are currently owned by the Chippewa County Economic Development Corporation and are zoned commercial/light industrial. A propane distribution company and restaurant are located on the former FS01 project site and the former US10 project site is located within the active airfield portion of Chippewa County International Airport. There are currently no plans to change land use and land use will likely remain commercial/industrial in the future at the former FS01 and US10 project sites.

2.7 Site Risks

Risks to public health and the environment at the former FS01 and US10 project sites were assessed in the RI.

Risks to human health were assessed using the Michigan Public Act 451, Part 201 Generic Cleanup Criteria and Screening Levels. EGLE developed the Part 201 Generic Cleanup Criteria and Screening Levels according to standard health-based algorithms and generic HHRA assumptions determined by EGLE to appropriately characterize patterns of human exposure associated with specific land use. The Part 201 Generic Cleanup Criteria and Screening Levels and the Media-specific and Time-sensitive Interim Action Screening Levels for Vapor Intrusion were used as screening criteria to determine the COPCs that would be assessed in a site-specific HHRA per CERCLA.

The former FS01 and US10 project sites are zoned commercial/industrial, and future site use likely will remain commercial/industrial. However, both residential and nonresidential Part 201 Generic Cleanup Criteria and Screening Levels were used to assess whether contaminants of concern need to be assessed in an HHRA.

Exposure to impacted soil, groundwater, and air were assessed as part of a screening-level HHRA. The data used in the screening-level risk assessment were collected during the RI and supplemental RI phases of the project from 2000 to 2017. No COPCs associated with the former FS01 and US10 project sites exceeded any applicable Part 201 residential or nonresidential health-based cleanup criteria in soil, groundwater, or air since 2008 (FS01) and 2005 (US10). No unacceptable risks to

human health associated with the impacted soil, groundwater, and air remain at the former FS01 and US10 project sites; therefore, completion of an HHRA per CERCLA was not warranted.

The former FS01 and US10 project sites are located in developed commercial/industrial areas of the former KAFB. The area surrounding the former FS01 project site continues to have grassed and paved areas in the southern portion and is generally a combination of grassed/paved and non-vegetated areas in the northern portion. The southern portion contains propane distribution and storage structures associated with the current tenant and is routinely mowed. The area surrounding the US10 project site continues to be grass and paved areas associated with Chippewa County International Airport. The grass areas are routinely mowed.

The FS01 and US10 project sites are not considered a sensitive or endangered ecosystem according to the Michigan State University Natural Features Inventory Database. No threatened or endangered species are dependent on the ecosystem at the former FS01 and US10 project sites. The former FS01 and US10 project sites are within the developed portions of the former KAFB and likely would not support endangered species. No unacceptable risks to ecological receptors associated with the impacted soil, groundwater or air at the FS01 or US10 project sites were identified.

2.8 Documentation of Significant Changes

The Proposed Plan detailing the No Action Decision for the former FS01 and US10 project sites was presented for public comment from June 22 through July 22, 2020, including the virtual public meeting held on July 7, 2020. Three comments were received during the virtual public meeting and are addressed in Section 3, Responsiveness Summary. No other comments were received from the public during the 30-day comment period. No significant changes to the preferred alternative were warranted or appropriate based on the public comments.

3. RESPONSIVENESS SUMMARY

3.1 Stakeholder Issues and Lead Agency Responses

CELRL placed a Public Notice in *The Sault News*, on May 26, 2020 soliciting comments on a No Action Decision Proposed Plan for the former FS01 and US10 project sites at the former KAFB. A 30-day public comment period (June 22 to July 22, 2020) that included a virtual public meeting on July 7, 2020, was conducted. The virtual public meeting was held due to the COVID-19 pandemic.

Three questions were asked during the virtual public meeting and USACE's responses to each question are as follows:

1. Brian King, Sault Ste. Marie Tribe of Chippewa Indians

Question: Was an investigation conducted along the 8-inch pipeline between the fuel storage area and the three underground storage tanks at US10?

Response: Yes, the 8-inch pipeline was investigated as a separate area of concern (Area of Concern 27). In 1994, the fuel distribution pipeline connecting Building 219 and USTs 10, 11, and 45 was abandoned in place. Abandonment in place included opening each end of the pipeline at Building 219 and at USTs 10, 11, and 45 and removing the contents with a vac truck. The pipeline and laterals were then rinsed with steam using a high-pressure jet tube with a round sprinkler head. The rinsate was removed with a vac truck and properly disposed. After removal of the rinsate, the ends of the pipe were plugged with hydro cement.

A site assessment was then conducted along the length of the JP-4 pipeline. A soil sample was collected every 30 feet from 4 to 8 feet bgs along the JP-4 pipeline. Five consecutive samples (every 150 feet, samples 30 feet apart) were composited into one. BTEX was not detected in the 20 site assessment samples submitted for laboratory analysis. Based on the site assessment there was no indication of a release from the JP-4 pipeline that connected the FS01 and US10 sites.

2. Brian King, Sault Ste. Marie Tribe of Chippewa Indians

Question: The Proposed Plan states that the fuel was delivered to the AST by rail car, but there was a 30-mile pipeline to St. Ignace. Was anything looked into regarding the pipeline?

Response: The six-inch distribution pipeline from St. Ignace, Michigan was privately owned; therefore, the pipeline is not FUDS eligible for investigation by USACE.

3. Brian King, Sault Ste. Marie Tribe of Chippewa Indians

Question: There is a small tank farm north of the AST, called then emergency storage tank. Was that connected to the tank farm?

Response: The emergency storage tanks were aboveground storage tanks. They were not connected to the former FS01 structures. This area was investigated as part of the FS01 investigation. There was no indication of a release from the emergency storage tank area.

No changes were made to the No Action Decision provided in the Proposed Plan based on the public comments received and the subsequent implementation with approval of this No Action Decision Document.

3.2 Technical and Legal Issues

No technical or legal issues associated with the No Action Decision were identified.

4. REFERENCES

Alpha-Omega Environmental, Inc. (Alpha-Omega). 1995. *Closure Report for Pickling Liquid Pipeline and the Six Fuel Hydrant Laterals Underneath Taxiway 6*.

Air Force Center of Environmental Excellence. 1998. *Air Force Aircraft and Airfield Deicing/Anti-icing—fact sheet*.

CH2M. 2012. *Remedial Investigation Report Fuel Storage Area (FS01) and Underground Storage Tank 10 (US10)*. December.

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MWH Americas, Inc. (MWH). 2008a. *Final Groundwater Flow and Solute Contaminant Fate and Transport Modeling Report, Former Kincheloe Air Force Base, Kinross, Michigan*.

MWH Americas, Inc. (MWH). 2008b. *Final Underground Storage Tank Research and Reconciliation Report*.

MWH Americas, Inc. (MWH). 2013. *Final Summary Report—Fuel Storage Area Former Kincheloe AFB*.

Parsons Engineering Science, Inc. 1998. *Final Summary of Contamination Report*.


U.S. Geological Survey Division. 2006. *Summary of Hydrogeological Conditions by County for the State of Michigan*.

Young's Environmental Cleanup. 2000. *Soil Berm Sampling, Removal and Disposal Report*.

FIGURES



Legend

 Site Boundary

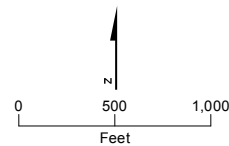


Figure 1
Site Location Map
USACE - Decision Document
Former Kincheloe AFB
Chippewa County, MI



Legend

- Existing Monitoring Well
- Approximate Locations of Historical Infrastructure

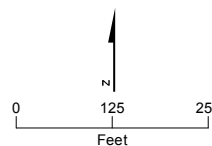
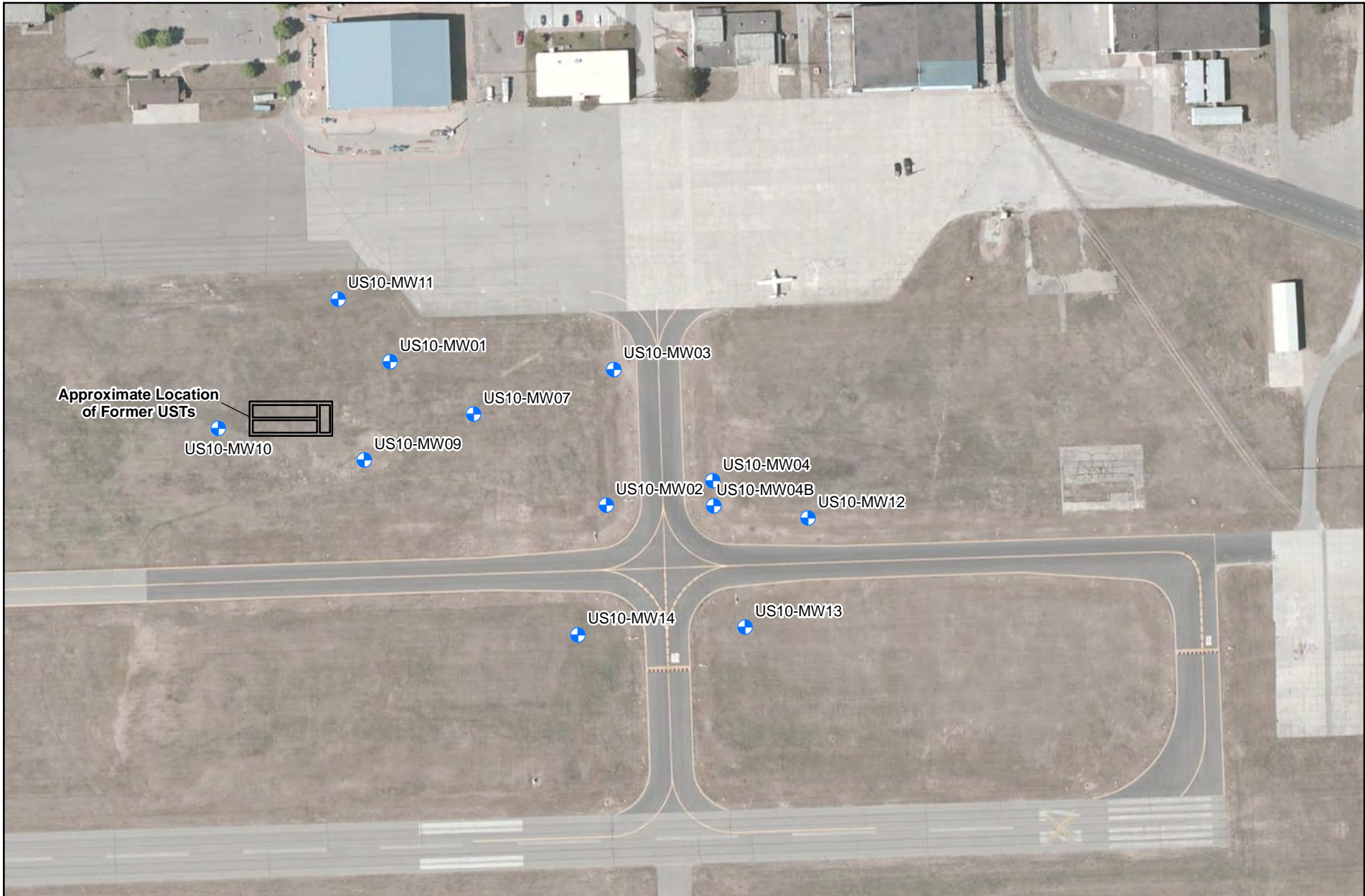




Figure 2
 FS01 Site Features
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI



Legend

-  Existing Monitoring Well
-  Approximate Locations of Historical Infrastructure

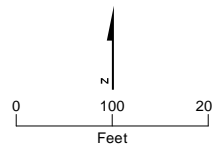
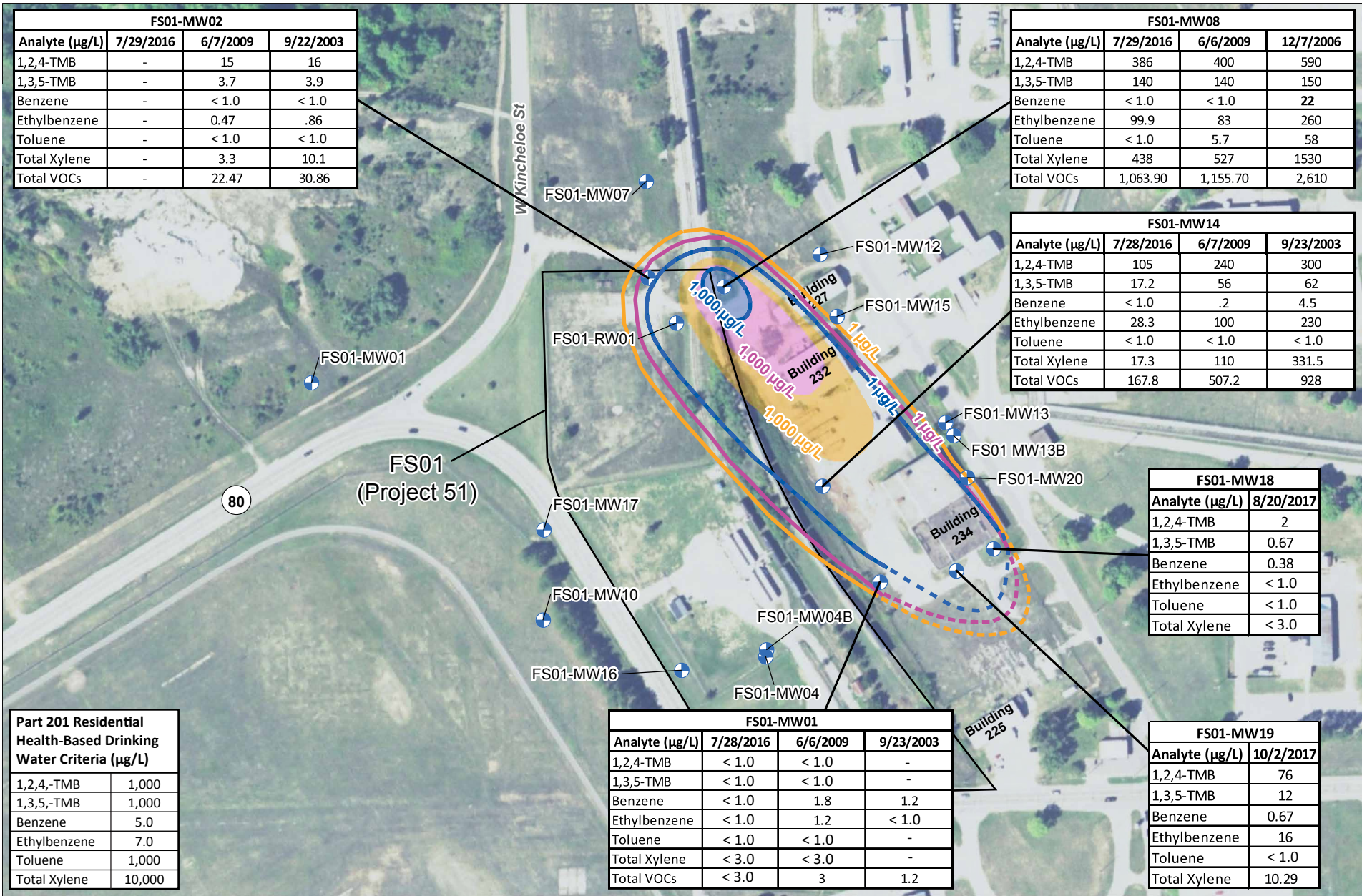


Figure 3
 US10 Site Features
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI



FS01-MW02			
Analyte (µg/L)	7/29/2016	6/7/2009	9/22/2003
1,2,4-TMB	-	15	16
1,3,5-TMB	-	3.7	3.9
Benzene	-	< 1.0	< 1.0
Ethylbenzene	-	0.47	.86
Toluene	-	< 1.0	< 1.0
Total Xylene	-	3.3	10.1
Total VOCs	-	22.47	30.86

FS01-MW08			
Analyte (µg/L)	7/29/2016	6/6/2009	12/7/2006
1,2,4-TMB	386	400	590
1,3,5-TMB	140	140	150
Benzene	< 1.0	< 1.0	22
Ethylbenzene	99.9	83	260
Toluene	< 1.0	5.7	58
Total Xylene	438	527	1530
Total VOCs	1,063.90	1,155.70	2,610

FS01-MW14			
Analyte (µg/L)	7/28/2016	6/7/2009	9/23/2003
1,2,4-TMB	105	240	300
1,3,5-TMB	17.2	56	62
Benzene	< 1.0	.2	4.5
Ethylbenzene	28.3	100	230
Toluene	< 1.0	< 1.0	< 1.0
Total Xylene	17.3	110	331.5
Total VOCs	167.8	507.2	928

FS01-MW18	
Analyte (µg/L)	8/20/2017
1,2,4-TMB	2
1,3,5-TMB	0.67
Benzene	0.38
Ethylbenzene	< 1.0
Toluene	< 1.0
Total Xylene	< 3.0

FS01-MW19	
Analyte (µg/L)	10/2/2017
1,2,4-TMB	76
1,3,5-TMB	12
Benzene	0.67
Ethylbenzene	16
Toluene	< 1.0
Total Xylene	10.29

FS01-MW01			
Analyte (µg/L)	7/28/2016	6/6/2009	9/23/2003
1,2,4-TMB	< 1.0	< 1.0	-
1,3,5-TMB	< 1.0	< 1.0	-
Benzene	< 1.0	1.8	1.2
Ethylbenzene	< 1.0	1.2	< 1.0
Toluene	< 1.0	< 1.0	-
Total Xylene	< 3.0	< 3.0	-
Total VOCs	< 3.0	3	1.2

Part 201 Residential Health-Based Drinking Water Criteria (µg/L)	
1,2,4-TMB	1,000
1,3,5-TMB	1,000
Benzene	5.0
Ethylbenzene	7.0
Toluene	1,000
Total Xylene	10,000

Legend

- Monitoring Well
- Approximate Historic Horizontal Extent of Petroleum Plume (Dashed Where Inferred)
- 2016/2017 Plume
- 2008/2009 Plume
- 2003/2006 Plume
- 22** Bold Indicates Value Exceeds Part 201 Residential Health-Based Drinking Water Value
- "-" Not Analyzed

- Notes:
1. Data to create plume maps used data from two years where data from a single year was incomplete (wells not sampled).
 2. Only analytes included in this data representation are BTEX and TMBs.
 3. All data presented in µg/L.
 4. Shaded portion of plume extents reflects concentrations of Total BTEX and TMB > 1,000 µg/L.
 5. Wells with no data presented for BTEX and TMBs did not have detections of these analytes.
 6. Total VOCs = Sum of BTEX and TMBs

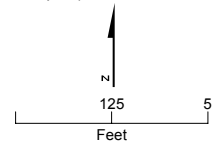
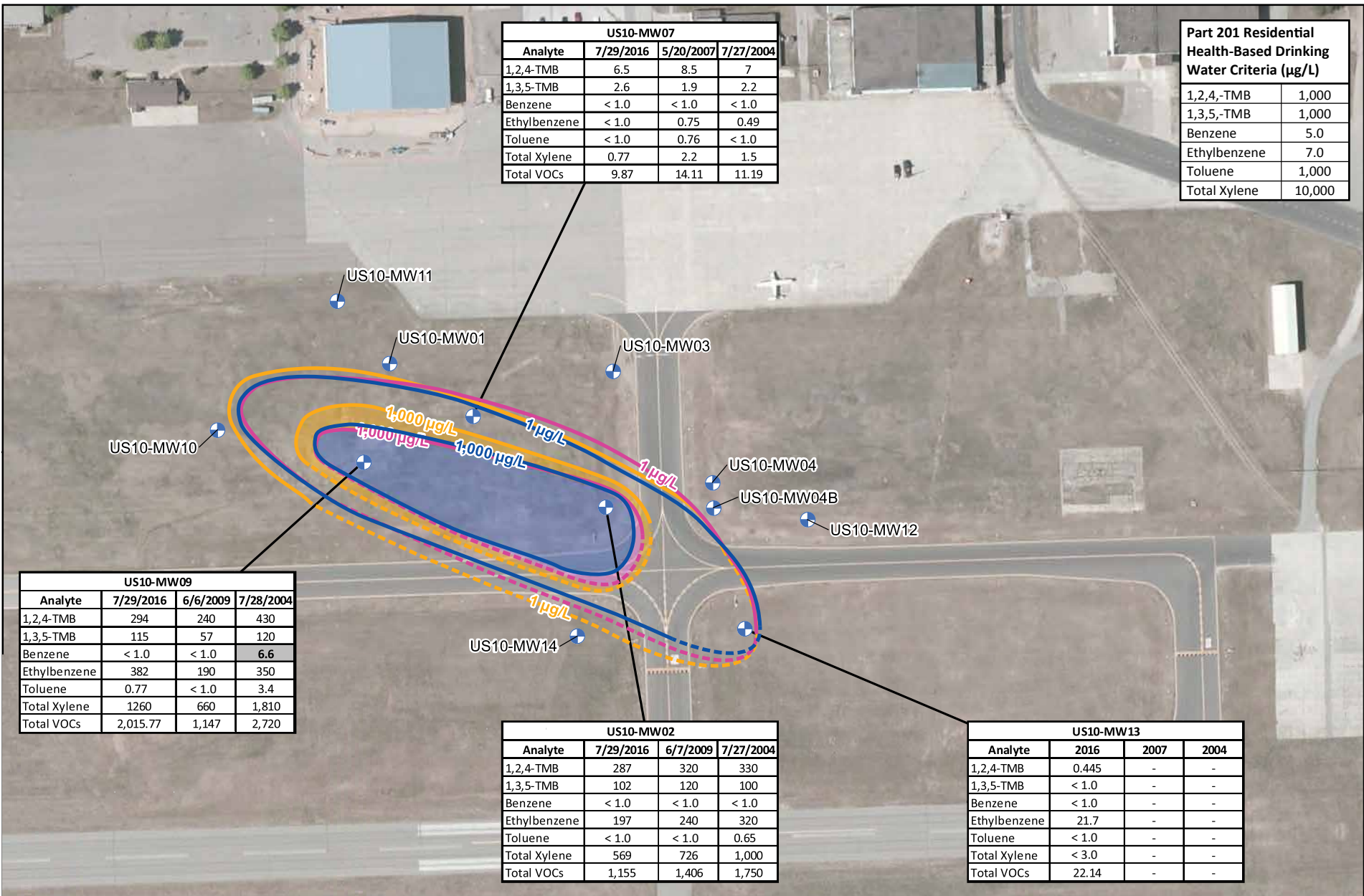


Figure 4
 FS01 Historical and Current Groundwater Analytical Data
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI

US10-MW07			
Analyte	7/29/2016	5/20/2007	7/27/2004
1,2,4-TMB	6.5	8.5	7
1,3,5-TMB	2.6	1.9	2.2
Benzene	< 1.0	< 1.0	< 1.0
Ethylbenzene	< 1.0	0.75	0.49
Toluene	< 1.0	0.76	< 1.0
Total Xylene	0.77	2.2	1.5
Total VOCs	9.87	14.11	11.19

Part 201 Residential Health-Based Drinking Water Criteria (µg/L)	
1,2,4,-TMB	1,000
1,3,5,-TMB	1,000
Benzene	5.0
Ethylbenzene	7.0
Toluene	1,000
Total Xylene	10,000



US10-MW09			
Analyte	7/29/2016	6/6/2009	7/28/2004
1,2,4-TMB	294	240	430
1,3,5-TMB	115	57	120
Benzene	< 1.0	< 1.0	6.6
Ethylbenzene	382	190	350
Toluene	0.77	< 1.0	3.4
Total Xylene	1260	660	1,810
Total VOCs	2,015.77	1,147	2,720

US10-MW02			
Analyte	7/29/2016	6/7/2009	7/27/2004
1,2,4-TMB	287	320	330
1,3,5-TMB	102	120	100
Benzene	< 1.0	< 1.0	< 1.0
Ethylbenzene	197	240	320
Toluene	< 1.0	< 1.0	0.65
Total Xylene	569	726	1,000
Total VOCs	1,155	1,406	1,750

US10-MW13			
Analyte	2016	2007	2004
1,2,4-TMB	0.445	-	-
1,3,5-TMB	< 1.0	-	-
Benzene	< 1.0	-	-
Ethylbenzene	21.7	-	-
Toluene	< 1.0	-	-
Total Xylene	< 3.0	-	-
Total VOCs	22.14	-	-

Legend

- Monitoring Well
- Approximate Historic Horizontal Extent of Petroleum Plume (Dashed Where Inferred)**
- 2016 Plume
- 2007/2009 Plume
- 2004 Plume

"-" Not Analyzed
6.6 Bold Indicates Value Exceeds Part 201 Residential Health-Based Drinking Water Value

Notes:

1. Data to create plume maps used data from two years where data from a single year was incomplete (wells not sampled).
2. Only analytes included in this data representation are BTEX and TMBs.
3. All data presented in µg/L.
4. Shaded portion of plume extents reflects concentrations of Total BTEX and TMB >1,000 µg/L.
5. Wells with no data presented for BTEX and TMBs did not have detections of these analytes.
6. Total VOCs = Sum of BTEX and TMBs

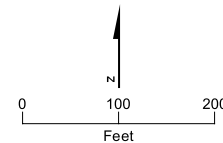
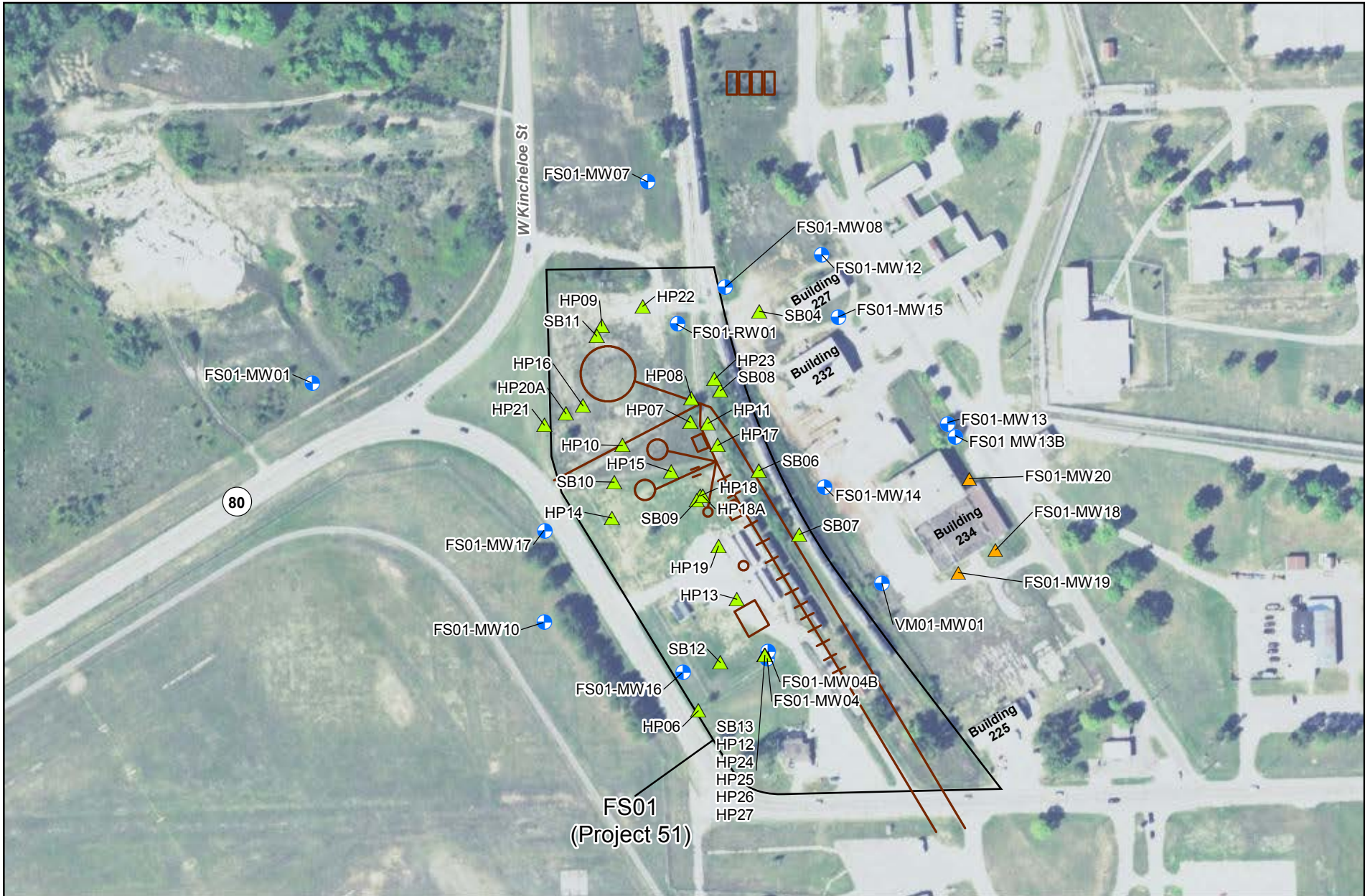


Figure 5

US10 Historical and Current Groundwater Analytical Data
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI



Legend

- ▲ 2017 Soil Boring / Monitoring Well Location
- ▲ Soil Boring Location
- ⊕ Existing Monitoring Well
- Approximate Locations of Historical Infrastructure

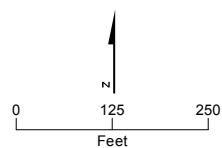
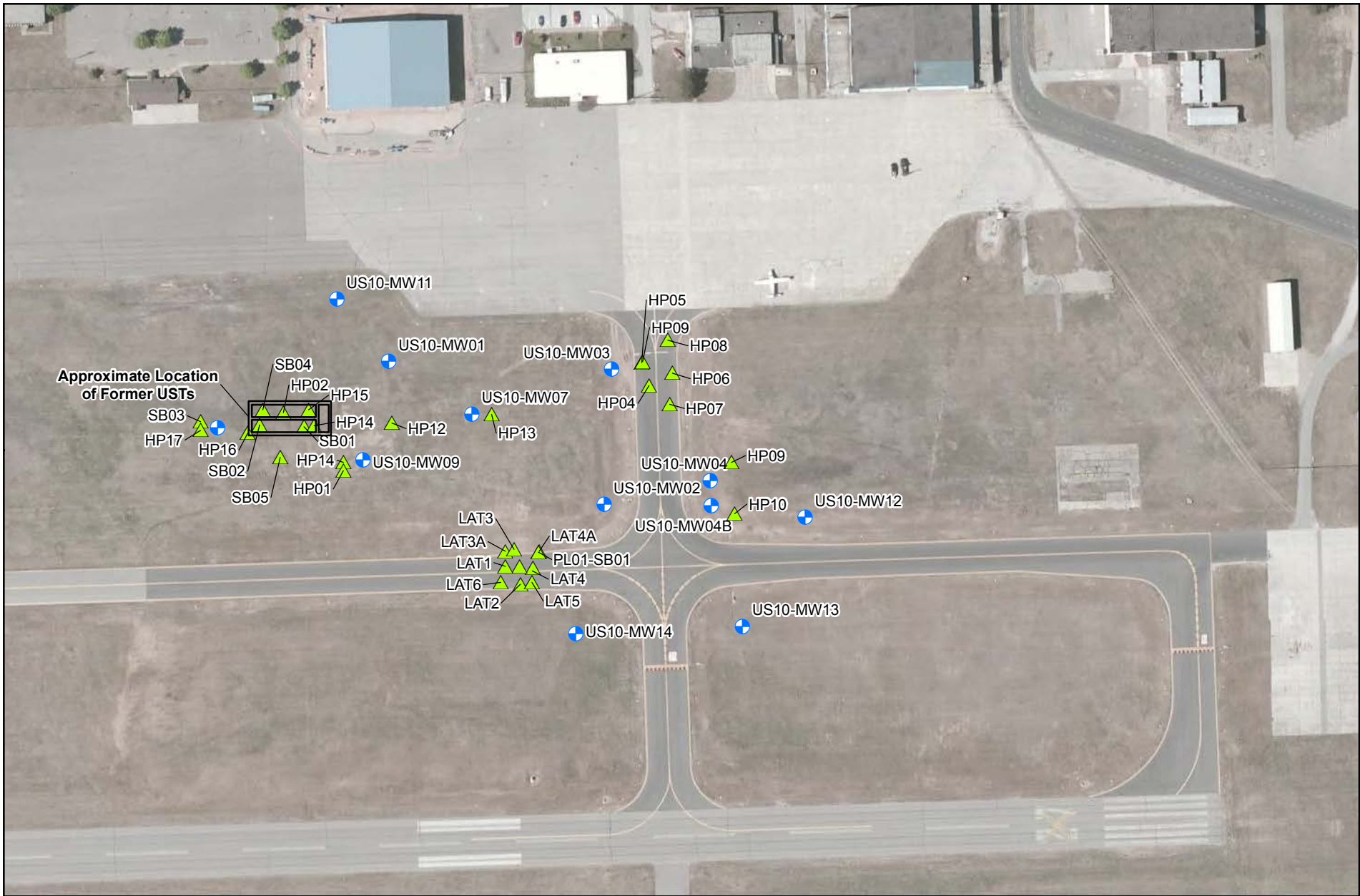


Figure 6
 FS01 Soil Boring Locations
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI

Source: ESRI, Microsoft (Image Dated 5/24/2010)



Legend

- ▲ Soil Boring Location
- ⊕ Existing Monitoring Well
- Approximate Locations of Historical Infrastructure

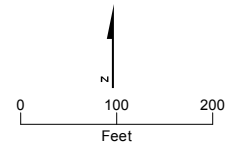
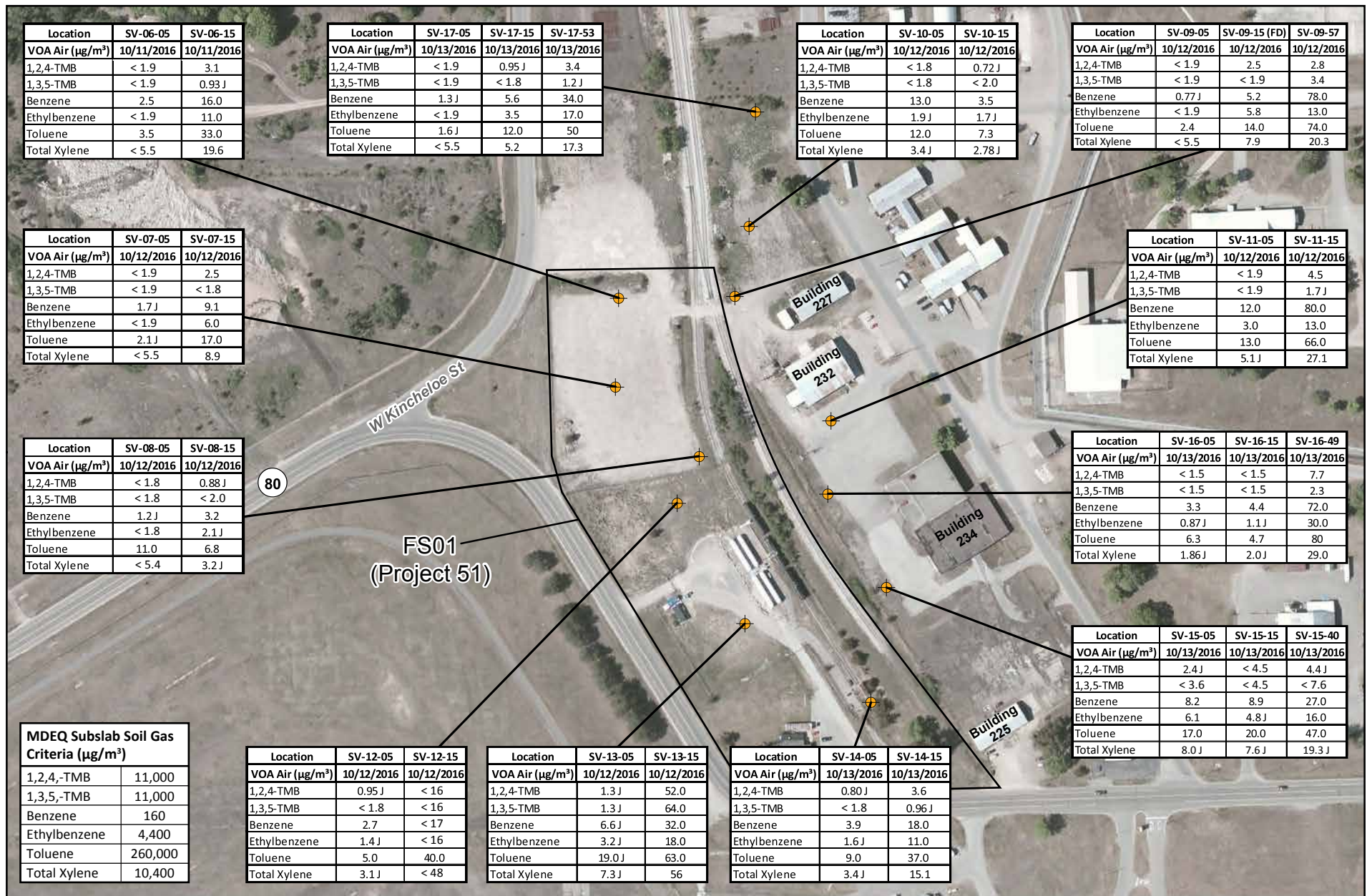


Figure 7
 US10 Soil Boring Locations
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI



Legend

- Soil Vapor Sampling Point
- ND Non Detect

Notes:

- $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter
- 1,2,4-TMB = 1,2,4-Trimethylbenzene
- 1,3,5-TMB = 1,3,5-Trimethylbenzene
- J = The reported result is an estimated value.
- UJ = Was not detected, but not above the Limit of Detection (LOD), so the value is estimated. However, the reported detection limit is approximate and may or may not represent the actual limit of detection.

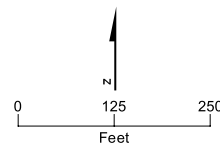
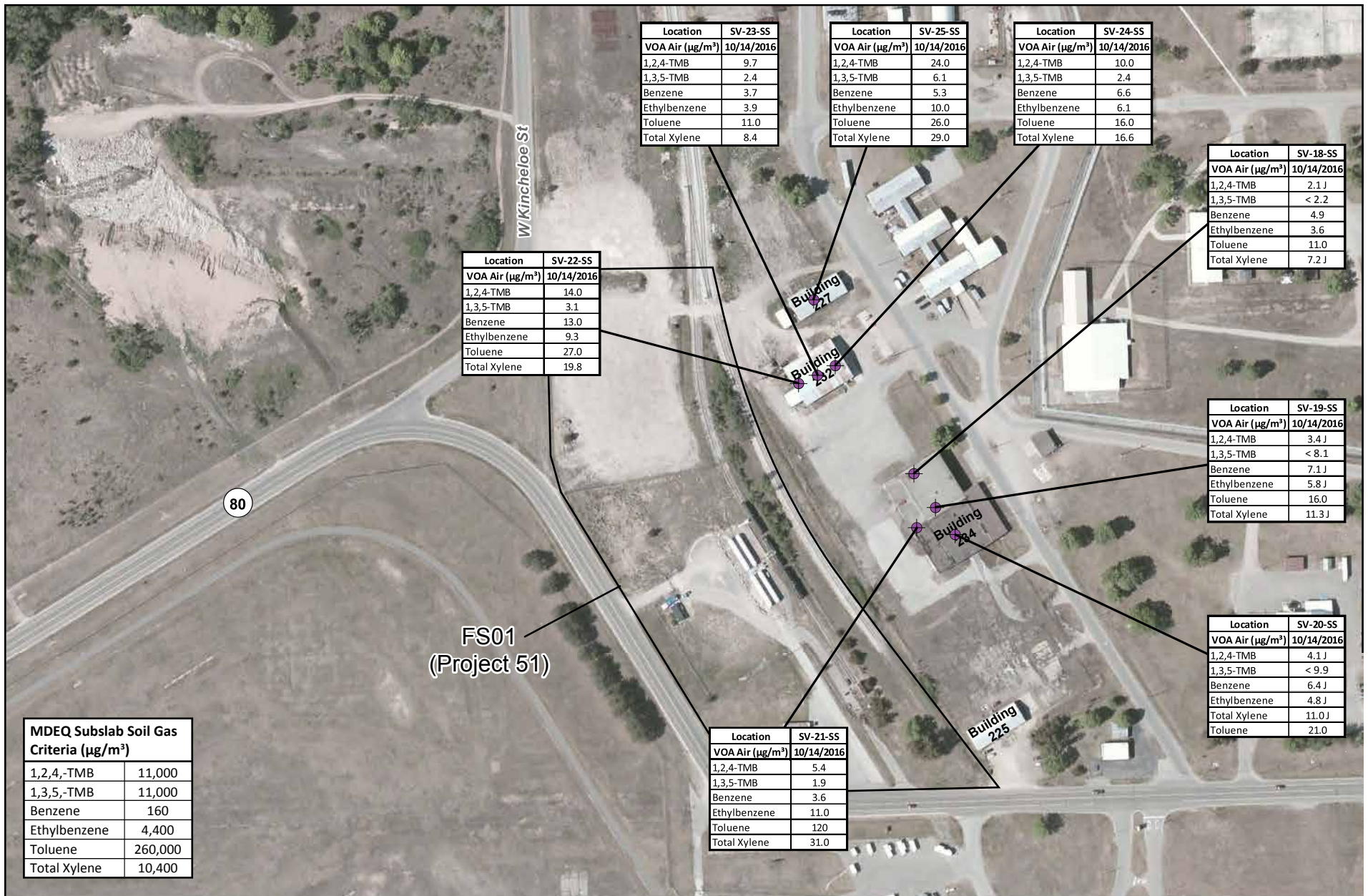


Figure 8
 FS01 Soil Vapor Data
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI



Legend

- Subslab Vapor Pin
- ND Non Detect

Notes:

1. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter
2. 1,2,4-TMB = 1,2,4-Trimethylbenzene
3. 1,3,5-TMB = 1,3,5-Trimethylbenzene
4. J = The reported result is an estimated value.
5. UJ = Was not detected, but not above the Limit of Detection (LOD), so the value is estimated. However, the reported detection limit is approximate and may or may not represent the actual limit of detection.

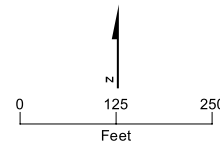
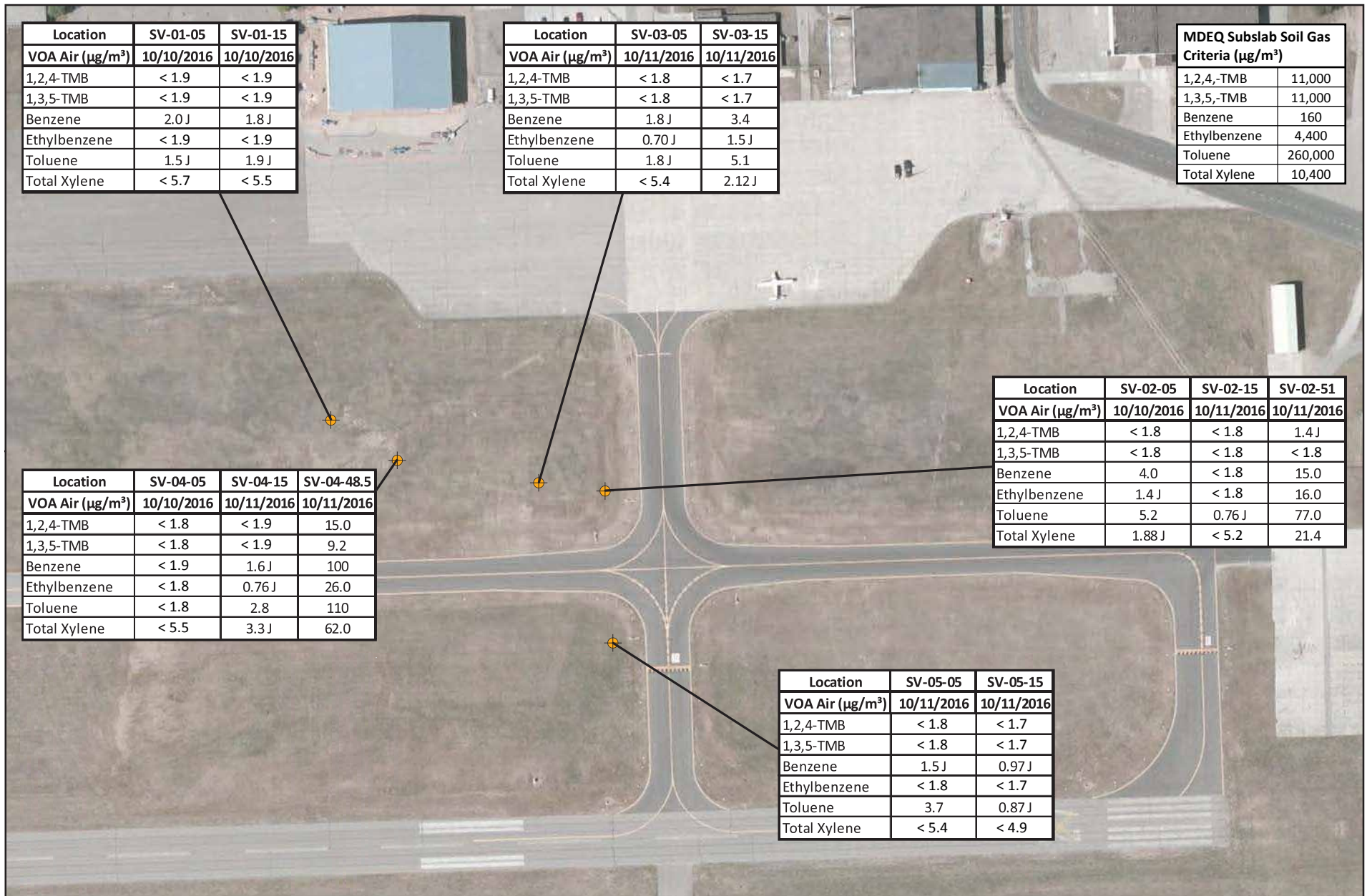


Figure 9
FS01 Subslab Data
USACE - Decision Document
Former Kincheloe AFB
Chippewa County, MI



Legend

-  Soil Vapor Sampling Point
- ND Non Detect

Notes:

1. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter
2. 1,2,4-TMB = 1,2,4-Trimethylbenzene
3. 1,3,5-TMB = 1,3,5-Trimethylbenzene
4. J = The reported result is an estimated value.
5. UJ = Was not detected, but not above the Limit of Detection (LOD), so the value is estimated. However, the reported detection limit is approximate and may or may not represent the actual limit of detection.

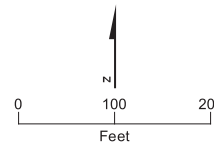


Figure 10

US10 Soil Gas Data
 USACE - Decision Document
 Former Kincheloe AFB
 Chippewa County, MI