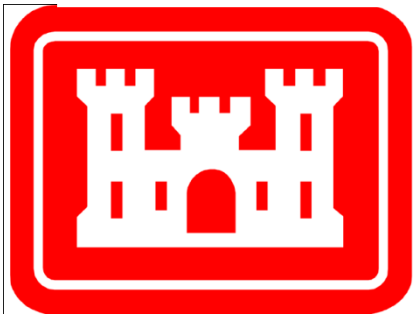
2017 SITE MANAGEMENT PLAN

Defense Depot Memphis, Tennessee
U.S. EPA I.D. Number TN4210020570

Prepared for:

Department of the Army



USACE Contract No. W90FYQ-09-D-0005
Task Order No. CK04

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Prepared for:

U.S. Army Corps of Engineers, Mobile District
Contract No. W90FYQ-09-D-0005
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TABLE OF CONTENTS

LIST OF APPENDICES

Appendix

LIST OF TABLES

Tables

LIST OF FIGURES

Figures

LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
AR	Administrative Record
AS/SVE	air sparging with soil vapor extraction
bgs	below ground surface
BRAC	Base Realignment and Closure
cDCE	cis-1,2-dichloroethene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	chloroform
COC	chemical of concern
CSM	Conceptual Site Model
CT	carbon tetrachloride
CVOC	chlorinated volatile organic compound
CWM	chemical warfare material
CY	cubic yard
DDMT	Defense Depot Memphis, Tennessee
DERP	Defense Environmental Restoration Program
DLA	Defense Logistics Agency
DoD	Department of Defense
e^2M	engineering-environmental Management, Inc.
EBT	enhanced bioremediation treatment
EISR	Early Implementation of Selected Remedy
ESD	Explanation of Significant Differences
ET&D	excavation, transportation and disposal
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FOST	Findings of Suitability to Transfer
FSVE	Fluvial soil vapor extraction
FU	functional unit
HHRA	human health risk assessment
HRS	Hazard Ranking System
HSWA	Hazardous and Solid Waste Amendment
IAQ	intermediate aquifer
IC	institutional control

LIST OF ACRONYMS AND ABBREVIATIONS
(CONTINUED)

IR	Information Repository
IRA	interim remedial action
IRACR	Interim Remedial Action Completion Report
IW	injection well
J&E	Johnson & Ettinger
LTM	long-term monitoring
LUC	land use control
LUCIP	land use control implementation plan
MACTEC	MACTEC Engineering and Consulting, Inc.
MAQ	Memphis aquifer
MCL	maximum contaminant level
MI	Main Installation
MIP	membrane interface probe
MLGW	Memphis Light Gas & Water
MNA	monitored natural attenuation
MW	monitoring well
NPL	National Priorities List
ODB	Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure Division
O&M	operations and maintenance
OPS	Operating Properly and Successfully
OU	Operable Unit
PAHs	polyaromatic hydrocarbons
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PCP	pentachlorophenol
PID	photoionization detector
PMW	performance monitoring well
POL	petroleum/oil/lubricants
ppm	parts per million
PRB	permeable reactive barrier
RA	remedial action

LIST OF ACRONYMS AND ABBREVIATIONS
(CONTINUED)

RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RG	remediation goal
RI	remedial investigation
RL	reporting limit
ROD	Record of Decision
RPP	Revised Proposed Plan
RW	recovery well
SCHD	Shelby County Health Department
SLERA	screening level ecological risk assessment
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
SVE	soil vapor extraction
SWMU	Solid Waste Management Unit
TC	target concentration
TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TeCA	1,1,2,2-tetrachloroethane
Trinity	Trinity Analysis and Development Corp.
TSVE	thermal soil vapor extraction
TTA	target treatment area
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VI	vapor intrusion
VISL	Vapor Intrusion Screening Level
VMP	vapor monitoring point
VOC	volatile organic compound
WNRC	Washington National Records Center
ZVI	zero valent iron

LIST OF ACRONYMS AND ABBREVIATIONS
(CONTINUED)

µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter

1.0 INTRODUCTION

HDR has prepared this 2017 Site Management Plan (SMP) for Defense Depot Memphis, Tennessee (DDMT) under Contract W90FYQ-09-D-0005, Task Order CK04 to the United States Army Corps of Engineers (USACE), Mobile District. The environmental restoration program at DDMT is directed by the Department of the Army, Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure (BRAC) Division (ODB).

This SMP has been prepared in accordance with *Department of Defense (DoD) Manual Number 4715.20, Defense Environmental Restoration Program [DERP] Guidance* (DoD, 2012) and fulfills a requirement of the *Federal Facilities Agreement at the Defense Distribution Depot Memphis* (FFA) (USEPA, 1995), which was signed by United States Defense Logistics Agency (DLA), United States Environmental Protection Agency (USEPA) and Tennessee Department of Environment and Conservation (TDEC) in 1995. DDMT's USEPA Identification Number is TN4210020570.

In accordance with the DERP Guidance, the SMP describes a coordinated approach for environmental restoration activities and includes all required activities by year until the expected completion of environmental restoration at DDMT. The SMP will be updated annually, made available for public review in the information repository (IR) and included in the Administrative Record (AR). The 2017 SMP is updated with information available as of 1 October 2016.

The IR is maintained in the TDEC office at the following address:

TDEC
8383 Wolf Lake Dr.
Bartlett, TN 38133-4119

The AR for DDMT is stored by the National Archives and Records Administration, Washington National Records Center (WNRC). The initial transmittal of files to the WNRC was made in December 2013, and a second transmittal was made on 16 September 2016. Additional shipments will be made periodically as AR documents are created. Prior to shipment, the AR documents are stored in a locked file cabinet at the DDMT field office. The WNRC address is:

WNRC
4205 Suitland Road
Suitland, MD 20745-8001

USEPA and TDEC did not have any comments on the 2017 SMP; the approval letters are included in Appendix A.

2.0 SUMMARY OF SITE CONDITIONS

2.1 SITE LOCATION AND DESCRIPTION

DDMT is located in southeastern Memphis, Shelby County, Tennessee approximately 5 miles east of the Mississippi River and just northeast of Interstate 240 (Figure 1). DDMT originated as a military facility in the early 1940s to provide stock control, material storage, and maintenance services for the U.S. Army. In 1995, DDMT was placed on the list of DoD facilities to be closed under BRAC. Storage and distribution activities continued until DDMT closed in September 1997.

DDMT covers approximately 632 acres and includes the Main Installation (MI) and Dunn Field. The MI contains approximately 567 acres with open storage areas, warehouses, former military family housing, and outdoor recreational areas. Dunn Field, which is located across Dunn Avenue from the north-northwest portion of the MI, contains approximately 65 acres and includes former mineral storage and waste disposal areas.

2.2 REGULATORY STATUS

The Depot was a Resource Conservation and Recovery Act (RCRA) hazardous waste generator with USEPA identification number TN4210020570. The majority of hazardous wastes generated by the Depot consisted of hazardous substances that reached shelf-life expiration dates and could no longer be used by the military services, and vehicle maintenance wastes. The Depot also generated hazardous wastes from the cleanup of small hazardous substance spills.

On 28 September 1990, USEPA Region 4 and TDEC issued the Depot a RCRA Part B permit for storage of hazardous waste. The Hazardous and Solid Waste Amendment (HSWA) portion of the permit issued by USEPA included requirements for the identification and, if necessary, corrective action of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). A RCRA Facility Assessment (RFA) completed in 1990 identified 49 SWMUs and 8 AOCs.

Subsequent to issuing the RCRA permit, USEPA prepared a final Hazard Ranking System (HRS) Scoring Package for the facility. On 14 October 1992, USEPA added the Depot to the National Priorities List (NPL) (57 Federal Register 47180 No. 199). On 6 March 1995, USEPA, TDEC, and the Depot entered into a FFA (USEPA, 1995) under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 120, and RCRA, Sections 3008(h) and 3004(u) and (v). The FFA outlines the process for investigation and cleanup of the Depot sites under CERCLA. The parties agreed that

investigation and cleanup of releases from the sites (including formerly identified SWMUs/AOCs) would satisfy any RCRA corrective action obligation.

The RCRA Part B permit for hazardous waste storage was terminated by TDEC in October 1998 upon request from DDMT because the storage unit was not constructed. The HSWA portion of the permit for corrective action remained in effect. DDMT submitted a corrective action permit renewal application in March 2004. In January 2005, TDEC issued a Denial to Reissue the Hazardous Waste Corrective Action Permit, which terminated the requirement to perform corrective action under RCRA, and noted that all corrective action activities shall continue to be performed under CERCLA.

2.3 SITE DESIGNATIONS

Site designations were developed for overlapping environmental programs and for facility reuse. During FFA negotiations after DDMT was placed on the NPL, the Depot was divided into four Operable Units (OUs): Dunn Field, OU 1; Southwest Quadrant MI, OU 2; Southeastern Watershed and Golf Course, OU 3; and North-Central Area MI, OU 4.

During preparation of the environmental baseline survey after DDMT was selected for closure under BRAC, the property was divided into 36 parcels based on planned reuse. Areas of environmental concern within each parcel were broken into sub-parcels representing buildings, spill locations, burial locations, former pistol ranges, open land areas, and other sites. This system allowed investigation results to be compared directly to BRAC parcels for reuse purposes and facilitated sampling/analysis and decisions regarding environmental condition of property for leasing and transfer.

During the MI Remedial Investigation (RI), the parcels were combined in functional units (FUs) in order to evaluate risk to human health and the environment. Each FU represented an area where human health exposure was generally uniform based on operational history, expected use and location. The MI was divided into six FUs with groundwater under the MI being FU 7. Dunn Field was divided into three areas for conducting baseline risk assessments based on similar historical use and proposed reuse: Northeast Open Area, Stockpile Area, and Disposal Area. The FUs/Areas are described on Table 1 and the boundaries are shown on Figure 2 for the MI and Figure 3 for Dunn Field.

Environmental restoration sites were first identified during the 1990 RFA, and additional sites were added over time. The 1990 RFA identified 57 SWMUs and AOCs. An appendix to the FFA increased the number of sites to 89 based on additional site investigations. Two of the 89 sites consisted of multiple disposal locations that were later separated, bringing the number of sites to 93. The site designations (e.g. RI, Screening, and No Further Action) were established when the sites were identified and do not reflect the

current status. The environmental restoration sites within each OU are listed on Table 2 with the current site status; the site locations are shown on Figures 4, 5, 6 and 7.

2.4 GEOLOGY AND HYDROGEOLOGY

The geologic units of interest at DDMT are (from youngest to oldest): loess, including surface soil; fluvial deposits; Jackson Formation/Upper Claiborne Group (Jackson/Upper Claiborne); and Memphis Sand.

The loess consists of wind-blown and deposited brown to reddish-brown, low plasticity clayey silt to silty clay. The loess deposits are about 20 to 30 feet thick and are continuous throughout the DDMT.

The fluvial (terrace) deposits at DDMT consist of two general layers. The upper layer is silty, sandy clay to clayey sand and ranges from about 0 to 30 feet thick. The lower layer is composed of interlayered sand, sandy gravel, and gravelly sand, and ranges from 30 to 100 feet thick. The uppermost aquifer is the unconfined Fluvial Aquifer, consisting of saturated sands and gravelly sands in the lower portion of the deposits. The saturated thickness ranges from 0 feet (dry) to approximately 70 feet, and is controlled by the uppermost clay configuration in the Upper Claiborne. The groundwater in the Fluvial Aquifer is not a drinking water source for area residents; however, the current Tennessee groundwater classification at DDMT is General Use (TDEC Chapter 1200-04-03).

The Jackson/Upper Claiborne forms the upper confining unit for the Memphis Aquifer (MAQ) on a regional basis and separates the Fluvial Aquifer from the MAQ at DDMT. The Upper Claiborne Group includes the Cockfield and Cook Formations, and the individual formations of the Jackson/Upper Claiborne consist of clays, silts, and sands deposited in lenses or individual beds that are not areally extensive. The Jackson Formation is reported to be absent in the area of DDMT. The Cockfield Formation consists of inter-fingering fine sand, silt, clay, and local lenses of lignite. The Cook Mountain Formation consists primarily of clay with varying amounts of fine sand and is reported to be the most persistent clay layer in the Jackson/Upper Claiborne confining unit. The Intermediate Aquifer (IAQ) is locally developed in the Upper Claiborne sands. Where clay layers are absent, a hydraulic connection is created between the Fluvial Aquifer and the IAQ, and potentially, the MAQ.

The Memphis Sand primarily consists of thick bedded, white to brown or gray, very fine grained to gravelly, partly argillaceous and micaceous sand. The Memphis Sand ranges from 500 to 890 feet in thickness, and begins at a depth below ground surface (bgs) of approximately 120 to 300 feet. The MAQ is a regional deep, confined aquifer and is the primary source of water for the City of Memphis. Memphis Light Gas & Water (MLGW) extracts groundwater from several well fields in the Memphis area, which has created a regional cone of depression in the potentiometric surface, with steeper local cones of

depression at each well field. The Allen Well Field is the closest to DDMT and is located approximately 2 miles west of Dunn Field.

3.0 ENVIRONMENTAL PROGRAM STATUS

The selected remedies in the decision documents for DDMT have been implemented. The *Preliminary Close Out Report* (USEPA, 2010a) was approved in May 2010, and the DDMT NPL site status was revised to Construction Complete. Interim remedial action completion reports (IRACRs) have been approved for all actions. USEPA has concurred with operating properly and successfully (OPS) determinations for the remedies implemented on Federal property. The remedial action objectives (RAOs) for groundwater have not been met; remedial action and long-term monitoring are continuing.

3.1 MAIN INSTALLATION (OU-2, 3 AND 4)

The MI contains approximately 567 acres with open storage areas, warehouses, former military family housing, and outdoor recreational areas. All of the MI property has been transferred for reuse through public benefit and economic development conveyances. (See Section 3.3)

Investigations from 1989 to 2001 identified contamination in surface soil and ground water. Surface soil contamination requiring response consisted primarily of metals, pentachlorophenol (PCP), polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), and a pesticide, dieldrin. Groundwater contamination requiring response was limited to chlorinated volatile organic compounds (CVOCs) primarily tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride (CT), and chloroform (CF). The site investigations and evaluation of remedial alternatives are described in the *Main Installation Remedial Investigation Report, Volumes I through IV* (CH2M HILL, 2000a), the *Final Main Installation Groundwater Feasibility Study Report* (CH2M HILL, 2000b), and the *Final Main Installation Soils Feasibility Study Report* (CH2M HILL, 2000c).

3.1.1 Prior Removal Activities

The following actions were taken on the MI prior to the Record of Decision (ROD). The locations are shown on Figure 2.

- Approximately 602 cubic yards (CY) of surface and subsurface soil were removed from the PCP dip vat area (Building 737) because of elevated levels of PCP (completed in 1985).
- Approximately 60,000 gallons of hazardous and petroleum/oil/lubricants materials from damaged drums were reclaimed and repackaged at Building 873 in 1985. Approximately 800 55-gallon drums were recouped in this open storage area and then returned to their original location for storage and distribution.

- Approximately 5,000 tons (3,700 CY) of surface soil in the Housing Area were removed because of the presence of dieldrin (began in June 1998; completed in October 1998). The Housing Area is an exception to the overall industrial land use for MI and remediation levels were based on residential reuse.
- Approximately 530 tons (400 CY) of surface soil surrounding the cafeteria (Building 274) were removed in 1998 because of elevated levels of PCBs.
- Approximately 980 CY of surface and subsurface soil from near Buildings 1084, 1085, 1087, 1088, 1089 and 1090 were removed in 2000 because of elevated levels of metals and PAHs.

3.1.2 Record of Decision

The *Memphis Depot Main Installation Record of Decision* (MI ROD) (CH2M HILL, 2001) received final approval in September 2001. The MI ROD specified the RAOs that the selected remedy was expected to meet in order to protect human health and the environment. The RAOs were developed to allow the lease and later transfer of the MI for its intended land uses (industrial and recreational).

The RAOs are:

Surface Soil

- to prevent direct contact/ingestion of surface soils contaminated with lead in excess of industrial worker risk-based criteria.
- to prevent direct contact/ingestion of surface soils contaminated with dieldrin and arsenic in excess of human health risk assessment criteria for residents.
- to prevent direct contact/ingestion of surface soils contaminated with lead in excess of risk-based criteria for protection of residential children.

Groundwater

- to prevent human ingestion of water contaminated with volatile organic compounds (VOCs) in excess of maximum contaminant levels (MCLs) from potential future on-site wells.
- to reduce concentrations of chemicals of concern (COCs) to MCLs or lower.
- to prevent horizontal and vertical off-site migration of groundwater contaminants in excess of MCLs.

The selected remedy presented in the MI ROD contained the following components:

- Excavation, transport and off-site disposal of lead contaminated surface soil near Building 949.
- Deed restrictions and land use controls (LUCs) to prevent residential land use on the MI, except at the existing housing area; to implement daycare restrictions; to prevent production/consumptive use groundwater controls for the Fluvial Aquifer and drilling into deeper aquifers on the MI; and to eliminate casual access through maintenance of a boundary fence around the golf course.
- Enhanced bioremediation treatment (EBT) of CVOCs in the most contaminated part of the groundwater plume.
- Long-term groundwater monitoring to document changes in plume concentrations and to detect potential plume migration to off-site areas or into deeper aquifers.
- Five-year reviews of the selected remedy.

The area of lead contamination in soil near Building 949 (approximately 300 CY) was excavated and disposed off-site prior to final execution of the ROD (see Figure 2). The action was taken to accommodate the economic redevelopment of the site, documented in *Remediation Report, Removal Action at Building 949* (Jacobs Federal Programs, 2002) and noted as a significant change in the ROD.

3.1.3 Remedial Action

The selected remedy included EBT in the most contaminated areas with the assumption that "untreated parts of the groundwater plume would degrade under natural attenuation". Groundwater concentrations equal to or greater than 100 micrograms per liter (µg/L) for PCE and TCE were used to delineate the initial treatment areas and this criterion was also used for the additional EBT treatment areas.

3.1.3.1 EBT

EBT was implemented in accordance with the *Main Installation Final Remedial Design, Revision 1* (MI RD) (CH2M HILL, 2004a). Two target treatment areas (TTA), in the southwest MI (TTA-1) and the southeast MI (TTA-2), were defined by 100 µg/L isoconcentration contours for CVOCs. The EBT system was constructed from May to August 2006 with installation of 49 4-inch injection wells (IWs) and 30 2-inch performance monitoring wells (PMWs); construction of the lactate-storage and transfer facility and two trailer-mounted injection systems; and baseline groundwater sampling and analysis.

Sodium lactate was injected into the Fluvial Aquifer in the two areas from September 2006 through February 2009. Performance monitoring was conducted quarterly from October 2006 through March 2009. System operations and monitoring results were described in annual reports. From 2006 to 2009, CVOC concentrations for parent compounds (PCE, TCE, CT and CF) were reduced over 90 percent in injection wells and over 80 percent in monitoring wells at locations with baseline concentrations above 100 µg/L.

The *Main Installation Interim Remedial Action Completion Report, Revision 1* (MI IRACR) (HDR|engineering environmental Management, Inc. [e^2M], 2010), including an OPS determination, was submitted to USEPA and TDEC in February 2010. Although EBT did not achieve the goal of reducing concentrations below MCLs, additional field investigation, groundwater modeling and trend analysis presented in the MI IRACR indicated that additional remedial action (RA) was not necessary. The OPS determination and the MI IRACR were approved by USEPA in March 2010. Additional monitoring wells installed in the IAQ and the upper portion of the MAQ supported the groundwater model results.

Additional EBT was implemented from November 2012 to November 2014 due to rebound in CVOC concentrations in long-term monitoring (LTM) samples. Quarterly injections and monitoring were conducted in five areas where individual CVOC concentrations of parent compounds (PCE, TCE and CT) exceeded 100 µg/L: TTA-1N, TTA-1S TTA-2, the West-Central plume and the Building 835 plume. Injections of sodium lactate solution into the Fluvial Aquifer were made in 45 IWs, and an additional 13 2-inch wells were used as PMWs. Quarterly performance monitoring was conducted at all IWs and PMWs from February 2013 to November 2014. The EBT injection and performance monitoring well locations are shown on Figure 8. The final report for additional EBT was *Main Installation Year Four Enhanced Bioremediation Treatment Report* (HDR, 2015).

3.1.3.2 Supplemental Remedial Investigation

While CVOC concentrations were reduced during the additional EBT, the RA was not sufficient to meet the RAOs for the MI. Supplemental Remedial Investigation (SRI) and Focused Feasibility Study (FFS) are currently being performed to develop a remedial strategy to achieve RAOs throughout the MI. Further RA will be conducted after the FFS is completed and the selected remedy has been confirmed or revised.

The SRI includes document review to re-examine the basis for the selected remedy and additional field investigation to improve the site hydrogeological model and delineation of contaminant plumes and to evaluate potential off-site impacts to groundwater. Phase 1 of the investigation was performed April to August 2015 and consisted of installing ten Fluvial Aquifer wells and two IAQ wells; the SRI Phase 1 wells were incorporated in LTM beginning in October 2015.

The SRI Phase 1 Summary Report, Revision 0 (HDR, 2016a) described the review of MI documents and regional studies and the field activities and findings of the Phase 1 investigation. The report was approved by USEPA in April 2016 and by TDEC in May 2016 following approval of responses to comments; the approved responses will be incorporated in the SRI report to be prepared upon completion of the Phase 2 investigation.

The conclusions from the Phase 1 report are provided below:

- DDMT is located in the southeast portion of the cone of depression created by groundwater withdrawal from the Allen Well Field. The groundwater flow direction in the MAQ at DDMT is west-northwest towards the Allen Well Field.
- Hydraulic connections (windows) between the Fluvial Aquifer and the MAQ are present throughout the Memphis area, and a window has been identified in the northwestern area of the MI.
- Naturally occurring biodegradation of CVOCs does not appear to be a significant contributor to natural attenuation in the Fluvial Aquifer at the MI. However, 1st order decay rates calculated for the 2009 groundwater model had good agreement with PCE and TCE concentrations at wells along the flow paths and use of attenuation factors in the 2009 model had good correlation with reported concentrations.
- Despite some question about the groundwater gradient used for the 2009 BIOSCREEN and MODFLOW/MT3D model, the model results are in good agreement with PCE and TCE concentrations in the IAQ and MAQ monitoring wells near the window. Comparison of source area PCE and TCE concentrations in the model with current concentrations in those areas indicates the modeled concentrations are still applicable and may be conservative.
- The SRI wells improved delineation of the identified plumes (see Figure 9):
  - Upgradient impacts were identified at the North-Central and TTA-1N plumes. The upgradient impacts are off-site for the TTA-1N plume and potentially off-site for the North-Central plume.
  - Delineation at the distal end of West-Central and TTA-2 plumes and at the core of the North-central plume were improved.
  - A new area of groundwater contamination was identified at MW-270 on the southern MI boundary. MW-270 contains high concentrations of TCE and cis-1,2-dichloroethene (cDCE).

cDCE has not been observed outside EBT areas at DDMT, and the high cDCE concentration indicates biodegradation may have occurred and the plume may be relatively old.

- No CVOCs were detected in the new IAQ wells, MW-262 and MW-273, limiting extent of CVOCs to the west of MW-256.

- The SRI wells also provided additional information on site hydrogeology:
  - Groundwater flow in the Fluvial Aquifer appears to enter the MI from all sides and to migrate vertically through the window in the northwest MI or to a sink in the south-central MI (see Figure 9).
  - Groundwater flow in the IAQ at the northwestern MI is apparently to the north rather than northwest as previously shown.
  - Additional monitoring wells are needed to confirm the change in the interpreted flow directions in both areas.

Preliminary recommendations for locations of SRI Phase 2 wells were provided in the SRI Phase 1 report. The SRI Phase 2 investigation and additional studies to be performed are discussed in Section 4.1.2.

3.1.3.3 Long-Term Monitoring

MI LTM is conducted to evaluate progress in reducing contaminant concentrations to MCLs or lower throughout the MI and to monitor horizontal and vertical contaminant migration off-site at concentrations in excess of MCLs. LTM has been performed since 2004 in accordance with the LTM Plan in Appendix B of the MI RD (CH2M HILL, 2004a). Recommendations for LTM optimization, including new well locations, well abandonment, and changes to well classification, sample frequency, analytical parameters and sampling procedures are made in the annual LTM reports.

In accordance with the LTM plan, MI LTM wells are classified in four categories:

- Background – wells screened in the Fluvial Aquifer located along or outside the MI boundary; wells upgradient of or at a distance from groundwater plumes on the MI and Dunn Field; and wells with no, or low, previous detections of site constituents.
- Boundary – wells screened in the Fluvial Aquifer located along or outside the MI boundary to monitor constituent migration from off-site sources.
- Sentinel – wells screened within either the fluvial or intermediate aquifer adjacent to or within the window to the IAQ.

- Performance – wells screened in the Fluvial Aquifer and within the limits of known groundwater plumes.

In 2015, MI LTM included 99 wells classified as Background (6), Boundary (7), Performance (62) and Sentinel (24). The sample frequency for two wells installed in 2013 (MW-260 and MW-261) will be determined after four semiannual sample events. The remaining 97 wells had the following sample frequency: biennial (16), annual (31) and semiannual (50). Samples were collected from 52 wells in a semiannual event in April and from 82 of 83 wells in an annual event in October 2015; a sample was not collected from MW-257 in October 2015 because of an obstruction above the screened interval. The 12 SRI Phase 1 wells were also sampled in October 2015.

Of the 62 performance wells, 57 are associated with designated plumes and five are outside the designated plumes (MW-25A, MW-52, MW-215A/B and PZ-03). The designated plumes are shown on Figure 9 with PCE and TCE isopleths from the October 2015 sample event; the plumes are listed below with the primary CVOCs and associated LTM wells. The Phase 1 SRI wells are not included in the LTM wells listed below.

Plume	CVOC	LTM Wells
TTA-1 North	PCE	DR1-2, DR1-7, DR1-8, MW-100B, PMW21-03, PMW21-05
TTA-1 South	PCE, TCE	DR1-1/1A, DR1-3, DR1-4, MW-101, PMW101-03A/B, PMW101-06A/B
TTA-2	PCE, CT, CF	DR2-1, DR2-3, DR2-4, DR2-6, MW-26, MW-64, MW-88, MW-92, MW-96, MW-217, MW-218, MW-259, PMW92-02
West-Central	PCE	MW-39/39A, MW-94A, MW-98, MW-200, MW-204A/B, MW-205A/B, MW-206A/B, MW-208A/B, MW-210B
Building 835	TCE	MW-142, MW-143, MW-198, MW199B, MW-209B, MW-257
North-Central	TCE	MW-103, MW-104, MW-214A/B, MW-258, MW-260
South-Central	TCE	MW-97, MW-216, MW-261

3.1.3.3.1 2015 MI LTM Conclusions

The latest annual LTM report, *Annual Long-Term Monitoring Report-2015, Revision 1* (HDR, 2016b), was approved by TDEC in July and by USEPA in September 2016. Conclusions for MI LTM were:

- Additional groundwater elevations from the SRI wells resulted in changes to the interpretation of groundwater flow:
  - a sink, indicating leakage to the IAQ, is suggested by the closed groundwater elevation contour in the south-central MI. The October 2015 groundwater contours show groundwater

flow on to the MI from all sides and flow off the MI through vertical leakage at the window in the northwest MI and the suggested sink in the south-central MI (see Figure 9).

- Groundwater flow in the upper IAQ at the northwestern MI is indicated to be to the north while flow in the MAQ in that area is to the west. The cone of depression created by the Allen Well Field west of DDMT suggests the gradient should be to the west. The northerly gradient in the upper IAQ may be due to discontinuous sand units in that area.

- The CVOC plume maps are similar to those for previous reports with less detail in some areas due to the absence of sample results from EBT wells in 2015. Inclusion of SRI wells in the October 2015 sample event resulted in changes to the plume maps at some well locations (see Figure 9).
  - Results at SRI well MW-263 suggest off-site impacts at the North-Central plume.
  - Results at MW-267 indicate an additional source area on the MI north of TTA-2.
  - Results at MW-269 provide confirmation of off-site impacts to the TTA-1N plume.
  - Results at MW-270 indicate a new plume is located on the southern boundary with potential off-site source/impacts
- CVOCs in the Fluvial Aquifer have migrated vertically into the IAQ through the window in the northwestern area of the MI. The plume in the IAQ extends to the northwest property boundary.
  - PCE and TCE concentrations at MW-256 in October 2015 were lower than results since 2012.
  - CVOCs were not detected in the two IAQ wells (MW-262 and MW-273) installed west of MW-256.
- CVOCs exceeded the MCLs at 59 of the 99 MI LTM wells and 5 of the 12 SRI wells; sentinel well MW-140 in the lower IAQ exceeded an MCL (PCE) for the first time.
- The CVOC trends for wells within the previous treatment areas (TTA-1N, TTA-1S, TTA-2, West-Central and Building 835) were reviewed for presence or absence of reductive dechlorination. Wells within each area had increasing PCE or TCE concentrations and decreasing cDCE concentrations indicating reductive dechlorination from EBT had ceased at those locations.

3.1.3.3.2 2015 MI LTM Recommendations

The 2015 LTM report recommended changes for MI LTM in 2016 included classification of the SRI Phase 1 wells, assignment/revision of well sample frequencies and abandonment of damaged wells.

Recommended classifications for the SRI wells were:

- Background: MW-266
- Boundary: MW-263, MW-269 and MW-270
- Sentinel: MW-262 and MW-273
- Performance: MW-265, MW-267, MW-271 and MW-272

Classifications were not recommended for MW-264 and MW-268. These two wells are installed in Upper Claiborne sand separated from the fluvial sand and gravel by a clay layer less than 10 ft thick. The water levels and analytical results do not appear to be consistent with nearby Fluvial Aquifer wells.

Recommended sample frequencies were:

- MW-260 and MW-261 were installed in 2013 and did not have established sample frequencies; these wells were recommended for semiannual sampling.
- The sample frequency at PZ-03 was recommended to be increased from annual to semiannual; TCE concentrations have exceeded the MCL in the last three annual samples.
- Sample frequencies for the SRI Phase 1 wells will be recommended in the 2016 LTM report.

Well abandonment was recommended for MW-257. Water level measurement and sampling at MW-257 could not be performed in October 2015 due to an obstruction in the well. The obstruction was cleared in April 2016, but a down-hole camera survey showed the well was damaged. No CVOCs have been detected above the reporting limit in MW-257 since installation in 2012.

3.1.3.3.3 April 2016 MI LTM Summary

The April 2016 LTM event included 139 wells, consisting of the 99 LTM wells utilized in 2015, 12 SRI wells installed in 2015, and 28 former EBT wells used for injections and performance monitoring in 2012 to 2014. Two of the SRI wells have not yet been classified; the remaining Phase 1 SRI wells and the LTM wells are classified as background (7 wells), boundary (10 wells), performance (66 wells), and sentinel (26 wells). The 2016 MI LTM wells are listed on Table 3 and shown on Figure 10.

The primary CVOC results for the semiannual sample event in April 2015 are summarized on Table 4; the CVOCs most often detected above MCLs and the maximum concentrations reported were PCE at 266 µg/L and TCE at 115 µg/L. Concentrations and isopleths for PCE and TCE for the April 2016 semiannual LTM event are shown on Figures 11 and 12. PCE and TCE concentrations for the April 2016 LTM event in IAQ and MAQ sentinel wells within the window are shown on the cross-section in Figure 13.

3.1.3.4 Land Use Controls

LUCs for the MI are described in the land use control implementation plan (LUCIP) in Appendix C of the MI RD (CH2M HILL, 2004a) and consist of institutional controls (ICs) in the form of lease restrictions, deed restrictions, notice of land use restrictions, zoning restrictions and groundwater well restrictions. The LUCs prevent residential use of the majority of the MI and production or consumptive use of groundwater or drilling of groundwater supply wells throughout the MI; the areas covered by the LUCs are shown on Figure 14. The LUCs will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use. An annual inspection is conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved.

The LUCs have been implemented in accordance with the LUCIP. The Notice of Land Use Restrictions for the MI was recorded at the City of Memphis/Shelby County Register of Deeds on January 26, 2005. Deed restrictions have been included in property transfers. Annual inspections have been performed since 2005 and reports have been distributed in accordance with the LUCIP. The *Main Installation 2016 Annual Site Inspection Report* (Trinity Analysis and Development Corp. [Trinity], 2016a) was submitted to USEPA and TDEC on 2 August 2016; no deficiencies or violations of the LUCs were identified.

3.2 DUNN FIELD (OU-1)

Dunn Field, which is located across Dunn Avenue from the MI, contains approximately 65 acres and includes former mineral storage and waste disposal areas. Approximately 41 acres have been transferred through a public benefit conveyance and a competitive public sale; approximately 24 acres along the western and northern sides of Dunn Field are still held by the Army. (See Section 3.3)

Site records indicated that chemical warfare material (CWM), chlorinated lime, super tropical bleach, and calcium hypochlorite, food stocks, paints/thinners, petroleum/oil/lubricants (POL), acids, herbicides, mixed chemicals, and medical waste were destroyed or buried in pits and trenches at the Dunn Field disposal sites. Soil samples collected for the RI showed significant levels of CVOCs: 1,1,2,2-tetrachloroethane (TeCA); 1,2-dichloroethane; total 1,2-dichloroethene; CT; CF; methylene chloride;

PCE; TCE; and vinyl chloride (VC). TCE and TeCA were the CVOCs most frequently detected in soil samples at elevated concentrations. Three contaminant plumes in the Fluvial Aquifer were identified at Dunn Field. The CVOCs detected in soil samples were also detected most frequently in groundwater sampling events; the CVOCs with the highest groundwater concentrations were TeCA and TCE. The site investigations and evaluation of remedial alternatives are described in the *Dunn Field Remedial Investigation Report* (CH2M HILL, 2002) and *Final Dunn Field Feasibility Study Report* (CH2M HILL, 2003a).

3.2.1 Prior Removal and Remedial Activities

The *Record of Decision for Interim Remedial Action of the Groundwater at Dunn Field (OU-1)* (CH2M HILL, 1996) was signed in April 1996, with the objective of hydraulic containment to prevent further contaminant plume migration and reduce contaminant mass in groundwater. The interim remedial action (IRA) groundwater recovery system consisted of 11 recovery wells (RWs) screened in the Fluvial Aquifer and associated piping located along the western boundary of Dunn Field. The system began operation in November 1998 with discharge of untreated groundwater to the city sewer system under an industrial discharge agreement. Based on reduction of CVOC concentrations in groundwater following implementation of the Source Areas RA, the final RWs were shutdown in January 2009. Approximately 918 pounds of total VOCs, including 369 pounds of TCE, were discharged by the IRA in just over 10 years of operation. The IRA system was removed and the RWs abandoned in July 2010. The final year of IRA groundwater monitoring and closure activities were described in the *Dunn Field Groundwater Interim Remedial Action 2009 Operations and Closure Report* (HDR, 2010).

A non-time critical removal action was conducted to reduce or eliminate the potential risk posed by CWM wastes at Sites 1, 24-A, and 24-B. The removal action was completed in March 2001 and documented in the *Final Chemical Warfare Materiel Investigation/Removal Action Report* (UXB International, Inc., 2001). Approximately 914 CY of soil contaminated with mustard degradation by-products, and 19 CY of mustard-contaminated soil were excavated, transported, and disposed offsite. Twenty-nine bomb casings were recovered from Site 24-A.

A non-time critical removal action was conducted to address lead contaminated surface soil at a former pistol range in the Northeast Open Area. The removal action was completed in March 2003 and documented in *Removal Action at Former Pistol Range, Site 60* (Jacobs Federal Programs, 2003). Approximately 930 CY of lead contaminated surface soil were excavated, transported, and disposed off-site at an approved, permitted landfill.

Locations of the IRA and the pre-ROD response actions are shown on Figure 3.

3.2.2 Record of Decision and ROD Amendment

The *Memphis Depot Dunn Field Record of Decision* (Dunn Field ROD) (CH2M HILL, 2004b) was approved in April 2004 and the *Dunn Field Record of Decision Amendment, Revision 3* (ROD Amendment) (e^2M, 2009a) was approved in March 2009.

The RAOs are:

Surface Soil

- Limit use of the surface soil in the Disposal Area to activities consistent with light industrial land use and prevent residential use through land controls

Disposal Sites

- Prevent groundwater impacts from a release of buried containerized hazardous liquids and the leaching of contaminants from buried hazardous solids
- Prevent unacceptable risk of direct contact with buried hazardous liquids and/or solids due to intrusive activities during future land use or site development

Subsurface Soil Impacted with VOCs

- Prevent direct inhalation of indoor air vapors from subsurface soils in excess of industrial worker criteria
- Reduce or eliminate further impacts to the shallow Fluvial Aquifer from VOCs in the subsurface soil

Groundwater

- Prevent human exposure to contaminated groundwater (i.e., exceeding protective target concentrations [TCs])
- Prevent further off-site migration of VOCs in excess of protective target levels
- Remediate Fluvial Aquifer groundwater to drinking water quality to be protective of the deeper MAQ

The components of the selected remedy from the Dunn Field ROD are:

- Excavation, transportation, and disposal (ET&D) of soil and material contained within disposal sites based upon results from a pre-design investigation
- Soil vapor extraction (SVE) to reduce VOC concentrations in subsurface soils to levels that are protective of the intended land use and groundwater
- Injection of zero valent iron (ZVI) within Dunn Field to treat CVOCs in the most contaminated part of the groundwater plume, and installation of a permeable reactive barrier (PRB) to remediate CVOCs within the off-site areas of the groundwater plume
- Monitored natural attenuation (MNA) and LTM of groundwater to document changes in plume concentrations, detect potential plume migration to off-site areas or into deeper aquifers, and track progress toward remediation goals (RGs)
- Implementation of LUCs, which consist of the following ICs: Deed and/or lease restrictions; Notice of Land Use Restrictions; City of Memphis/Shelby County zoning restrictions and the Shelby County Health Department (SCHD) groundwater well restrictions.

The ROD Amendment was prepared to document a fundamental change in the remedy for the offsite areas of the groundwater plume; the change was the use of air sparging with soil vapor extraction (AS/SVE) instead of a PRB. The ROD Amendment also revised the criteria for extent of the AS/SVE system and clarified the treatment objective. The AS/SVE system was selected to cross the core of the plume near the downgradient end and to reduce the individual CVOC concentrations in groundwater to 50 µg/L or less. Groundwater modeling results indicated that the AS/SVE system in combination with natural attenuation processes would reduce groundwater concentrations to MCLs in accordance with the RAOs within a reasonable period of time. The RAOs and the RGs for the contaminants of concern, shown on Table 5, were not changed from the Dunn Field ROD.

3.2.3 Remedial Actions

Three RAs were performed to implement the selected remedies for OU 1, Dunn Field: Disposal Sites RA (ET&D); Source Areas RA (SVE, ZVI injections and LUCs); and Off-Depot Groundwater RA (AS/SVE, MNA, and LTM). Upon completion of the AS/SVE system for Off Depot groundwater in 2009, construction of the selected remedies for DDMT was complete. Locations of the Disposal Sites, Source Areas and Off-Depot Groundwater RAs are shown on Figure 15.

3.2.3.1 Disposal Sites

Soil and debris including potential principal threat wastes (primarily drums and glass bottles) from five disposal sites were excavated and transported for off-site disposal in accordance with the *Dunn Field Disposal Sites Final Remedial Design, Revision 1* (CH2M HILL, 2004c). The disposal sites are listed on Table 2 as Sites 3, 10, 13, 64 and 90; Site 64 was also identified as Installation Assessment Site 31 and Site 90 was also listed as Site 4.1. The remedial actions are described in *Dunn Field Disposal Sites Remedial Action Completion Report, Revision 1* (MACTEC, 2006), which was approved by USEPA in August 2006.

The Disposal Sites RA was performed during two separate mobilizations. During the first mobilization from March 2005 to May 2005, excavations at Sites 13, 64, 90, and the majority of Site 10 were completed. Site 3 and the remaining materials from Site 10 were completed during the second mobilization in February and March 2006. Approximately 2,700 CY of non-hazardous materials were transported off-site and disposed of at the BFI South Shelby County Landfill. Approximately 234 CY of hazardous materials from Disposal Site 3 was disposed at the Clean Harbors Lambton Secure Landfill in Canada. The confirmation samples met the RGs at each site.

3.2.3.2 Early Implementation

An Early Implementation of Selected Remedy (EISR) using ZVI was performed to reduce contaminant mass downgradient of the planned PRB location in order that the portion of the plume slated for MNA in the ROD was not unduly extensive or high in concentration. ZVI injections were made November 2004 to January 2005. Injections were made in 14 borings at 2-foot intervals over the Fluvial Aquifer thickness, which averaged 21 feet; the injection locations were spaced approximately 60 to 80 feet apart. The depth of injection ranged from approximately 70 to 100 feet bgs. The total mass of ZVI injected was approximately 192,500 pounds. The *EISR Interim Remedial Action Completion Report, Revision 1* (MACTEC, 2005a) noted that the injections did not achieve the goal of 90 percent or greater reduction of TCE and TeCA and the report included recommendations for decreased spacing between injection locations to achieve increased reduction in CVOCs. The report was approved by USEPA on 22 September 2005.

3.2.3.3 Source Areas

The Source Areas RA included conventional SVE in the coarse-grained fluvial soils; ET&D for two shallow areas containing waste materials (TA-1F) and buried drums with residual petroleum hydrocarbons (TA-3); thermal SVE (TSVE) (in situ thermal desorption) in the fine grained loess; and ZVI injection in the Fluvial

Aquifer. The RA was performed in accordance with the *Memphis Depot Dunn Field Source Areas Final Remedial Design* (Dunn Field RD) (CH2M HILL, 2007).

The RAs are described in the *Dunn Field Source Areas Interim Remedial Action Completion Report, Revision 1* (HDR|e^{2}M, 2009); the IRACR was approved by USEPA and TDEC in November 2009. The memorandum, *Dunn Field Operating Properly and Successfully Demonstration, Source Areas Remedial Action* (e^{2}M, 2009b), was approved by USEPA in October 2009.

The Fluvial SVE (FSVE) system was installed to remove CVOCs from the fluvial sands at Dunn Field. The system consists of two blowers connected to seven SVE wells with screened intervals at approximately 30 to 70 feet bgs, 20 vapor monitoring points (VMPs) located 15 to 80 feet from the SVE wells and an equipment building for the blowers, heat exchangers and controls. Ten additional SVE wells were installed in borings for confirmation soil samples in November 2010. The FSVE system layout is shown on Figure 16. The FSVE system was operated from July 2007 through July 2012, and approximately 4,049 pounds of VOCs were removed. The VOC concentration in the extracted vapor decreased asymptotically to less than 1 part per million (ppm). The FSVE system was shutdown in July 2012 based on confirmation soil sample results demonstrating that RAOs had been met. The final year of operations and monitoring was described in *Dunn Field Source Areas Fluvial Soil Vapor Extraction System Annual Operations Report, Year Five, Revision 0* (HDR, 2012a), which was approved by USEPA and TDEC in December 2012.

The initial excavations at TA-1F and TA-3 were performed October 2007 to January 2008. Further excavation was delayed in order to proceed with construction and operation of the TSVE system. The excavations were completed February to June 2009. Approximately 7,400 CY of waste material were disposed as non-hazardous waste at the Waste Management, Inc. landfill in Tunica MS, a CERCLA-approved facility. Soil confirmation samples met RGs in both areas.

TSVE treatment was performed in four areas with a total area of about 1.25 acres and a treatment interval of approximately 5 to 30 feet bgs. System components included 367 heater-only wells; 68 vapor extraction wells, 62 multi-level temperature monitoring points, 25 pressure monitoring points and a Shotcrete surface cover to limit water infiltration and improve vapor capture. The system operated continuously from 27 May 2008 until the heaters were shutdown on 20 November 2008. The vapor extraction system was shut down on 4 December 2008. Approximately 12,500 pounds of VOCs were removed during treatment. Confirmation soil samples, collected at various depths from 35 soil borings, demonstrated that clean-up standards were met.

ZVI injections were not required because groundwater objectives for the Source Areas remedy were achieved through the subsurface soil remedies.

3.2.3.4 Off Depot Groundwater

The Off Depot Groundwater RA included installation of an AS/SVE system across the core of the plume near the downgradient end; MNA and long-term groundwater monitoring to document remedy performance and/or changes in the lateral or vertical extent of the CVOC plume; and ICs to prevent access to contaminated groundwater. The RA was performed in accordance with the *Memphis Depot Dunn Field Off Depot Groundwater Final Remedial Design, Revision 1* (Off Depot RD) (CH2M HILL, 2008). Remedial action construction and implementation are described in *Off Depot Groundwater Interim Remedial Action Completion Report, Revision 1* (Off Depot IRACR) (HDR, 2011a), which was approved by USEPA in August 2011.

3.2.3.4.1 Vapor Intrusion Study

Vapor sampling was performed in 2009 to assess potential vapor intrusion (VI) at residential structures from CVOCs in the Off Depot plume. The sampling activities and results were described in Sections 3.4 and 3.9.4 of the Off Depot IRACR. Since the past disposal activities which resulted in the groundwater plume were limited to Dunn Field, CVOCs in groundwater were considered the only source for potential VI in the Off Depot area. The target area was determined using the 2009 TCE 5 µg/L isopleth with a 100-foot outer buffer. Parcels within the areas were identified and visually surveyed. Based on site conditions and access, vapor probe locations were selected at four properties. A control location was selected on the MLGW substation property adjacent to both an AS/SVE vapor monitoring point (VMP-4) and a monitoring well with high CVOC concentrations (MW-155). CVOC concentrations at MW-155 in June 2009 were 1610 µg/L for TeCA and 643 µg/L for TCE.

Baseline Vapor Samples

Baseline vapor samples were collected in September 2009 prior to the start of AS/SVE operations. Nine soil vapor probes were installed in the loess at the selected properties and the control location; each probe had two sample screens (5 feet and 15 feet bgs). The loess was observed to be uniform throughout the study area with at least 90% silt and clay. Three CVOCs (TCE, PCE and methylene chloride) were detected above reporting limits (RLs) in vapor samples from the loess. The maximum concentrations were less than 20 micrograms per cubic meter (µg/m^3) and were below vapor screening levels (Soil Vapor Screening Values-Residential from New Jersey Department of Environmental Protection website, March 2007). Nine CVOCs were detected above RLs in the two samples from VMP-4, which is screened in the

fluvial sands below the loess. TeCA and TCE were detected at the highest concentrations, as in groundwater samples within the plume; the maximum concentrations were TCE at 6830 µg/m^3 and TeCA at 1420 µg/m^3. The results of the baseline samples were summarized as follows:

- CVOC concentrations in vapor samples from the loess were below residential screening levels and were orders of magnitude lower than baseline concentrations in the fluvial sands.
- CVOCs at the highest concentrations in the baseline samples from the fluvial sands (TeCA and TCE) were not detected as frequently or at similar relative concentrations in the loess.
- Vapor concentrations in baseline samples collected from the loess directly above the plume were similar to results from the locations above the edge of the plume.

The baseline memorandum concluded the loess provides a good barrier to vertical migration of soil vapor preventing vapor intrusion problems above the groundwater plume in the Off Depot area.

Second Round Vapor Samples

A second round of vapor samples was collected in March 2010 to confirm the findings from the baseline vapor probe samples and to evaluate the impact of AS/SVE operations on vapor concentrations. The same three CVOCs (TCE, PCE and methylene chloride) were detected in samples from the loess; the CVOC concentrations were similar to the initial samples and remained below screening levels. TCE, PCE and methylene chloride were also detected in vapor samples from the fluvial sand (VMP-4), but the concentrations were much lower than reported in the baseline samples. TCE was reported at the highest concentration (28 µg/m^3), which was less than 1% of the baseline sample concentration.

The second round memorandum concluded that AS-SVE operations had significantly reduced CVOC concentrations in the fluvial sands and that the CVOCs in the groundwater plume did not present a VI problem for nearby residences. Abandonment of the vapor probes was recommended with no further monitoring for VI required. Following approval from USEPA and TDEC, the vapor probes were abandoned in September 2010.

3.2.3.4.2 AS/SVE Operations

The AS/SVE system consists of 90 AS points, 12 SVE wells, 10 pairs of VMPs and control buildings for the AS compressor, SVE blowers and system controls. The AS/SVE system was designed to operate with up to one-third of the 90 AS points operating at any time. The AS points are individually programmed for daily operation in 2-hour blocks and are set to operate in three groups. System operations have been

adjusted periodically to reduce potential for plume diversion around the treatment area. The AS/SVE system layout and nearby monitoring wells are shown on Figure 17.

AS/SVE operations began 21 December 2009 and approximately 84 pounds of VOCs were removed through December 2015. The latest annual report, *Off Depot Air Sparge-Soil Vapor Extraction System Annual Operations Report, Year Five, Revision 1* (HDR, 2016c), was approved by TDEC in May and by USEPA in August 2016.

Year Five operations began in January 2014, but the AS/SVE system shut down in February 2014 due to extensive equipment damage from a power surge during a thunderstorm. System repairs and testing were completed and operations resumed in March 2015. Since the resumption of operations, the AS/SVE system has been operated in alternating months to restore the northerly groundwater flow observed prior to system operation. Standard operations with the air sparge wells open and two blowers alternating to extract vapors 24 hours per day began in March 2015 and continued in alternate months thereafter; the individual AS wells are divided into three groupings and operate for 12 hours each day (4 hours per group) when the air sparge manifold is open and a blower is operating. In April 2015 and the following alternate months, the air sparge manifold was closed, except for brief periods during system inspections, and a single blower operated for 12 hours per day; the two blowers were alternated on a weekly basis. Extended Year 5 Operations were completed 31 December 2015.

The AS/SVE system had limited operations from January to May 2016 while a new task order for system operations was developed. During this period, the air sparge manifold was closed, except for brief periods during system inspections, and a single blower operated for 12 hours per day. The two blowers were alternated on a weekly basis until Blower #1 was shutdown on 7 April due to low amperage and motor noise; Blower #2 was operated daily thereafter.

Trinity assumed responsibility for AS/SVE operations on 5 May with HDR providing operational support under subcontract. Operations resumed on 17 May 2016 with the air sparge manifold open in alternate months. Due to the shutdown of Blower #1, the system has been operated with Blower #2 for 12 hours per day. When the air sparge manifold is open, the three groups of AS wells operate for approximately 9 hours per day. The reduced blower operation has not had an apparent impact on effectiveness; the system has maintained negative pressure indicating the AS injections are being captured by the SVE wells and there has been no observed increase in PID measurements at SVE wells or VMPs. The initial Year 6 semiannual report will summarize operations and monitoring for May through November 2016.

The initial attempt at repair of Blower #1 in September resulted in additional problems being identified. The blower was removed and transported to the Kaeser maintenance shop in Memphis for further evaluation on 7 November 2016.

Overall performance of the AS/SVE system is evaluated based on results of LTM analyses. The goal for active groundwater remediation at Dunn Field is to reduce CVOC concentrations below 50 µg/L for individual CVOCs; MNA is expected to achieve the RGs for groundwater over time. The AS/SVE system is to continue operations until the upgradient concentrations from the Dunn Field plume do not exceed 50 µg/L for individual CVOCs for 12 months. Since April 2012, only TCE in MW-159, located immediately upgradient of the system, has consistently exceeded the 50 µg/L standard; the TCE concentration at MW-159 decreased from 227 µg/L in October 2015 to 38.4 µg/L in April 2016. The decrease is suspect based on increased water levels in April from record rainfall in March 2016 and will need to be confirmed in the October 2016 LTM event. The only other LTM performance well exceeding the 50 µg/L standard was MW-87 in southwestern Dunn Field; the CF concentration has varied between 49.5 µg/L and 63.1 µg/L from October 2014 through April 2016.

Additional AS wells will be installed near MW-159 in late 2016 or early 2017 to reduce concentrations below the active treatment objective of 50 µg/L for individual CVOCs. The proposed well locations are shown on Figure 17. The *Off Depot Air Sparge Well Installation Work Plan, Dunn Field* (Trinity, 2016b) was submitted to USEPA and TDEC for review on 8 August 2016. The work plan was approved by TDEC on 11 October 2016 and USEPA provided comments on 21 October; responses to USEPA comments were submitted on 23 November.

The initial project schedule assumed AS/SVE operations would be conducted for 5 years. However, since the active remediation goal of CVOC concentrations at 50 µg/L (or less) has not been met, operations are planned to continue through at least 2017.

3.2.3.5 Long-Term Monitoring

Dunn Field LTM is conducted to evaluate progress in meeting RAOs to prevent further off-site migration of VOCs in groundwater in excess of protective target levels and restore Fluvial Aquifer groundwater to drinking water quality to be protective of the deeper MAQ. IRA groundwater samples were collected regularly from 1999 to 2010 in order to evaluate IRA effectiveness in restricting plume migration. Since 2010, groundwater monitoring has been conducted in accordance with the LTM Plan in Appendix C of the Off Depot RD. Recommendations for LTM optimization are provided in the annual LTM reports.

In accordance with the LTM plan, Dunn Field LTM wells are classified in three categories:

- Background – wells screened in the Fluvial Aquifer located along or outside of the Dunn Field boundary; wells upgradient to or at a distance from contaminant plumes on Dunn Field; and wells with no or only low-level previous detections of site constituents.
- Sentinel – wells screened within either the fluvial or intermediate aquifers adjacent to or within a window to the IAQ.
- Performance – wells screened in the Fluvial Aquifer; located within the limits of known contaminant plumes; or repeatedly have contaminants in samples from locations targeted for treatment during the RA.

In 2015, Dunn Field LTM included 85 wells classified as Background (8), Background-NE (5), Performance (49), Performance-FSVE (14) or Sentinel (9). The Background-NE wells are located on or bordering the northeast section of Dunn Field and have CVOC concentrations from a suspected off-site source(s) upgradient of Dunn Field. The Performance-FSVE wells were selected for rebound monitoring after shutdown of the FSVE system in July 2012. The wells had the following sample frequency: biennial (15 wells), annual (33 wells) and semiannual (37). Samples were collected from 85 wells in a biennial event in April and from 37 wells in a semiannual event in October 2015.

3.2.3.5.1 2015 Dunn Field LTM Conclusions

The latest annual LTM report, *Annual Long-Term Monitoring Report-2015, Revision 1* (HDR, 2016b), was approved by TDEC in July and by USEPA in September 2016. Conclusions for Dunn Field LTM were:

- CVOC concentrations remain low at most wells due to the Source Areas and Off Depot RAs. In October 2015, CVOC concentrations exceeded the active treatment objective at one performance well and exceeded an MCL or TC at 12 performance wells.
  - The exceedances at seven wells are due to residual contamination from the Dunn Field plume.
  - The exceedance at one well is considered due to rebound following the FSVE shutdown.
  - The exceedances at four wells are due to impacts from the suspected off-site plume.
- CVOC concentrations above MCLs in performance and background-NE wells on the north end of Dunn Field are due to contaminant migration from a suspected, off-site source(s).

- There has not been significant rebound in CVOC concentrations since shutdown of the FSVE system in 2012.
  - Increased CVOC concentrations at two wells, MW-06 and MW-87, on the western boundary of Dunn Field were observed in 2014; the increases were considered to indicate contaminant rebound in groundwater. Concentrations in these wells decreased in October 2015.
  - Increased concentrations were not observed in other Dunn Field wells in 2014 or 2015.
- Increased CVOC concentrations near the AS/SVE system have been reduced by operational changes and the March 2015 resumption of AS/SVE operations.
  - Increased concentrations at wells in two areas were noted in the 2014 LTM report, six wells near the southwest end of the AS/SVE system due to plume diversion and five wells immediately downgradient of the AS/SVE system due to the 2014 equipment shutdown.
  - Concentrations have decreased at all these wells and CVOC concentrations are below MCLs and TCs except at MW-246, which exceeds the TC for TeCA.

3.2.3.5.2 2016 Dunn Field LTM Recommendations

Recommended changes for Dunn Field LTM in 2016 were limited to revision of sample frequency at one well.

- Sample frequency was recommended to be decreased from annual to biennial at MW-182. TCE was detected below the RL in 2005 and the nine following samples through April 2015 were non-detect for all CVOCs.

Well MW-33 was recommended for abandonment in 2014 due to problems with access since 2012. The well abandonment is scheduled to occur in late 2016.

3.2.3.5.3 April 2016 Dunn Field LTM Summary

For 2016, there are 85 Dunn Field LTM wells classified as Background (8), Background-NE (5), Performance (49), Performance-FSVE (14) or Sentinel (9) wells. The wells have the following sample frequency: biennial (16), annual (32) and semiannual (37). The 2016 Dunn Field LTM wells are listed on Table 6 and the well locations are shown on Figure 18.

Reduction in CVOC concentrations from the remedial actions on Dunn Field and the Off Depot area began shortly after operations began for the Dunn Field FSVE system in July 2012 and the Off Depot

AS/SVE system in December 2009. The reduction is shown in total CVOC plume maps for April 2007 and April 2016 on Figure 19.

The primary CVOC results for the annual sample event in April 2016 are summarized on Table 7; the CVOCs most often detected above the target concentrations in the Dunn Field ROD and the maximum concentrations are: TCE, 47 µg/L; PCE, 39.2 µg/L; TeCA, 8.9 µg/L and DCE 15 µg/L. Concentrations and isopleths for TeCA, TCE and PCE for the April 2016 LTM event are shown on Figures 20, 21 and 22.

3.2.3.5.4 Off-Site Plume, Northeast Dunn Field

CVOC concentrations above MCLs in performance and background-NE wells on the north end of Dunn Field are considered to result from contaminant migration from a suspected, off-site source(s). Concentrations of 1,1-DCE, PCE, and TCE above MCLs have been detected at the north end of Dunn Field (MW-07 and MW-08) since 1993. Two wells, MW-129 and MW-130, were installed upgradient of the northeast corner of Dunn Field in 2003 and groundwater concentrations have exceeded MCLs for 1,1-DCE, PCE, and TCE since installation. Groundwater flow on Dunn Field is to the west.

The Dunn Field RI (CH2M Hill, 2002) included limited investigation in the Northeast Open Area and no samples were collected in the northeast corner. TDEC has performed several investigations of possible source areas for CVOCs in groundwater upgradient of Dunn Field, but has not identified a specific release site(s).

Army has considered the groundwater contamination in the northern portion of Dunn Field to result solely from a suspected off-site source(s) for the following reasons:

- CVOCs are present at the highest concentrations in wells upgradient of Dunn Field indicating an off-site source.
- One of the primary CVOCs (1,1-DCE) is not present in other groundwater plumes in the western portion of Dunn Field.
- Only a few suspected source areas were identified in the Northeast Open Area with only Site 50, Dunn Field Northeastern Quadrant Drainage Ditch, identified in the northeast corner of Dunn Field (see Table 2 and Figure 4). Site 50 was a Screening Site during the Dunn Field RI with no further action required.

In order to support the absence of a CVOC source in the NE area of Dunn Field contributing to the off-site groundwater plume, further investigation is planned. An on-site membrane interface probe (MIP)

survey with confirmation soil sampling will be performed at the northeast corner of Dunn Field in 2016 or early 2017 to determine if soil contamination is present and potentially impacting groundwater. The planned MIP locations are shown on Figure 23.

The *Membrane Interface Probe Survey Work Plan, Dunn Field* (Trinity, 2016c) was submitted to USEPA and TDEC for review on 23 August 2016. The work plan was approved by TDEC on 21 October 2016 and USEPA provided comments on 25 October; responses to USEPA comments were submitted on 21 November 2016.

If the MIP survey and confirmation soil sampling determine soil contamination is not present on-site, that will support the presence of an off-site source(s) northeast of Dunn Field and not associated with DDMT. Army has no current plans for further investigation if soil contamination is not identified in the northeast corner of Dunn Field.

3.2.3.6 Land Use Controls

LUCs for Dunn Field are described in the LUCIP in Appendix A of the Off Depot RD (CH2M HILL, 2008): deed and/or lease restrictions, Notice of Land Use Restrictions, City of Memphis/Shelby County zoning restrictions, the SCHD groundwater well restrictions, fencing and the Dunn Field LUC protocol. The LUCs are to limit use of the Disposal Area to light industrial land uses, to prevent residential use of Dunn Field, and to prevent exposure to contaminated groundwater; the areas covered by the LUCs are shown on Figure 24. The LUCs will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use. An annual inspection is conducted to determine whether the required LUCs remain effective and that land use restrictions are being achieved.

The majority of the eastern section of Dunn Field was approved for unrestricted use in the Dunn Field ROD (CH2M HILL, 2004b). There is some overlap between the unrestricted use area and the areas subject to LUCs as approved in the Dunn Field LUCIP (Figure 24).

The LUCs have been implemented in accordance with the LUCIP. The Notice of Land Use Restrictions for Dunn Field was recorded at the City of Memphis/Shelby County Register of Deeds on 11 June 2009. Annual inspections have been performed since 2009 and reports have been distributed in accordance with the LUCIP. The *Dunn Field 2016 Annual Site Inspection Report* (Trinity, 2016d) was submitted to USEPA and TDEC on 2 August 2016; no deficiencies or violations of the LUCs were identified.

3.3 PROPERTY TRANSFER

Six Findings of Suitability to Transfer (FOSTs) including all property within DDMT have been completed. The area covered by each FOST is shown on Figure 25. Following approval of FOST 6, USEPA issued the *Superfund Property Reuse Evaluation Checklist for Reporting the Site Wide Ready for Anticipated Use Measure* (USEPA, 2010b) documenting that all cleanup goals affecting current and reasonably anticipated future land uses have been achieved, and all institutional or other controls required in the RODs have been put in place.

Property transfers through deed or letter of assignment have been completed for all FOSTs, except FOST 5. The acreage, type of conveyance, type of transfer, receiving party and date of transfer are listed on Table 8. Army plans to transfer the remaining 24.5 acres on FOST 5 through a competitive public sale. The transfer has been delayed due to economic conditions, impediments to site development from remediation equipment and monitoring wells on-site, and the presence of groundwater contamination from a suspected off-site source migrating on to the property.

4.0 ACTIVITIES REQUIRED FOR SITE COMPLETION

Selected remedies for DDMT have been implemented in accordance with the MI and Dunn Field RODs, and the IRACRs have been approved by USEPA and TDEC. The Preliminary Closeout Report has also been approved by USEPA, and the NPL site status is Construction Complete.

Soil cleanup standards have been met where applicable. The remaining requirement for completion of remedial action is that groundwater concentrations for CVOCs, which are the contaminants of concern, are below MCLs.

The ongoing activities are summarized below with additional information in the following sections:

- Additional EBT at the MI was completed in November 2014; further MI RA will be conducted upon completion of the SRI/FFS and approval of an Explanation of Significant Differences (ESD) or ROD Amendment, as required.
- An evaluation of potential VI risks from CVOCs in soil and groundwater at the MI will begin in 2017 prior to the next Five-Year Review.
- FSVE operations on Dunn Field were shut down in July 2012 after remediation goals were met. The SVE wells, piping and equipment compound remain in place while groundwater is monitored for rebound. Limited rebound, primarily in concentrations of CF, has been observed at MW-06 and MW-87, but additional remedial action is not considered necessary at present.
- AS/SVE in the Off Depot area is continuing; only a small area near MW-159 exceeds the active remediation goal and additional AS wells will be installed in late 2016 or early 2017 to remediate that area.
- An investigation is planned in the northeast corner of Dunn Field to determine the presence or absence of CVOCs in soil that may contribute to the groundwater plume migrating on to Dunn Field.
- LTM at Dunn Field and the MI is performed to monitor contaminant migration horizontally and vertically and to evaluate progress toward restoring groundwater concentrations to MCLs. LTM will continue until CVOC concentrations are at or below MCLs.
- LUCs and requirements for Five-Year Reviews will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use.

4.1 MAIN INSTALLATION

4.1.1 EBT

Previous EBT at the MI was summarized in Section 3.1.3. Although CVOC concentrations were reduced during the latest EBT performed from November 2012 to August 2014, it was not sufficient to meet the RAOs for the MI. Further remedial action on the MI is being delayed until the SRI/FFS is completed, and the selected remedy has been confirmed or revised. The 28 EBT performance wells were incorporated in 2016 LTM to improve plume delineation in the former treatment areas.

4.1.2 Supplemental Remedial Investigation and Focused Feasibility Study

The following considerations for the SRI/FFS were developed from review of the Phase 1 Summary Report and the 2015 LTM report:

- Water level data suggests a sink in the southeast MI and groundwater flow in the Fluvial Aquifer onto the MI from all directions. If confirmed, groundwater impacts on the MI would not affect off-site residents, and the remedial action should address reduction/prevention of impacts to deeper aquifers through vertical migration primarily through the window.
- Additional plume delineation is needed in several areas to confirm the extent, including upgradient and off-site locations.
- Phase 1 well MW-270 along the southern MI boundary identified groundwater contamination outside the designated plumes. There are other large areas of the MI which have not been investigated for groundwater impacts
- Although 2009 groundwater modeling indicated attenuation was occurring, site conditions are not conducive to natural biodegradation of CVOCs and CVOC concentrations have generally not decreased outside EBT areas. The 100 µg/L criterion for active remediation is not considered sufficient to meet RAOs and will be re-considered during the FFS.

Data gaps to be addressed by the SRI along with the number and general location for monitoring wells to address the data gaps are listed on Table 9. An additional twenty-nine well locations are recommended. Nine wells were selected for installation during Phase 2 in 2016; the 20 remaining wells will be installed during Phase 3 in 2017. The Phase 2 and planned Phase 3 well locations are shown on Figure 26.

The *Supplemental Remedial Investigation Phase 2 Work Plan, Revision 1* (HDR 2016d) was approved by TDEC in June and by USEPA in August 2016. Field work began on 24 September and is expected to be completed by 17 November 2016. The Phase 3 well locations will be reviewed based on the Phase 2

results and final locations will be provided in a work plan to be submitted for review by USEPA and TDEC.

Additional work is planned to complete the SRI with concurrence from USEPA and TDEC, to provide sufficient information for evaluation of remedial alternatives in the FFS, and to develop a successful strategy for remedial action. A Phase 4 investigation will be performed to address data gaps, if any, following Phase 3 and is expected to include additional monitoring wells and vertical delineation of soil and groundwater contamination at two locations. Risk assessment and groundwater modeling updates for the MI are also planned in 2017.

The groundwater component of the MI RI human health risk assessment (HHRA) completed in 2000 will be updated to comply with current guidance and address technical and policy changes since its completion. Since the original ROD schedule for achieving MCLs has been shown to be impracticable, the RAOs will be reviewed with consideration of interim goals tied to contaminant mass reduction, while retaining the ultimate goal to restore the aquifer. Technical memoranda will be prepared to describe the risk assessment protocol for review by USEPA and TDEC prior to implementation and to present site information, risk estimation and the findings. The final memoranda will be included in the final SRI report for review by USEPA and TDEC.

An updated groundwater model will be developed to incorporate the site information obtained since the previous groundwater modeling in 2009 and to utilize a more detailed flow and transport model. The modeling update will include data collection and compilation, conceptual site model (CSM) development, and groundwater flow and transport model construction, calibration and predictive scenarios. Data will be requested from MLGW, with assistance from USEPA and TDEC, to include monthly pumping data for supply wells and monthly water level data for supply and monitoring wells at Allen Well Field. The updated CSM will consider groundwater flow directions and velocities within the site, off-site and towards the Allen Well Field in the Memphis Sand Aquifer; identification of potential source areas based on current PCE and TCE plume maps and establishment of boundary conditions for the model domain.

The model will focus on flow and transport in the Fluvial Aquifer with simplifying assumptions for Intermediate and Memphis Aquifers based on available information. A technical memorandum documenting the CSM, modeling objectives and data limitations, and planned model construction will be submitted for review and concurrence by USEPA and TDEC. A second technical memorandum will be completed documenting the final model construction, calibration and predictive scenarios. The memoranda will be incorporated in the final SRI report.

The FFS, to be performed after completion of the SRI, will identify contaminant extent, volumes and area of groundwater contamination, and develop appropriate remedial alternatives for evaluation. The alternatives are expected to include No Action, EBT (including bioaugmentation), AS/SVE, and groundwater pump and treat system. A detailed analysis will be performed for the remedial alternatives that pass the preliminary screening against applicable CERCLA evaluation criteria.

4.1.3 Long-Term Monitoring

MI LTM is performed in accordance with the LTM Plan in the MI RD (CH2M HILL, 2004a). Recommendations for optimization are made in the annual LTM reports. The current status of MI LTM was described in Section 3.1.3.3.

In April 2016, a semiannual LTM event was performed with samples collected at 93 wells, including 53 of 99 MI LTM wells, 12 SRI Phase 1 wells and 28 former EBT performance wells. MCLs for PCE, TCE, cDCE, VC and/or CT were exceeded at 75 wells including 40 LTM performance wells, 10 LTM sentinel wells and 1 LTM boundary well, 5 SRI wells and 19 former EBT wells. A biennial MI LTM event was conducted 10 to 19 October; the results will be presented in the 2016 LTM report.

4.1.4 Vapor Intrusion

Potential VI issues at the MI will be evaluated in 2017 through a study performed in accordance with current DoD guidance, *DoD Vapor Intrusion Handbook* (Tri-Service Environmental Risk Assessment Workgroup, 2009). Recent USEPA and TDEC guidance will also be considered. Based on a previous study conducted as part of the Off Depot remedial action, the potential for VI from groundwater is low (Section 3.2.3.4.1).

The DOD Guidance provides a 5-step approach for VI investigations. Steps 1 and 2 are considered complete based on past site investigation activities.

Step 1 requires the potential for VI to be evaluated in order to determine if a potential human exposure pathway exists at the site through comparison of site chemicals to a list provided in the guidance (Appendix A: Chemicals that are Sufficiently Volatile and Toxic, based on EPA's 2002 Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils). The selected remedy at the MI addresses CVOCs present in groundwater at the MI (PCE, TCE, cDCE, VC, CT and CF); these CVOCs are listed in the referenced appendix as being sufficiently volatile and toxic. The CVOCs are present in groundwater at concentrations up to 300 µg/L and have been detected at low levels in near surface soils. The groundwater plumes, and potentially soil contamination, are present beneath

commercial/industrial buildings at the site resulting in a potential vapor intrusion human exposure pathway.

Step 2 requires an evaluation to determine whether exposure to the vapors poses an immediate risk to building inhabitants – i.e., acute health risks or risk of explosion. Past investigations have demonstrated CVOC concentrations in groundwater and soil at the MI are relatively low and do not indicate potential for 'free product' in soil or groundwater. A previous VI study in the Off Depot area at DDMT where CVOC concentrations in groundwater were an order of magnitude higher than on the MI, found that CVOC concentrations in shallow soil vapor were below applicable residential screening levels. There have been no reports of suspected vapor intrusion from the businesses operating at the Memphis Depot Industrial Park. No immediate risk to building occupants from VI is indicated, and a screening level VI evaluation is appropriate.

Step 3 requires a screening level VI human health assessment of volatile site contaminants based on comparison of soil-gas or groundwater data to conservative risk-based screening values. The maximum soil and groundwater CVOC concentrations will be input into the EPA's Vapor Intrusion Screening Level (VISL) calculator. If the results indicate an unacceptable human health risk, site-specific data will be used with the Johnson & Ettinger (J&E) model. If the J&E results indicate an unacceptable human health risk, then Step 4 will be performed including vapor sampling and analysis. The methods and the results of the screening level assessment will be documented in a technical memorandum.

Step 4 requires a site-specific VI pathway evaluation, including collection of near-slab soil gas, sub-slab soil gas and/or indoor air samples. The analytical results for the samples will be incorporated into a HHRA to determine whether no further action or mitigation/remediation is warranted. Step 4A will include soil-gas sampling in open areas or beneath the sub-slab in buildings; samples will be collected at locations considered to have the highest VOC concentrations based on current groundwater plume maps and VOC concentrations in soil based on the 2009 Membrane Interface Probe (MIP) study on the MI. The analytical results will be used with the VISL calculator and, if warranted, the J&E model to calculate the health risk. A work plan will be prepared with sample locations and methods, analytical methods, and procedures for determining the health risk. The activities and results of the soil gas sampling and the risk determination will be documented in a second technical memorandum. Step 4B will include indoor air sampling in selected buildings if warranted to further evaluate the human health risk. A work plan prior to the sampling and a technical memorandum after risk assessment will be prepared as described for Step 4A.

Step Five requires evaluation of mitigation/remediation options, if necessary based on the site specific VI pathway evaluation. The evaluation will address mitigation to prevent (or minimize) VI from soil or groundwater, and remediation through treatment or removal of soil contamination.

A detailed report describing VI study activities, analytical results with data validation and laboratory reports, conclusions and recommendations will be prepared upon completion of this task or at an earlier stage if sampling analysis results and modeling indicates VI risk is below applicable criteria.

4.2 DUNN FIELD

4.2.1 Fluvial SVE Operations

The FSVE system was shut down in July 2012 based on confirmation soil samples meeting the RAO and system influent asymptotically decreasing below 1 ppm. The conveyance lines were closed and the wells were opened for passive venting. The air intakes and exhausts for the blowers were sealed; power at the equipment compound was switched off, but the utility connection remains in place for use during maintenance.

BaroBall™ caps were installed on 11 SVE wells for increased efficiency during passive venting. The caps have a control valve which utilizes the natural fluctuation of atmospheric pressure to allow soil gas to flow out of the well while restricting air flow from the surface into the well.

Rebound of CVOC concentrations in groundwater is evaluated through LTM sample results at the 14 Performance-FSVE wells on Dunn Field. The system layout and well locations used to monitor rebound are shown on Figure 16.

Vadose zone modeling indicated the highest CVOC concentrations in groundwater due to rebound from residual CVOC mass in the fluvial sands would be observed within 90 days after FSVE shutdown. For rebound due to residual CVOC mass in the loess, the modeling indicated the highest CVOC concentrations in groundwater would be observed within 2 to 3 years for TeCA and 4 to 5 years for TCE. The model parameters and results were described in Appendix F of *Dunn Field Source Areas Fluvial Soil Vapor Extraction System Annual Operations Report, Year Four, Revision 0* (HDR, 2011b).

The October 2016 LTM event will mark 4 years of post-shutdown monitoring. The only indication of rebound to date has been increased CF and TCE concentrations at MW-06 and MW-87 along the central section of Dunn Field's western boundary. Analytical results for April 2013 to April 2016 are shown below. The concentrations of CF and TCE in both wells increased in 2013 and 2014, but have been relatively stable since then. The concentrations are below MCLs, but CF has consistently exceeded the

TC (12 µg/L) at MW-87. The limited increase in concentrations does not warrant additional FSVE operation but it will continue to be monitored in 2017.

MW-06	Apr-2013	Oct-2013	Apr-2014	Oct-2014	Apr-2015	Oct-2015	Apr-2016
CF (µg/L)	2.21	2.38	4.2	9.05	11	4.03	7.39
TCE (µg/L)	0.707	0.848	0.929	1.32	2.59	0.89	1.02

MW-87	Apr-2013	Oct-2013	Apr-2014	Oct-2014	Apr-2015	Oct-2015	Apr-2016
CF (µg/L)	0.254 J	3.46	19.3	56.2 J	63.1	49.5	59.8
TCE (µg/L)	<1	0.677 J	2.74	4.16	4.16	3.38	7.04

4.2.2 AS/SVE Operations

The AS/SVE system consists of 90 AS points, 12 SVE wells, 10 pairs of VMPs and control buildings for the AS compressor, SVE blowers and system controls. The AS/SVE system layout is shown on Figure 17.

The vapor stream passes through the air/water separator tank to remove entrained vapor and debris from the air stream. No other treatment is performed prior to discharge. AS/SVE operations were incorporated in SCHD Permit #01030-01P issued for the FSVE with permit conditions, including the VOC emission limit of 5.71 lb/hour, applicable to the combined operations. On 11 May 2016, SCHD cancelled the permit and exempted the remediation system based on emissions being below the de minimus limit of 0.1 pounds per hour. Effluent vapor monitoring will continue to confirm emissions remain below the de minimus limit.

Overall effectiveness of the AS/SVE system is evaluated based on results of LTM analyses. As stated in the Off Depot RD (CH2M HILL, 2008), shutdown of the AS/SVE system will be considered when groundwater samples collected upgradient and downgradient of the AS barrier show individual CVOC concentrations at or below 50 µg/L for 12 months. Isolated upgradient outliers may be excluded from consideration if surrounding wells show statistically significant decreasing trends.

The only well, upgradient or downgradient of the AS/SVE system, exceeding the active remediation goal (50 µg/L) in April 2016 was MW-87 near the Dunn Field boundary (CF at 59.8 µg/L); the concentration is below the MCL and no action is planned other than continued monitoring. The TCE concentration in MW-159, located immediately upgradient of the system, decreased from 227 µg/L in October 2015 to 38.4 µg/L in April 2016. The TCE concentration at MW-159 has consistently exceeded the 50 µg/L

standard since start-up in 2009 and the decrease was suspect based on increased water levels in April. The October 2016 LTM sample at MW-159 contained TCE at 171 µg/L.

Additional AS wells are to be installed near MW-159 in late 2016 or early 2017 to reduce CVOC concentrations in that area below the active remediation goal; the new AS well locations are shown on Figure 17. As stated in Section 3.2.3.4.2, responses to USEPA comments on the *Off Depot Air Sparge Well Installation Work Plan, Dunn Field* (Trinity, 2016b) were submitted on 23 November 2016. Since the active remediation goal has not been met, AS/SVE operations are planned to continue through at least 2017.

AS/SVE operations include:

- Weekly site visits to adjust AS compressor and SVE blower cycles in accordance with the operating plan and to conduct system inspections to identify and schedule repair or replacement of components, as needed.
- Bi-weekly readings at AS compressor and SVE blowers for flow rate, pressure/vacuum, temperature, and operating hours.
- Monthly flow rate, vacuum and photoionization detector (PID) measurements at SVE wells and system effluent during months when the AS manifold is open.
- Quarterly PID and vacuum measurements at VMPs.
- Quarterly laboratory samples from system effluent analyzed for VOCs.
- Semiannual report to describe operations and maintenance (O&M) activities, system status, performance and monitoring results.
- Annual operations report to summarize system operations and monitoring results with data validation and to provide recommendations for optimization of operations.

Inspections include a visual review of the equipment compound (exterior and interior) and major system components. The inspector records system flow rates and other operating parameters on field records provided in the O&M manual. Flow rates and operating parameters are read from one of the system computer display screens or directly from gauges and meters located within the equipment room. Original field sheets are maintained on-site in the project file. General maintenance of AS/SVE system components is performed based on field observations and manufacturer requirements.

Vapor samples for laboratory analysis are limited to the system effluent and are collected quarterly for VOC analysis. PID readings at SVE wells and system effluent and the effluent sampling results are used

to assess VOC capture effectiveness. The effluent sampling results are also used to verify compliance with the SCHD de minimus emissions. PID readings and vacuum measurements at VMPs are used to assess the vacuum radius of influence and vapor extraction effectiveness.

4.2.3 Long-Term Monitoring

Dunn Field LTM is conducted in accordance with the LTM Plan in the Off Depot Groundwater RD (CH2M HILL, 2008). Recommendations for optimization are made in the annual LTM reports. The current status of Dunn Field LTM was described in Section 3.2.3.5.

In April 2016, an annual sampling event was performed at Dunn Field and the Off Depot area with samples collected at 70 of 85 Dunn Field LTM wells. MCLs or TCs for TeCA, PCE, TCE, cDCE, DCE, VC and/or CF were exceeded at 7 Performance wells and 5 Background-NE wells. The number of performance wells exceeding the MCL or TC decreased from 11 in April 2015; three of the Performance wells (MW-31, MW-79 and MW-220) are impacted by the off-site plume. A semiannual Dunn Field LTM event was conducted 10 to 19 October; the results will be presented along with changes for 2017 LTM in the 2016 annual report.

4.2.4 Off-Site Plume

As described in Section 3.2.3.5.4, Army plans to conduct an on-site membrane interface probe (MIP) survey with confirmation soil sampling in late 2016 or early 2017 to determine if soil contamination is present and potentially impacting groundwater. Responses to USEPA comments on the *Membrane Interface Probe Survey Work Plan, Dunn Field* (Trinity, 2016c) were submitted on 21 November 2016.

If the MIP survey and confirmation soil sampling determine soil contamination is not present on-site, the results will support the presence of an off-site source(s) that is northeast of Dunn Field and not associated with DDMT. Army has no current plans for further investigation if soil contamination is not identified in the northeast corner of Dunn Field.

4.3 LAND USE CONTROLS

The LUCs applicable to the MI and Dunn Field are described in the LUCIPs in the MI RD (CH2M HILL, 2004a) and Off Depot Groundwater RD (CH2M HILL, 2008). The areas covered by the LUCs are shown on Figures 14 and 24. LUCs will remain in place until concentrations of contaminants of concern have been reduced to levels that allow for unlimited exposure and unrestricted use. As described in Sections 3.1.3.4 and 3.2.3.6, annual inspections are conducted to determine whether the required LUCs remain

effective and that land use restrictions are being achieved. No deficiencies or violations of the LUCs have been identified.

4.4 FIVE-YEAR REVIEWS

The continued effectiveness of the selected remedies at the MI and Dunn Field are evaluated in CERCLA Five-Year reviews because hazardous substances remain at the site above levels that allow for unrestricted use and unlimited exposure. Because the final remedies for both the MI and Dunn Field include LUCs in perpetuity, the period in which five-year reviews will be needed is indefinite.

The initial statutory review, *Memphis Depot, Dunn Field Five Year Review* (CH2M HILL, 2003b), was triggered by initiation of the IRA groundwater recovery system at Dunn Field on DDMT in 1998. The second review was conducted in 2007 and the report, *Second Five-Year Review, Revision 1* (e^2M, 2007), was approved in January 2008.

The *Third Five-Year Review, Revision 1* (HDR, 2012b) was approved by USEPA on 23 January 2013. The remedies at Dunn Field (OU 1) and the MI (OUs 2, 3 and 4) were found to be protective of human health and the environment, and because the RAs at all OUs for DDMT are protective, the site is protective of human health and the environment. Two issues were identified, both related to the MI: rebound in CVOC concentrations and the time required to achieve groundwater RAOs. The issues, recommended actions, schedule and status are shown on Table 10.

The fourth five-year review will be conducted in 2017 in accordance with *Comprehensive Five-Year Review Guidance* (USEPA, 2001). The report is required to be completed by 23 January 2018. A VI study for the MI and review of previous risk assessments for the MI are to be conducted in 2017 to support the protectiveness determination for DDMT. The VI study was described in Section 4.1.4 and the risk assessment update for the groundwater component of the HHRA in the MI RI was described in Section 4.1.2.

In addition to the groundwater HHRA update, the soil component of the HHRA and the screening level ecological risk assessment (SLERA) in the MI RI will be reviewed. Soil contaminants (lead, PCP, dieldrin, PCBs and metals/ PAHs) were addressed in removal actions prior to completion of the MI ROD. There has been no change in the site's development for light industrial use nor has there been an increase in suitable ecological habitat since the MI RI was completed in 2000. The review shall be conducted to evaluate the impact of changes to toxicity factors and risk assessment protocols for the identified soil contaminants and for ecological risk in order to determine if an update to the soil component of the HHRA and/or the SLERA is warranted.

4.5 TIMELINE FOR SITE COMPLETION

The master schedule for MI, Dunn Field and site-wide activities through planned site completion in 2026 is shown on Figure 27. The planned completion date in the 2016 SMP was 2024; the current date results from the addition of SRI Phases 3 and 4 and delaying the FFS until the completion of SRI Phase 4. The estimated timeline for site completion includes the following:

- Main Installation
  - SRI to be completed in February 2019.
  - FFS to be completed in May 2019.
  - ROD Amendment to be final in May 2020.
  - Additional RA from November 2020 through November 2023.
  - MI LTM through 2023, with final quarterly compliance monitoring in 2024.
  - MI Remedial Action Completion Report to be completed in September 2025.
- Dunn Field
  - Off Depot AS/SVE operates through May 2018.
  - Dunn Field LTM through 2018, with final quarterly compliance monitoring in 2019.
  - Dunn Field Remedial Action Completion Report to be completed in October 2020.
- Final Closeout Report to be completed in March 2026.

The timeline described above is considered a reasonable estimate given current information. Significant variables include the time required for additional MI RA to achieve RAOs and whether additional RA is necessary on Dunn Field to address the impact of the groundwater plume from a suspected off-site source(s).

- The schedule assumes 3 years of additional RA at the MI, which may not be sufficient; the estimated schedule for RA will be included in the FFS.
- The schedule does not currently include additional investigation or remedial action on Dunn Field. The schedule currently estimates the Dunn Field RA will be completed in 2020 and additional work could be performed without impacting the current site completion date in 2026.

5.0 SCHEDULE AND FISCAL YEAR REQUIREMENTS

5.1 RESPONSE SCHEDULES

The environmental restoration activities currently planned for the next three fiscal years are summarized below. Table 11 lists primary and secondary documents for the DDMT environmental restoration program through FY19; primary and secondary documents are defined in the FFA, Section XV (USEPA, 1995).

FY17

- MI RA – Complete SRI Phase 2 and prepare SRI Phases 1-2 report. Conduct risk assessment update and ground-water modeling. Conduct Phase 3 well installation and sampling.
- MI LTM – Perform groundwater monitoring in accordance with LTM plan.
- MI VI – Perform screening level assessment. Prepare work plan for soil gas sampling as first step in site-specific VI pathway evaluation and collect soil gas samples.
- Dunn Field/Off Depot RA – Install additional AS wells. Complete Year 6 and begin Year 7 AS/SVE operations and monitoring.
- Dunn Field LTM – Perform groundwater monitoring in accordance with LTM plan. Conduct MIP survey in northeast Dunn Field.
- Site Management and Community Relations – Conduct annual LUC inspections; prepare SMP Update and annual community newsletter; conduct 4th Five-Year Review and complete Rev. 0 report.

FY18

- MI RA – Prepare SRI Phase 3 summary report and SRI Phase 4 work plan, complete Phase 4 field investigation, begin final SRI report and begin FFS.
- MI LTM – Perform groundwater monitoring in accordance with LTM plan.
- MI VI - Prepare work plan for indoor air sampling as second step in site-specific VI pathway evaluation and collect indoor air samples. Prepare indoor air sampling memorandum and select mitigation and/or remediation options.
- Dunn Field/Off Depot RA – Complete Year 7 AS/SVE operations and monitoring.
- Dunn Field LTM – Perform groundwater monitoring in accordance with LTM plan.

- Site Management and Community Relations – Conduct annual LUC inspections; prepare SMP Update and annual community newsletter; complete 4th Five-Year Review Report.

FY19

- MI RA – Complete SRI and FFS. Prepare Revised Proposed Plan and begin new MI RD.
- MI LTM – Perform groundwater monitoring in accordance with LTM plan.
- MI VI - Prepare Comprehensive VI Study report.
- Dunn Field/Off Depot RA – Remove/abandon FSVE and AS/SVE systems.
- Dunn Field LTM – Perform groundwater compliance monitoring.
- Site Management and Community Relations – Conduct annual LUC inspections; prepare SMP Update and annual community newsletter;

5.2 REQUIREMENTS BY FISCAL YEAR

The financial requirements by fiscal year for the environmental program at DDMT are summarized in Table 12, which lists estimated annual costs on a site-wide basis. These requirements are revised annually in accordance with updates to the cost-to-complete database (Army Environmental Database-Restoration) maintained by ODB.

6.0 REFERENCES

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TABLES

TABLE 1
FUNCTIONAL UNIT AND AREA DESCRIPTIONS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Main Installation

Functional Unit	Name	Size[1] (Acres)	Common Past Land Use	Description
1	Twenty Typical Warehouses	89	Transportation to and storage in closed warehouses	Located in the northeastern area of the MI, consisting of about 20 large warehouses, with interspersed roadways and railroad tracks.
2	Southeast Golf Course/ Recreational Area	53	Golf, other recreation	Located in the southeastern corner of the MI, consisting of golf course (Parcel 3). This FU also includes a baseball field and a small playground in the southeastern corner. This FU includes two constructed ponds and two concrete-lined drainage ditches from the ponds leading to the off-site area.
3	Southwest Open Area	92	Transportation to and storage in open-sided warehouses, painting and sandblasting, open storage	Located in the southwestern corner of the MI, consisting of varied type of parcels and sites.
4	Northern and Open Areas	193	Open storage, and transportation to and storage in closed warehouses	Located in the north-central to northwest area of the MI, covering a large area.
5	Newer Warehouses	109	Transportation to and storage in closed warehouses	Located in the south-central area of the MI and includes 10 large warehouse buildings.
6	Administrative and Residential Areas	33	Offices, equipment storage and maintenance, on-base housing	Located along the property boundary of the Depot along the Airways Boulevard. This FU includes the old Residential Unit Area, parking lots, and other asphalt-paved areas.
7	Groundwater at the Main Installatiion	-	No past use of groundwater	Includes all groundwater beneath the Main Installation.

Dunn Field

Area	Size[1] (Acres)	Description
Northeast Open Area	20	Land in the northeast quadrant of Dunn Field, mostly grass covered with some lightly wooded areas.
Disposal Area	14	Open land in the northwest quadrant of Dunn Field, where the majority of disposal sites are located.
Stockpile Area	30	Open land in the southern half of Dunn Field. Area of former bauxite and fluorspar stockpiles (removed in 1999) and burial areas in the eastern and southwestern portions of Dunn Field.

Notes:
1) Acreage is approximate
FU: Functional Unit
MI: Main Installation

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
Operable Unit 1: Dunn Field			
1	36.16	Mustard and Lewisite Training Sets (9 sets) Burial Site (1955)	A CERCLA Removal Action took place for this area in 2000-2001. No further action is required for this site.
2	36.1	Ammonia Hydroxide (7 pounds) and Acetic Acid (1 gallon) Burial (1955)	No further action is required for this site.
3	36.2	Mixed Chemical Burial Site (orthotoluidine dihydrochloride) (1955)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation of this site began in March 2005 and was completed in 2006. USEPA approved the RACR in August 2006. No further action is required for this site.
4	36.3	POL Burial Site (thirteen 55-gallon drums of oil, grease, and paint)	This site is associated with Dunn Field groundwater remediation for administrative purposes. Soil vapor extraction system in fluvial deposits operated from July 2007 to July 2012. Thermal-enhanced soil vapor extraction system in loess deposits operated from May until December 2008. USEPA approved the Source Areas OPS determination in October 2009 and the Source Areas IRACR in November 2009. The off-depot groundwater air sparging/soil vapor extraction system began operating in December 2009. USEPA approved the Off Depot IRACR in August 2011. Additional AS wells will be installed in late 2016 and AS/SVE system operations will continue through 2017. No further action is required for this site.
5	36.4	Methyl Bromide Burial Site A (3 cubic feet) (1955)	No further action is required for this site.
6	36.2	40,037 units ointment (eye) Burial Site (1955)	No further action is required for this site.
7	36.5	Nitric Acid Burial Site (1,700 quart bottles) (1954)	No further action is required for this site.
8	36.6	Methyl Bromide Burial Site B (3,768 1-gallon cans) (1954)	No further action is required for this site.
9	36.17	Ashes and Metal Burial Site (burning pit refuse) (1955)	No further action is required for this site.
10	36.21	Solid Waste Burial Site (near MW-10) (metal, glass, trash, etc.)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation of this site began in March 2005 and was completed in 2006. USEPA approved the RACR in August 2006. No further action is required for this site.
11	36.7	Trichloroacetic Acid Burial (1,433 1-ounce bottles) (1965)	No further action is required for this site.
12	36.8	Sulfuric and Hydrochloric Acid Burial (1965)	No further action is required for this site.
13	36.9	Mixed Chemical Burial (Acid, 900 pounds; unnamed solids, 8,100 pounds)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation of this site was completed in March 2005. USEPA approved the RACR in August 2006. No further action is required for this site.
14	36.22	Municipal Waste Burial Site B (near MW-12) (food, paper products)	No further action is required for this site.
15	36.23	Sodium Burial Sites (1968)	No further action is required for this site.
16	36.1	Unknown Acid Burial Site (1969)	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
17	36.11	Mixed Chemical Burial Site C (1969)	No further action is required for this site.
18	36.15	Plane Crash Residue (Dunn Field)	No further action is required for this site.
19	36.24	Former Tear Gas Canister Burn Site (Dunn Field)	No further action is required at this site.
20	36.25	Probable Asphalt Burial Site (Dunn Field)	No further action is required at this site.
21	36.26	XXCC-3 Burial Site (Dunn Field)	No further action is required at this site.
22	36.15	Hardware Burial Site (nuts and bolts) (Dunn Field)	No further action is required for this site.
23	36.29	Construction Debris and Food Burial Site (Dunn Field)	No further action is required for this site.
24	36.29	Former Burial/Burn Site and Neutralization Pit	Beginning in August 2000 all 29 bomb casings were recovered from the burial site and 900 cubic yards of soil contaminated with mustard degradation by-products were excavated and disposed offsite. Beginning in November 2000, 33 cubic yards of soil contaminated with mustard and degradation by-products were excavated from the neutralization pit and disposed offsite. In March 2001, the CERCLA Removal Action was complete. No further action is required for this site.
50	36.27	Dunn Field Northeastern Quadrant Drainage Ditch	No further action is required at this site.
60	36.14	Pistol Range Impact Area/Bullet Stop	A CERCLA Removal Action for lead in surface soil was conducted in 2003. No further action is required at this site.
61	36.28	Buried Drain Pipe (Northwestern Quadrant of Dunn Field)	No further action is required for this site.
62	36.12/36.13	Bauxite Storage (Northeastern Quadrant of Dunn Field)	No further action is required at this site.
63	36.29/36.30	Fluorspar Storage (10 mounds in Southeastern Quadrant of Dunn Field, 1 mound in Southwestern Quadrant of Dunn Field) All mounds removed by 1999	No further action is required at this site.
64	36.29	Bauxite Storage (Southwestern Quadrant of Dunn Field Removed in 1972), CC-2 Burial Site, IA Site 31 (smoke pot burn/disposal area)	The selected CERCLA remedy for IA Site 31 includes excavation of contaminated soils/waste materials and off-site disposal. For the remaining portions of the site no further action is required. Excavation of this site was completed in March 2005. USEPA approved the RACR in August 2006. No further action is required for this site.
85	36.14	Old Pistol Range Building 1184/Temporary Pesticide Storage	A CERCLA Removal Action for lead in surface soil was conducted in 2003. No further action is required at this site.
86	36.18/36.19	Food Supplies (Dunn Field)	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
90	36.3	POL Burial Site (thirty-two 55-gallon drums of oil, grease, and thinner) (1955)	The selected CERCLA remedy includes excavation of contaminated soils/waste materials and off-site disposal. Excavation and off-site disposal of this site was completed in March 2005. USEPA approved the RACR in August 2006. No further action is required for this site.
91	36.23	Sodium Phosphate Burial (1968)	No further action is required for this site.
92	36.23	14 Burial Pits: Na_2PO_4, sodium, acid, medical supplies, and chlorinated lime (1969)	No further action is required for this site.
93	36.1	Acid Burial Site	No further action is required for this site.
Operable Unit 2: Southwestern Quadrant, MI			
27	24.1	Former Recoupment Area (Building 873)	Contaminated soil removed in 1985 as part of pre-Remedial Investigation activities. No further action is required for this site.
29	35.2	Former Underground Waste Oil Storage Tank	The tank was located and removed during a CERCLA Removal Action in 2000; the contaminated soils were disposed as special waste and the tank contents were disposed as RCRA hazardous waste. This site is associated with MI groundwater remediation for administrative purposes. Enhanced bioremediation treatment (EBT) was selected as the CERCLA groundwater remedy. EBT was initially performed from May 2006 until February 2009. USEPA approved the MI IRACR and the (SRI/FFS) OPS determination in March 2010. Additional EBT was conducted from November 2012 to August 2014. Further MI groundwater remedial action has been halted until completion of the Supplemental Remedial Investigation and Focused Feasibility Study are completed, and the selected remedy has been confirmed or revised. SRI Phase 2 was completed in 2017. Additional investigation (Phases 3 and 4), groundwater modeling and risk assessment are planned in 2017.
30	24.3/35.3	Paint Spray Booths (2 of 3 total; Buildings 770 and 1086)	No further action is required for this site.
31	35.4	Former Paint Spray Booth (Building 1087)	Building 1087 was decontaminated by vacuuming to remove free dust and pressure washing. The surface soil outside the building was excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
32	35.5	Sandblasting Waste Accumulation Area	Building 1088 was decontaminated by vacuuming to remove free dust and pressure washing. The surface soil outside the building was excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
33	35.4	Sandblasting Waste Drum Storage Area (metal shed south of Building 1088)	The surface soil in this area was excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
34	24.3	Building 770 Underground Oil Storage Tanks	The underground storage tanks were removed in 1989. No further action is required for this site.
40	24.3	Safety Kleen Units - 5 of 9 total (all located in Building 770)	No further action is required for this site.
41	24.3	Satellite Drum Accumulation Areas - 1 of 4 total (vicinity Building 770)	No further action is required for this site.
71	Multiple	Herbicide (All railroad tracks) (used to clear tracks)	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
82	23.7/23.8	Flammables (Buildings 783 and 793)	No further action is required for this site.
84	27.2	Flammables, Solvents, Waste Oil, etc. (Building 972)	No further action is required for this site.
87	35.2	DDT, banned pesticides (Building 1084)	Building 1084 was demolished and the debris was disposed off-site at a solid waste landfill. A concrete sump beneath the building was excavated; the contaminated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
88	35.2	POL (Building 1085)	The concrete slab and hydraulic lift were removed during a CERCLA Removal Action in 2000; the contaminated soils were disposed offsite as special waste and the lift and cylinders were cleaned and disposed as scrap metal. The concrete debris was disposed offsite as construction debris. No further action is required for this site.
89	28.2	Acids (Building 1089)	Building 1089 was decontaminated by vacuuming to remove free dust and pressure washing. The surface soil in areas outside the southern end of the building were excavated to a depth of one foot and replaced with clean backfill. The excavated soil was disposed off-site as special waste. This CERCLA Removal Action was completed in 2000. No further action is required for this site.
Operable Unit 3: Southeastern Watershed And Golf Course, MI			
25	3.8	Golf Course Pond	No further action is required for this site.
26	3.6	Lake Danielson	No further action is required for this site.
30	4.4	Paint Spray Booths (1 of 3 total - Building 260)	No further action is required for this site.
40	4, 19, and 21	Safety Kleen Units - 4 of 9 total units (Buildings 253, 469, 490, and 689)	No further action is required for these sites.
41	4 and 19	Satellite Drum Accumulation Areas - 2 of 4 total areas (Buildings 260 and 469)	No further action is required for this site.
48	5.2	Former PCB Transformer Storage Area	Site remediation by removal of surface soil was completed in 1998. No further action is required for this site.
49	17.3	Medical Waste Storage Area	No further action is required for this site.
51	3.7	Lake Danielson Outlet Ditch	No further action is required for this site.
52	3.9	Golf Course Pond Outlet Ditch	No further action is required for this site.
58	4.9	Pesticides, Herbicides (Pad 267)	No further action is required for this site.
59	4.1	Pesticides, Cleaners (Building 273)	No further action is required for this site.
65	7.2	XXCC-3 (Building 249)	No further action is required for this site.
66	4.11	POL (Building 253)	No further action is required for this site.
67	4.7	MOGAS (Building 257	No further action is required for this site.
68	4.8	POL (Building 263) (20 by 40 feet)	No further action is required for this site.
69	3.11	2,4-D, M2A1, and M4 Flamethrower Liquid Fuels (surface application)	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
73	Multiple	2,4-Dichlorophenoxyacetic Acid (all grassed areas)	No further action is required for this site.
75	21.5	Unknown Wastes near Building 689	No further action is required for this site.
76	21.5	Unknown Wastes near Building 690	No further action is required for this site.
77	22.2	Unknown Wastes near Buildings 689 and 690	No further action is required for this site.
78	21.3	Alcohol, Acetone, Toluene, Naphtha; Hydrofluoric Acid Spill	No further action is required for this site.
Operable Unit 4: North-Central Area, MI			
28	32.3	Recoupment Area (Building 865)	No further action is required for this site.
35	15.2	DRMO Building S308 - Hazardous Waste Storage	This site was decontaminated and certified clean November 2001 in accordance with the RCRA Closure Plan (Permit TNHW-053). No further action is required for this site.
36	15.5	DRMO Hazardous Waste Concrete Storage Pad	No further action is required for this site.
37	15.5	DRMO Hazardous Waste Gravel Storage Pad	No further action is required for this site.
38	15.5	DRMO Damaged/Empty Hazardous Materials Drum Storage Area	No further action is required for this site.
39	15.5	DRMO Damaged/Empty Lubricant Container Area	No further action is required for this site.
41	13.4	Satellite Drum Accumulation Area (1 of 4 total - Building 210)	No further action is required for this site.
42	33.9	Former pentachlorophenol Dip Vat Area	In 1986, the dip vat was removed and the soil was excavated to a depth of 10 feet. Soil with PCP concentrations greater than 200 ppb remained beneath the excavated area. The excavation was backfilled with clean soil and with gravel or concrete placed on top of the fill. No further action is required for this site.
43	33.9	Former Underground pentachlorophenol Tank Area	The tank was brought above ground in 1986 and drained into drums. The soil around the site was excavated to a depth of 10 to 15 feet, 20 feet wide and 22 feet long. The pumps and lines were also removed. The excavation was backfilled with clean soil and with gravel or concrete placed on top of the clean fill. No further action is required for this site.
44	33.6	Former Wastewater Treatment Unit Area	No further action is required for this site.
45	33.9	Former Contaminated Soil Staging Area	No further action is required for this site.
46	33.9	Former pentachlorophenol Pallet Drying Area	No further action is required for this site.
47	33.9	Former Contaminated Soil Drum Storage Area (removed 1988)	No further action is required for this site.
53	30.2	X-25 Flammable Solvents Storage Area (near Building 925)	No further action is required for this site.
54	15.6	MI - DRMO East Stormwater Runoff Canal	No further action is required for this site.

TABLE 2
ENVIRONMENTAL RESTORATION SITES
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Site No.	Parcel No.	Description	Site Status
55	15.6	MI - DRMO North Stormwater Runoff Canal	No further action is required for this site.
56	29.3	MI - West Stormwater Drainage Canal	No further action is required for this site.
57	12.1	Building 629 Spill Area	No further action is required for this site.
70	Multiple	POL, Various Chemical Leaks (railroad tracks 1, 2, 3, 4, 5, and 6)	No further action is required for this site.
71	Multiple	Herbicide (all railroad tracks) (used to clear tracks)	No further action is required for this site.
72	15.5/15.6	Waste Oil (DRMO yard) (surface application for dust control)	No further action is required for this site.
73	Multiple	2,4-Dichlorophenoxyacetic Acid (all grassed areas)	No further action is required for this site.
74	15.3	Flammables, Toxics (West End - Building 319)	No further action is required for this site.
79	15.6	Fuels, Miscellaneous Liquids, Wood, and Paper (Vicinity S702)	No further action is required for this site.
80	33.13	Fuel and Cleaners Dispensing (Building 720)	No further action is required for this site.
81	33.7	Fuel Oil AST (Building 765 – removed in 1994)	No further action is required for this site.
83	30.5	Disposal of Dried Paint Residues - South of Building 949	Lead contaminated soil was removed from an area of approximately 7,200 square feet. The CERCLA Removal Action was completed in 2001. No further action is required for this site.

Notes:
AOC: Area of Concern
AST: Aboveground Storage Tank
CWM: Chemical Warfare material
CWMP: Chemical Warfare Management Plan
DDT: 4,4′-Dichlorodiphenyltrichloroethane
DRMO: Defense and Reutilization Marketing Office
FU: Functional Unit
IRACR: Interim Remedial Action Completion Report
MI: Main Installation
MOGAS: Motor gasoline
Na: Sodium
OPS: Operating Properly and Successfully
PCB: Polychlorinated biphenyl
PO_4: Phosphate
POL: Petroleum, oil, and lubricants

a. Source: DLA correspondence dated September 24, 2004, RE: Corrective Action Permit Application and Attachment 1 Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) Defense Depot Memphis, Tennessee

TABLE 3
MAIN INSTALLATION LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-34	Intermediate	Sentinel	Biennial	279411.21	801917.96	299.97	300.80	136.6	20	156.6
MW-38	Intermediate	Sentinel	Biennial	279141.38	802450.43	307.45	308.45	139.9	15	154.9
MW-39	Fluvial	Performance	Semiannual	277280.67	802598.11	296.28	296.58	95.5	20	115.5
MW-39A	Fluvial	Performance	Semiannual	277278.11	802607.66	298.61	298.70	148.1	20	168.1
MW-50	Fluvial	Boundary	Biennial	276455.81	807065.28	298.82	299.32	115.0	10	125.0
MW-52	Fluvial	Performance	Annual	275371.97	805897.36	279.26	279.71	94.0	10	104.0
MW-53	Fluvial	Background	Biennial	279176.66	805136.05	306.38	305.58	72.5	10	82.5
MW-55	Fluvial	Background	Biennial	279301.05	801204.62	292.08	292.48	64.0	10	74.0
MW-62	Fluvial	EBT	TBD	278289.65	801857.92	293.71	293.90	86.1	10	96.1
MW-63A	Fluvial/Intermediate	Sentinel	Annual	278200.31	803572.83	305.96	306.33	140.0	10	150.0
MW-63B	Fluvial/Intermediate	Sentinel	Annual	278201.32	803557.77	305.78	306.22	115.0	10	125.0
MW-64	Fluvial	Performance	Semiannual	276951.52	805005.97	304.21	304.46	102.0	10	112.0
MW-66A	Fluvial	Background	Biennial	276626.02	799792.63	284.22	284.34	74.6	20	94.6
MW-85	Fluvial	EBT	TBD	276704.14	806064.51	304.13	304.50	95.9	15	110.9
MW-88	Fluvial	Performance	Semiannual	276879.05	806512.88	305.15	305.47	82.0	15	97.0
MW-89	Intermediate	Sentinel	Annual	278286.97	802555.25	303.98	304.38	147.0	30	177.0
MW-90	Intermediate	Sentinel	Semiannual	278283.60	802539.51	304.19	304.64	115.0	30	145.0
MW-92	Fluvial	Performance	Semiannual	276614.20	806489.66	304.41	304.78	93.0	15	108.0
MW-93	Fluvial	Boundary	Biennial	275542.22	804440.10	294.08	294.31	92.0	15	107.0
MW-94A	Fluvial	Performance	Semiannual	276805.80	803085.80	303.00	303.23	109.6	10	119.6
MW-96	Fluvial	Performance	Annual	276310.14	806320.24	289.02	289.67	75.5	20	95.5
MW-97	Fluvial	Performance	Semiannual	276074.23	802139.23	297.44	297.70	97.5	20	117.5
MW-98	Fluvial	Performance	Semiannual	276891.37	802572.77	294.43	294.93	137.0	10	147.0
MW-99	Fluvial	Background	Biennial	277443.37	801114.53	285.33	285.69	91.5	20	111.5
MW-100B	Fluvial	Performance	Semiannual	276600.61	800854.26	290.92	291.47	107.4	20	127.4
MW-101[1]	Fluvial	Performance	Semiannual	276204.09	801110.27	291.74	291.98	89.0	15	104.0
MW-102B	Fluvial	Boundary	Biennial	275760.59	800707.72	311.40	312.07	120.5	20	140.5
MW-103	Fluvial	Performance	Annual	278690.88	805159.83	301.37	301.89	70.0	20	90.0
MW-104	Fluvial	Performance	Annual	278676.47	805417.03	291.98	292.18	70.5	20	90.5
MW-107[2]	Fluvial/Intermediate	Sentinel	Semiannual	278419.07	803009.93	304.92	305.18	128.0	15	143.0
MW-108	Fluvial/Intermediate	Sentinel	Semiannual	277658.02	802985.53	303.07	303.25	160.0	10	170.0
MW-113	Fluvial	EBT	TBD	276685.34	806279.10	304.81	304.92	96.0	10	106.0
MW-140	Intermediate	Sentinel	Annual	279061.29	801715.68	298.12	298.16	224.6	20	244.6
MW-141	Intermediate	Sentinel	Semiannual	278019.19	802571.25	303.71	303.70	148.7	20	168.7
MW-142	Fluvial	Performance	Annual	278056.03	801629.12	291.18	291.49	85.0	20	105.0
MW-143	Fluvial	Performance	Semiannual	278301.35	801201.48	290.66	290.90	78.6	20	98.6
MW-16	Fluvial	Background	Biennial	278837.83	807099.66	299.86	300.19	57.6	15	72.6
MW-19	Fluvial	Background	Biennial	278945.87	800782.26	290.57	290.86	83.1	10	93.1

TABLE 3
MAIN INSTALLATION LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-21	Fluvial	EBT	TBD	276473.36	800602.47	295.00	295.30	92.1	15	107.1
MW-22	Fluvial	Boundary	Biennial	275912.38	800702.16	298.04	298.49	95.4	10	105.4
MW-23	Fluvial	Boundary	Biennial	275791.02	801817.13	298.99	299.24	101.2	10	111.2
MW-24	Fluvial	Boundary	Biennial	275616.05	803538.81	299.51	299.81	97.3	15	112.3
MW-25A	Fluvial	Performance	Annual	275975.11	805521.27	269.88	270.13	73.0	10	83.0
MW-26	Fluvial	Performance	Semiannual	276508.16	805962.09	303.69	303.89	97.6	10	107.6
MW-197A	Fluvial	EBT	TBD	276975.42	802042.30	291.26	291.54	161.7	15	176.7
MW-197B	Fluvial	EBT	TBD	276973.14	802036.92	291.03	291.43	93.8	15	108.8
MW-198	Fluvial	Performance	Annual	277775.91	802142.37	291.78	292.20	90.3	15	105.3
MW-199A	Intermediate	Sentinel	Annual	277756.40	802573.52	301.53	301.84	146.1	15	161.1
MW-199B	Fluvial	Performance	Semiannual	277751.74	802575.66	301.73	302.07	104.6	15	119.6
MW-200	Fluvial	Performance	Semiannual	277006.10	802859.39	300.18	300.51	102.9	15	117.9
MW-202A	Intermediate	Sentinel	Annual	278685.74	802111.27	299.23	299.69	176.2	15	191.2
MW-202B	Intermediate	Sentinel	Semiannual	278692.79	802112.04	299.51	299.74	118.8	15	133.8
MW-203A	Fluvial	EBT	TBD	276841.76	801740.43	290.70	290.80	142.9	15	162.9
MW-203B	Fluvial	EBT	TBD	276821.40	801741.59	290.87	291.10	93.0	15	113.0
MW-204A	Fluvial	Performance	Semiannual	276724.66	802168.25	292.21	292.49	133.3	15	148.3
MW-204B	Fluvial	Performance	Semiannual	276707.81	802167.07	292.71	293.00	94.9	15	109.9
MW-205A	Fluvial	Performance	Semiannual	277157.18	802277.24	292.30	292.40	141.3	15	156.3
MW-205B	Fluvial	Performance	Semiannual	277173.05	802277.84	292.16	292.30	97.3	15	112.3
MW-206A	Fluvial	Performance	Semiannual	277219.28	802792.28	299.92	300.35	127.3	15	142.4
MW-206B	Fluvial	Performance	Semiannual	277200.85	802794.78	299.90	300.12	96.7	15	111.7
MW-207A	Fluvial	Sentinel	Semiannual	277652.76	803192.01	304.05	304.45	149.9	15	164.9
MW-207B	Fluvial	Sentinel	Semiannual	277665.02	803193.27	304.06	304.42	108.5	15	123.5
MW-208A	Fluvial	Performance	Semiannual	277382.22	802799.08	302.21	302.40	183.5	15	198.5
MW-208B	Fluvial	Performance	Semiannual	277396.90	802814.96	301.79	302.08	106.7	15	121.7
MW-209A	Intermediate	Sentinel	Semiannual	277574.28	802507.10	298.05	298.36	189.0	15	204.0
MW-209B	Fluvial	Performance	Semiannual	277581.50	802520.13	298.49	298.72	102.3	15	117.3
MW-210A	Intermediate	Sentinel	Semiannual	277238.57	801958.11	289.61	289.70	177.0	15	192.0
MW-210B	Fluvial	Performance	Semiannual	277228.18	801951.94	289.29	289.53	97.0	15	112.0
MW-211	Intermediate	Sentinel	Annual	278000.59	802973.69	303.74	304.09	166.3	15	181.3
MW-212	Fluvial	EBT	TBD	278028.36	802225.40	295.34	295.68	85.3	15	100.3
MW-213	Fluvial	EBT	TBD	278427.08	801669.11	294.22	294.20	77.3	15	92.3
MW-214A	Fluvial	Performance	Annual	277877.62	803906.94	303.61	303.96	119.1	15	134.1
MW-214B	Fluvial	Performance	Annual	277875.84	803922.20	303.70	303.96	101.6	15	116.6
MW-215A	Fluvial	Performance	Annual	277298.37	804164.31	304.50	304.86	128.8	15	143.8
MW-215B	Fluvial	Performance	Annual	277298.27	804177.33	304.56	304.98	105.4	15	120.4
MW-216	Fluvial	Performance	Annual	276024.68	801995.93	297.34	297.63	99.9	15	115.0

TABLE 3
MAIN INSTALLATION LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-217	Fluvial	Performance	Semiannual	276670.60	805213.69	304.18	304.51	101.8	15	116.8
MW-218	Fluvial	Performance	Semiannual	276936.70	805628.44	305.60	306.00	98.9	15	114.0
MW-219	Fluvial	Boundary	Semiannual	276429.49	800460.96	295.13	295.00	98.0	15	113.0
MW-229	Intermediate	Sentinel	Biennial	279294.17	802836.96	311.78	312.09	188.4	20	208.4
MW-252	Intermediate	Sentinel	Annual	278789.21	801364.70	294.16	294.40	126.1	20	146.1
MW-253	Intermediate	Sentinel	Biennial	278287.43	801191.42	290.47	290.80	118.3	20	138.3
MW-254	Memphis	Sentinel	Annual	279334.36	800857.53	292.84	293.28	285.8	20	305.8
MW-255	Memphis	Sentinel	Annual	279304.76	801226.84	291.84	292.38	284.7	20	304.7
MW-256	Intermediate	Sentinel	Semiannual	279301.82	801243.80	292.68	293.40	127.1	20	147.1
MW-257	Fluvial	Performance	Annual	278549.06	801340.58	292.22	292.67	85.5	15	100.5
MW-258	Fluvial	Performance	Semiannual	278125.81	804426.82	304.37	304.83	79.3	20	99.3
MW-259	Fluvial	Performance	Semiannual	276279.04	804450.97	290.77	291.44	98.6	20	118.6
MW-260	Fluvial	Performance	Semiannual	278398.46	804376.22	304.16	304.45	68.0	20	88.3
MW-261	Fluvial	Performance	Semiannual	276390.64	802591.62	293.52	293.79	90.0	20	110.3
MW-262	Intermediate	SRI Phase 1	TBD	279334.45	800832.52	293.22	293.50	154.4	10	164.6
MW-263	Fluvial	SRI Phase 1	TBD	278944.92	805816.52	291.40	291.78	69.1	10	79.3
MW-264	Fluvial	SRI Phase 1	TBD	278410.68	804589.96	303.72	304.00	104.8	10	115.0
MW-265	Fluvial	SRI Phase 1	TBD	278111.58	804709.99	305.15	305.61	85.8	10	96.0
MW-266	Fluvial	SRI Phase 1	TBD	277092.39	806686.45	304.68	305.10	77.1	10	87.3
MW-267	Fluvial	SRI Phase 1	TBD	277161.13	806001.07	303.84	304.30	71.9	10	82.1
MW-268	Fluvial	SRI Phase 1	TBD	277203.89	805283.96	304.59	304.92	109.5	10	119.7
MW-269	Fluvial	SRI Phase 1	TBD	276369.16	800126.79	290.05	290.50	92.2	10	102.4
MW-270	Fluvial	SRI Phase 1	TBD	275482.67	805042.50	281.74	282.20	78.4	10	88.6
MW-271	Fluvial	SRI Phase 1	TBD	276314.97	803773.86	294.91	295.50	134.7	10	144.9
MW-272	Fluvial	SRI Phase 1	TBD	275879.61	804036.59	293.27	293.70	112.8	10	123.0
MW-273	Intermediate	SRI Phase 1	TBD	279713.20	800122.19	284.73	285.00	128.1	10	138.3
DR1-1	Fluvial	Performance	Annual	276300.34	800855.57	293.14	293.42	121.7	20	141.7
DR1-1A	Fluvial	Performance	Annual	276307.34	800863.06	293.00	293.37	89.2	20	109.2
DR1-2	Fluvial	Performance	Annual	276536.64	801152.66	290.00	291.39	97.7	20	117.7
DR1-3	Fluvial	Performance	Semiannual	276527.27	801415.91	290.93	291.11	109.7	20	129.7
DR1-4	Fluvial	Performance	Annual	276231.20	801399.53	292.78	293.00	106.3	20	126.3
DR1-5	Fluvial	EBT	TBD	276080.00	800828.43	294.46	294.86	124.7	20	144.7
DR1-5A	Fluvial	EBT	TBD	276087.00	800835.01	294.51	294.87	90.0	20	110.0
DR1-6	Fluvial	EBT	TBD	276043.88	801103.40	293.17	293.50	114.4	20	134.4
DR1-6A	Fluvial	EBT	TBD	276035.02	801103.61	293.28	293.58	90.9	20	110.9
DR1-7	Fluvial	Performance	Annual	276791.26	801441.36	289.15	289.46	108.3	20	128.3
DR1-8	Fluvial	Performance	Annual	276752.48	800875.32	290.09	290.47	92.7	20	112.7
DR2-1	Fluvial	Performance	Semiannual	276772.10	806497.62	304.90	305.08	73.9	20	93.9

TABLE 3
MAIN INSTALLATION LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
DR2-2	Fluvial	EBT	TBD	276770.85	806658.86	304.30	304.67	78.4	15	93.4
DR2-3	Fluvial	Performance	Semiannual	276539.12	806203.16	303.44	303.66	93.0	20	113.0
DR2-4	Fluvial	Performance	Annual	276455.62	806633.07	303.55	303.96	88.1	20	108.1
DR2-5	Fluvial	EBT	TBD	276830.98	806180.40	305.41	305.72	84.5	15	99.5
DR2-6	Fluvial	Performance	Semiannual	276643.99	805860.91	304.70	304.92	94.6	20	114.6
PMW21-01	Fluvial	EBT	TBD	276533.14	800600.14	294.76	295.00	88.4	20	108.4
PMW21-02	Fluvial	EBT	TBD	276574.64	800701.00	292.98	293.19	91.3	20	111.3
PMW21-03	Fluvial	Performance	Semiannual	276573.43	800742.52	292.11	292.72	90.3	20	110.3
PMW21-04	Fluvial	EBT	TBD	276601.83	800771.56	291.87	292.20	89.0	20	109.0
PMW21-05	Fluvial	Performance	Semiannual	276628.32	801129.72	288.53	288.92	94.3	20	114.3
PMW85-01	Fluvial	EBT	TBD	276802.18	806146.13	305.08	305.39	93.2	10	103.2
PMW85-05	Fluvial	EBT	TBD	276752.08	806222.46	305.12	305.32	93.2	10	103.2
PMW92-02	Fluvial	Performance	Semiannual	276667.02	806476.47	304.17	304.35	94.8	10	104.8
PMW101-02A	Fluvial	EBT	TBD	276281.93	801144.78	292.00	292.29	117.7	20	137.7
PMW101-02B	Fluvial	EBT	TBD	276286.33	801145.41	291.98	292.24	97.8	20	117.8
PMW101-03A	Fluvial	Performance	Semiannual	276348.46	801198.37	291.61	291.99	119.2	20	139.2
PMW101-03B	Fluvial	Performance	Semiannual	276353.09	801194.14	291.55	291.82	99.3	20	119.3
PMW101-04A	Fluvial	EBT	TBD	276299.41	801182.12	291.07	291.43	117.9	20	137.9
PMW101-04B	Fluvial	EBT	TBD	276296.40	801186.86	291.47	291.75	98.6	20	118.6
PMW101-06A	Fluvial	Performance	Semiannual	276191.88	801187.45	292.13	292.72	120.0	20	140.0
PMW101-06B	Fluvial	Performance	Semiannual	276194.93	801183.96	292.17	292.40	99.3	20	119.3
PMW101-07A	Fluvial	EBT	TBD	276143.43	801171.78	292.20	292.52	117.9	20	137.9
PMW101-07B	Fluvial	EBT	TBD	276141.84	801176.74	292.36	292.70	98.0	20	118.0
PMW92-03	Fluvial	EBT	TBD	276678.91	806438.66	303.91	304.17	92.5	10	102.5
PZ-03	Fluvial	Performance	Semiannual	276379.33	802941.05	298.51	298.98	108.9	10	118.9

Notes:

1: MW-101 has three screened sections at the following depths (ft, btoc): 89-104, 109-119 and 124-134.
2: MW-107 has two screened sections at the following depths (ft, btoc): 128-143 and 148-158.
ft: feet
btoc: below top of casing
msl: mean sea level

TABLE 4
MAIN INSTALLATION PRIMARY CVOC RESULTS, APRIL 2016
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

VOC Analyte	MCL (µg/L)	Number of Samples with Analyte Above RL	Maximum Concentrations (µg/L)	Location of Maximum Concentration	Number of Samples with Analyte Above MCL
Carbon tetrachloride	5	12	47.6	MW-217	6
Chloroform	80	26	7.61	MW-265	0
cis-1,2-Dichloroethene	70	49	147	PMW85-05	5
Tetrachloroethene	5	68	266	PMW21-04	58
trans-1,2-Dichloroethene	100	6	1.91	MW-270	0
Trichloroethene	5	69	115	PMW21-04	42
Vinyl chloride	2	14	130	MW-100B	9

Notes:
µg/L micrograms per liter
--: Not Listed
RL: reporting limit
MCL: Maximum Contaminant Level

TABLE 5
REMEDIATION GOALS FROM DUNN FIELD RECORD OF DECISION
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

	Remedial Goal Objectives				
	Site-Specific Soil Screening Levels to be Protective		Protective Soil Vapor Concentration		Groundwater Target Concentrations at 10-4 Target Risk Levels and Target HI=1.0 (µg/L)
Parameter	Loess Specific Values (mg/kg)	Fluvial Deposit Specific Values (mg/kg)	Loess Specific Values (ppbv)	Fluvial Deposit Specific Values (ppbv)	
Carbon Tetrachloride	0.2150	0.1086	28.14	14.22	3.0
Chloroform	0.9170	0.4860	61.57	32.63	12.0
Dichloroethane, 1,2-	0.0329	0.0189	1.12	0.64	—
Dichloroethene, 1,1-	0.1500	0.0764	57.00	29.03	7/340
Dichloroethene, cis-1,2-	0.7550	0.4040	73.86	39.52	35.0
Dichloroethene, trans-1,2-	1.5200	0.7910	256.53	133.50	50.0
Methylene Chloride	0.0305	0.0169	5.14	2.85	—
Tetrachloroethane, 1,1,2,2-	0.0112	0.0066	0.03	0.55	2.2
Tetrachloroethene	0.1806	0.0920	15.18	0.99	2.5
Trichloroethane, 1,1,2	0.0627	0.0355	0.84	2.03	1.9
Trichloroethene	0.1820	0.0932	10.56	2.06	5.0
Vinyl Chloride	0.0294	0.0150	28.94	14.77	—

Notes:
mg/kg: milligrams per kilogram
µg/L: micrograms per liter
ppbv: parts per billion per volume
MCL: maximum contaminant level
HI: hazard index
—: Not available for groundwater cleanup goals because of low number of detections or detected values consistently less than MCLs.

TABLE 6
DUNN FIELD LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-03	Fluvial	Performance-FSVE	Semiannual	281596.25	802100.69	292.35	290.40	65.5	10	75.5
MW-04	Fluvial	Background	Biennial	281278.87	802369.19	301.61	300.00	60.0	20	80.0
MW-06	Fluvial	Performance-FSVE	Semiannual	280604.17	802069.13	289.11	288.10	51.0	20	71.0
MW-07	Fluvial	Background-NE	Annual	281839.88	802481.70	295.10	293.10	67.0	10	77.0
MW-08	Fluvial	Background-NE	Annual	282001.04	802727.91	292.59	292.74	56.5	10	66.5
MW-13	Fluvial	Background	Biennial	281033.56	802369.21	300.01	300.10	66.0	15	81.0
MW-15	Fluvial	Performance	Annual	280348.88	801985.36	295.12	295.23	63.4	15	78.4
MW-28	Fluvial	Background	Biennial	281568.58	803154.48	294.79	294.89	54.3	15	69.3
MW-31	Fluvial	Performance	Semiannual	281651.53	801783.90	290.37	287.50	64.1	15	79.1
MW-44	Fluvial	Performance	Semiannual	281073.71	800601.09	269.07	269.40	64.0	10	74.0
MW-54	Fluvial	Performance	Semiannual	281159.21	801183.83	295.39	295.57	84.5	10	94.5
MW-57	Fluvial	Performance	Annual	280184.05	802006.19	290.77	291.10	60.0	10	70.0
MW-58	Fluvial	Performance	Biennial	279845.07	802066.44	290.51	290.70	57.0	10	67.0
MW-67	Memphis	Sentinel	Biennial	280473.05	800933.94	278.21	275.53	260.0	15	275.0
MW-68	Fluvial	Performance	Annual	281500.76	802040.04	291.69	291.60	72.5	10	82.5
MW-69	Fluvial	Performance	Annual	281202.55	802011.49	307.02	304.90	82.1	10	92.1
MW-70	Fluvial	Performance	Annual	281029.60	801988.49	304.99	302.80	80.8	10	90.8
MW-71	Fluvial	Performance	Annual	280584.68	801804.71	294.40	291.90	65.5	10	75.5
MW-76	Fluvial	Performance	Annual	281311.98	801642.76	302.71	303.30	73.0	20	93.0
MW-77	Fluvial	Performance	Semiannual	281142.96	801815.29	304.42	304.70	68.0	20	88.0
MW-78	Fluvial	Performance	Biennial	282051.71	802065.28	275.00	275.40	44.5	20	64.5
MW-79	Fluvial	Performance	Semiannual	281794.22	800899.03	285.03	285.40	82.5	20	102.5
MW-80	Fluvial	Background	Biennial	281417.56	800199.07	273.81	274.00	53.0	20	73.0
MW-87	Fluvial	Performance-FSVE	Semiannual	280696.36	802038.55	294.93	292.80	63.0	15	78.0
MW-91	Fluvial	Performance	Annual	280474.97	802014.43	291.99	289.30	55.0	15	70.0
MW-126	Fluvial	Background	Biennial	282390.01	800491.67	252.22	252.49	16.0	10	26.0
MW-129	Fluvial	Background-NE	Annual	282271.08	803128.53	293.01	293.33	65.0	15	80.0
MW-130	Fluvial	Background-NE	Annual	282116.80	803241.45	293.17	293.77	59.5	20	79.5
MW-134	Fluvial	Performance-FSVE	Semiannual	281012.74	802102.58	300.81	301.05	75.0	15	90.0
MW-144	Fluvial	Performance	Semiannual	281138.63	801528.84	291.60	291.89	56.8	20	76.8
MW-145	Fluvial	Performance	Annual	280967.63	800823.18	284.72	284.86	80.1	20	100.1
MW-147	Fluvial	Performance	Annual	281501.94	801674.17	289.76	289.93	60.3	20	80.3
MW-148	Fluvial	Performance	Annual	281377.94	801461.63	294.71	294.87	70.0	20	90.0
MW-149	Fluvial	Performance	Semiannual	281130.04	800982.76	287.18	287.44	81.4	20	101.4
MW-150	Fluvial	Performance	Semiannual	281239.57	801283.62	296.86	297.00	71.2	20	91.2
MW-151	Fluvial	Performance	Semiannual	281290.42	800874.85	284.27	284.42	77.0	20	97.0
MW-152	Fluvial	Performance	Annual	281515.56	800892.84	289.59	289.82	91.0	20	111.0
MW-153	Fluvial	Performance	Biennial	282119.38	800952.34	279.17	279.26	76.1	20	96.1
MW-154	Fluvial	Background	Biennial	280501.53	800919.48	273.81	274.07	53.3	10	63.3
MW-155	Fluvial	Performance	Annual	281325.32	801168.98	291.54	291.83	76.9	20	96.9
MW-157	Fluvial	Performance	Annual	281050.86	801348.37	286.47	286.55	56.7	20	76.7

TABLE 6
DUNN FIELD LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-158	Fluvial	Performance	Annual	281434.42	801005.34	294.07	294.38	91.0	15	106.0
MW-158A	Fluvial	Performance	Annual	281443.51	801005.67	293.95	294.22	77.9	15	92.9
MW-159	Fluvial	Performance	Semiannual	281304.17	801006.69	286.36	286.68	80.5	20	100.5
MW-160	Fluvial	Performance	Annual	281366.70	801304.05	293.84	294.13	64.3	20	84.3
MW-163	Fluvial	Performance	Semiannual	281152.59	801487.27	290.63	290.81	56.2	20	76.2
MW-164	Fluvial	Performance	Semiannual	280997.55	801497.47	287.48	287.71	55.6	20	75.6
MW-165	Fluvial	Performance	Semiannual	281384.63	800855.49	287.06	287.35	88.6	15	103.6
MW-165A	Fluvial	Performance	Semiannual	281383.55	800865.69	287.26	287.53	71.3	15	86.3
MW-166	Fluvial	Performance	Semiannual	281225.00	800927.99	282.72	283.29	84.6	15	100.0
MW-166A	Fluvial	Performance	Semiannual	281213.39	800927.27	282.90	283.36	68.1	15	83.4
MW-167	Fluvial	Background	Biennial	281394.03	800618.54	284.82	285.21	70.5	15	85.5
MW-169	Transition	Sentinel	Biennial	282491.23	800956.58	261.90	262.17	68.1	20	88.1
MW-170	Fluvial	Sentinel	Biennial	282443.17	801260.46	273.75	273.98	59.8	20	79.8
MW-171	Fluvial	Sentinel	Biennial	282315.35	801057.83	270.69	271.02	53.3	15	68.3
MW-174	Fluvial	Performance-FSVE	Semiannual	280352.00	802092.07	296.56	296.83	67.0	10	77.0
MW-176	Fluvial	Performance	Annual	280823.77	802032.08	299.68	299.92	76.0	10	86.0
MW-180	Fluvial	Performance	Annual	281476.43	802131.85	296.14	296.39	72.0	10	82.0
MW-182	Fluvial	Sentinel	Biennial	280524.22	800623.13	275.40	272.98	62.0	10	72.0
MW-184	Fluvial	Performance	Annual	280903.16	801442.29	283.12	283.34	58.0	10	68.0
MW-187	Fluvial	Background	Biennial	280563.18	802348.09	302.74	303.21	76.0	10	86.0
MW-190	Fluvial	Performance	Semiannual	281138.88	801595.73	297.32	297.58	78.0	10	88.0
MW-220	Fluvial	Performance-FSVE	Semiannual	281617.49	802166.87	293.29	290.31	64.9	15	79.9
MW-221	Fluvial	Performance-FSVE	Semiannual	281399.71	802100.05	301.52	298.37	73.1	15	88.1
MW-222	Fluvial	Performance-FSVE	Semiannual	280986.04	802145.54	303.82	301.06	74.2	15	89.2
MW-223	Fluvial	Performance-FSVE	Semiannual	280913.53	802104.29	303.00	300.41	73.9	15	88.9
MW-224	Fluvial	Performance-FSVE	Semiannual	281017.74	802181.62	304.13	301.18	73.7	15	88.7
MW-225	Fluvial	Performance-FSVE	Semiannual	280947.12	802070.50	304.52	301.30	75.0	15	90.0
MW-226	Fluvial	Performance-FSVE	Semiannual	280931.94	802147.21	303.19	300.56	74.2	15	89.2
MW-227	Fluvial	Performance-FSVE	Semiannual	280257.91	802081.00	299.70	296.64	63.6	15	78.6
MW-228	Fluvial	Performance-FSVE	Semiannual	280251.88	802157.40	301.65	298.59	64.1	15	79.1
MW-230	Fluvial	Background-NE	Annual	281842.79	802800.06	286.57	286.66	59.2	15	74.2
MW-235	Fluvial	Sentinel	Annual	280727.57	800447.83	264.00	264.21	50.6	10	60.8
MW-237	Intermediate	Sentinel	Annual	281356.02	800963.99	289.18	289.53	166.5	10	176.7
MW-241	Fluvial	Performance	Annual	281389.82	801396.64	292.97	293.16	73.4	15	88.4
MW-242	Fluvial	Performance	Annual	281297.31	801228.65	295.40	295.94	73.2	16	88.7
MW-243	Fluvial	Performance	Semiannual	281370.62	801116.45	292.26	292.53	80.7	20	100.7
MW-244	Fluvial	Performance	Semiannual	281333.49	801101.07	288.72	289.45	76.3	20	96.3
MW-245	Fluvial	Performance	Semiannual	281379.46	801035.00	290.48	290.62	85.1	20	105.1
MW-246	Fluvial	Performance	Semiannual	281387.26	800951.62	288.17	288.49	85.2	20	105.2
MW-247	Fluvial	Performance	Semiannual	281319.40	800900.12	286.17	286.63	80.5	20	100.5
MW-248	Fluvial	Performance	Annual	281253.66	800720.22	275.45	275.93	67.5	20	87.5

TABLE 6
DUNN FIELD LTM WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Sample Frequency	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
MW-249	Fluvial	Performance	Semiannual	281029.63	800789.83	285.53	285.89	78.0	20	98.0
MW-250	Intermediate	Sentinel	Annual	281045.53	800900.38	289.66	290.19	168.7	15	183.7
MW-251	Intermediate	Sentinel	Annual	281211.70	801021.75	285.83	286.16	160.2	15	175.2

Notes:
ft: feet
btoc: below top of casing
msl: mean sea level

TABLE 7
DUNN FIELD PRIMARY CVOC RESULTS, APRIL 2016
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

VOC Analyte	MCL (µg/L)	TC (µg/L)	Number of Samples with Analyte Above RL	Maximum Concentration (µg/L)	Location of Maximum Concentration	Number of Samples with Analyte above MCL	Number of Samples with Analyte above TC
1,1,2,2-Tetrachloroethane	--	2.2	9	8.9	MW-144	--	4
1,1,2-Trichloroethane	5	1.9	2	1.19	MW-87	0	0
1,1-Dichloroethene	7	7	11	15	MW-07	6	6
1,2-Dichloroethane	5	--	0	<0.5	--	0	--
Carbon tetrachloride	5	3	0	0.975 J	MW-249	0	0
Chloroform	80	12	28	59.8	MW-87	0	1
cis-1,2-Dichloroethene	70	35	4	9.64	MW-159	0	0
Tetrachloroethene	5	2.5	9	39.2	MW-07	8	8
trans-1,2-Dichloroethene	100	50	0	0.873 J	MW-159	0	0
Trichloroethene	5	5	33	47	MW-130	12	12
Vinyl chloride	2	--	1	6.77	MW-159	1	--

Notes:
µg/L micrograms per liter
--: Not Listed
RL: reporting limit
MCL: Maximum Contaminant Level
TC: Target Concentration

TABLE 8
PROPERTY TRANSFER STATUS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

FOST No.	Area	Date FOST signed	Acres	Type of Conveyance	Type of Transfer (Transferee)	Date of Transfer/Deed
1	MI	23-Feb-01	6.52	PBC	Deed (Alpha Omega Veterans)	18-Sep-01
2	MI	27-Sep-01	4.67 13.36	PBC EDC	Deed (Memphis Police Department) Deed (DRC)	6-Feb-02 6-May-02
3	MI	1-Jul-04	302.48 46.74	EDC PBC	Deed (DRC) Letter of Assignment (DOI/NPS)	14-Apr-06 29-Sep-05
4	DF	4-Mar-05	1.57 39.35	PBC CPS	Deed (Memphis) Deed (Dunn Field Business Park, LLC)	2-Sep-05 24-Oct-07
5	DF	12-Jul-10	24.5	CPS		
6	MI	2-Aug-10	193.0	EDC	Deed (DRC)	30-Mar-11

Notes:
CPS: Competitive Public Sale
DF: Dunn Field
DOI/NPS: Department of Interior/National Parks Service
DRC: Depot Redevelopment Corporation
EDC: Economic Development Conveyance
MI: Main Installation
PBC: Public Benefit Conveyance

TABLE 9
DATA GAPS AND RECOMMENDED WELLS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Data Gap	CVOC	Well Locations	Phase 2 Wells	Phase 3 Wells
1. Offsite extent of CVOCs in IAQ	PCE, TCE	One Intermediate Aquifer well north of MW-256.	MW-274	-
2. Extent of CVOCs at MW-270	TCE	Four Fluvial Aquifer wells, two on-site and two off-site	MW-275, MW-276	MW-283, MW-284
3. Presence of sink in southeast MI	--	One Fluvial Aquifer well on south MI boundary between MWs 24 & 93	MW-277	-
4. Potential impacts in IAQ from sink	PCE, TCE	One Intermediate Aquifer well in the central area of suspected sink, near MW-259	-	MW-285
5. Extent of CVOCs upgradient & offsite of TTA-1N	PCE	Three Fluvial Aquifer wells upgradient and side-gradient of MW-269	MW-278	MW-286, MW-287
6. Extent of CVOCs upgradient of TTA-1S	PCE	One Fluvial Aquifer well upgradient of DR1-5/5A	MW-279	-
7. Extent of CVOCs upgradient of TTA-2W	PCE, TCE, CT	Four Fluvial Aquifer wells: upgradient (north-northeast) and side-gradient (east-southeast) of MW-267 and adjacent to MW-268.	MW-280	MW-288, MW-289, MW-290
8. Extent of VOCs upgradient and side-gradient of N-C plume	PCE, TCE	Four Fluvial Aquifer wells: off-site northeast of MW-263, side-gradient at mid-section of plume east of MW-260 and side-gradient at downgradient extent of plume	MW-281	MW-291, MW-292, MW-293
9. Additional FAQ wells to clarify groundwater gradient and presence of CVOCs in areas w/o previous investigation	--	Three Fluvial Aquifer wells:north-central MI upgradient of MW-107, northeast MI and central MI at northern extent of suspected sink	MW-282	MW-294, MW-295
10. Extent of CVOCs upgradient of B835	TCE	Two Fluvial Aquifer wells: upgradient (NW) of MW-143, upgradient of MW-62 and between MW-257 and MW-62	-	MW-296, MW-297
11. Extent of contamination in S-C plume	TCE	Four Fluvial Aquifer wells: upgradient of MW-97; downgradient of MW-97, south of MW-261 between MW-97 and PZ-03 and between PZ-03 and MW-271	-	MW-298, MW-299, MW-300, MW-301
12. Southeast MI	PCE, TCE	One Fluvial Aquifer well upgradient of MW-52 and MW-270	-	MW-302

TABLE 10
STATUS OF FOLLOW-UP ACTIONS FROM THIRD FIVE-YEAR REVIEW
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Issues	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)		Completion Date	Document
					Current	Future		
Rebound in groundwater concentrations of CVOCs on the MI in TAs and concentrations above MCLs in IAQ wells	Restart EBT	ODB	USEPA/TDEC	11/15/2012	N	N	11/6/2012	EBT injections conducted November 2012 through August 2014.
Time required to achieve RAOs on the MI	Re-evaluate in annual report following one year of additional EBT	ODB	USEPA/TDEC	3/11/2014	N	N	4/4/2014	Year Three EBT Report submitted to USEPA/TDEC concluded "it is not likely that contaminant concentrations will be reduced to MCLs throughout the MI by December 2015". A supplemental remedial investigation and focused feasibility study is being performed to develop a remedial strategy to achieve RAOs throughout the MI.

Notes:
CVOCs: chlorinated volatile organic compounds
EBT: enhanced bioremediation treatment
IAQ: intermediate aquifer
MCLs: maximum contaminant levels
MI : Main Installation
ODB: Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure Division
RAOs: Remedial Action Objectives
TAs: treatment areas
TDEC: Tennesse Department of Environment and Conservation
USEPA: United States Environemtnal Protection Agency

TABLE 11
PRIMARY AND SECONDARY DOCUMENTS, FY17 THROUGH FY19
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Activity	2017 SMP Date	Date Type
Fiscal Year 2017		
AS Well Installation Work Plan, Rev. 1	15-Nov-2016	Target
MIP Survey Work Plan, Rev. 1	15-Nov-2016	Target
2017 Site Management Plan, Rev. 0	30-Nov-2016	Deadline
2016 LTM Report, Rev 0	25-Jan-2017	Target
2017 Site Management Plan, Rev. 1	29-Jan-2017	Deadline
MI Supplemental RI (Phase 1-2) Report, Rev 0	10-Mar-2017	Deadline
AS Well Installation Summary Report, Rev. 0	14-Mar-2017	Target
MIP Survey Summary Report, Rev. 0	21-Mar-2017	Target
MI Risk Assessment Protocol Tech Memo	30-Mar-2017	Target
MI Supplemental RI Phase 3 Work Plan Rev. 0	4-Apr-2017	Deadline
MI VI Screening Level VI Assessment Tech Memo	18-Apr-2017	Target
2016 LTM Report, Rev 1	25-Apr-2017	Target
MI VI Soil Gas Sampling Work Plan Rev. 0	18-May-2017	Target
AS Well Installation Summary Report, Rev. 1	27-May-2017	Target
MI Supplemental RI (Phase 1-2) Report, Rev 1	9-Jun-2017	Deadline
MIP Survey Summary Report, Rev. 1	10-Jun-2017	Target
MI Conceptual Site Model, Objectives and Model Construction Tech Memo	14-Jun-2017	Target
Fourth Five-Year Review, Rev 0	18-Jun-2017	Deadline
MI Supplemental RI Phase 3 Work Plan Rev. 1	13-Jul-2017	Deadline
Off Depot AS/SVE Operations Report, Year 6 Rev 0	28-Jul-2017	Target
MI VI Soil Gas Sampling Work Plan Rev. 1	7-Aug-2017	Target
MI Risk Assessment Summary Tech Memo	12-Aug-2017	Target
2017 Annual LUCIP Inspection Reports	14-Aug-2017	Target
Fiscal Year 2018		
MI SRI Groundwater Model Summary Tech Memo	7-Oct-2017	Target
MI VI Soil Gas Sampling Tech Memo	14-Oct-2017	Target
Fourth Five-Year Review, Rev 1	20-Oct-2017	Deadline
MI VI Indoor Air Sampling Work Plan Rev. 0	8-Nov-2017	Target
Off Depot AS/SVE Operations Report, Year 6 Rev 1	25-Nov-2017	Target
2018 Site Management Plan, Rev. 0	30-Nov-2017	Deadline
MI Supplemental RI Phase 3 Summary Report	12-Jan-2018	Target
Fourth Five-Year Review, Final	19-Jan-2018	Deadline
2017 LTM Report, Rev 0	25-Jan-2018	Target
MI VI Indoor Air Sampling Work Plan Rev. 1	28-Jan-2018	Target
2018 Site Management Plan, Rev. 1	29-Jan-2018	Deadline
MI Supplemental RI Phase 4 Work Plan Rev. 0	11-Feb-2018	Deadline

TABLE 11
PRIMARY AND SECONDARY DOCUMENTS, FY17 THROUGH FY19
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis Tennessee

Activity	2017 SMP Date	Date Type
2017 LTM Report, Rev 1	25-Apr-2018	Target
MI Supplemental RI Phase 4 Work Plan Rev. 1	12-May-2018	Deadline
Off Depot AS/SVE Operations Report, Year 7 Rev 0	28-Jul-2018	Target
2018 Annual LUCIP Inspection Reports	14-Aug-2018	Target
MI VI Indoor Air Sampling Tech Memo	19-Sep-2018	Target
Fiscal Year 2019		
MI Supplemental RI (Phase 3-4) Report, Rev 0	11-Nov-2018	Deadline
MI Comprehensive VI Study Report, Rev. 0	24-Nov-2018	Target
Off Depot AS/SVE Operations Report, Year 7 Rev 1	25-Nov-2018	Target
2019 Site Management Plan, Rev. 0	30-Nov-2018	Deadline
2018 LTM Report, Rev 0	25-Jan-2019	Target
2019 Site Management Plan, Rev. 1	29-Jan-2019	Deadline
MI Focused Feasibility Study Report, Rev 0	4-Feb-2019	Deadline
MI Supplemental RI (Phase 3-4) Report, Rev 1	10-Feb-2019	Deadline
MI Comprehensive VI Study Report, Rev.1	22-Feb-2019	Target
2018 LTM Report, Rev 1	25-Apr-2019	Target
MI Focused Feasibility Study Report, Rev 1	10-May-2019	Deadline
MI Revised Proposed Plan, Rev 0	4-Jul-2019	Deadline
2019 Annual LUCIP Inspection Reports	14-Aug-2019	Target
MI Revised Proposed Plan, Rev 1	23-Sep-2019	Deadline

TABLE 12
FISCAL YEAR REQUIREMENTS
2017 SITE MANAGEMENT PLAN
Defense Depot Memphis, Tennessee

Description	2017	2018	2019	2020	2021	2022	2023	Out Years	Total
Remedial Action Sites	$0	$223,000	$1,080,000	$1,090,000	$1,003,000	$903,000	$208,000	$1,302,000	$5,809,000

FIGURES

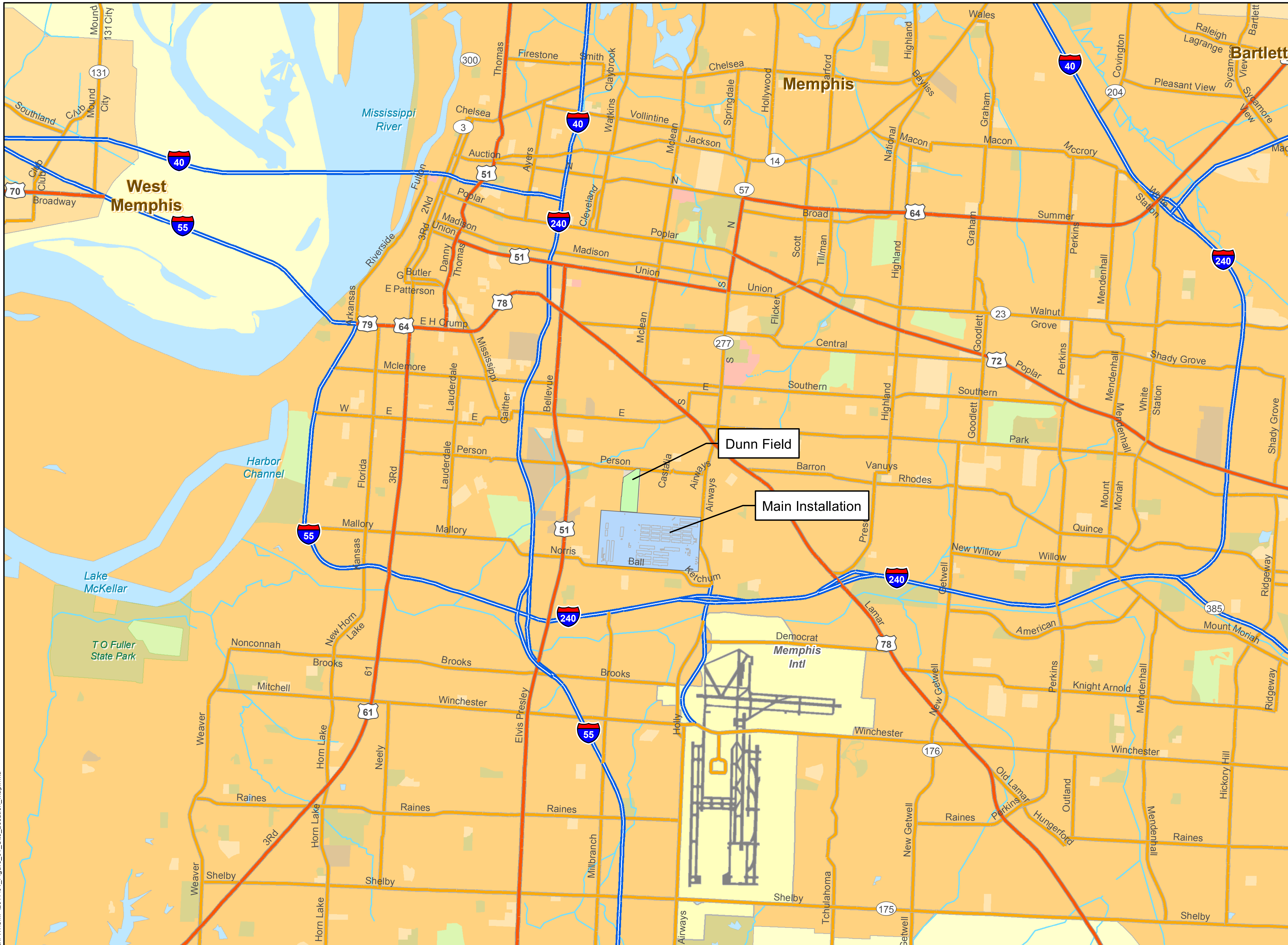

Figure 1

Site Location Map

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N W E S

0 1 2
Miles

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 10/4/2016
Edition: Rev 0

HDR

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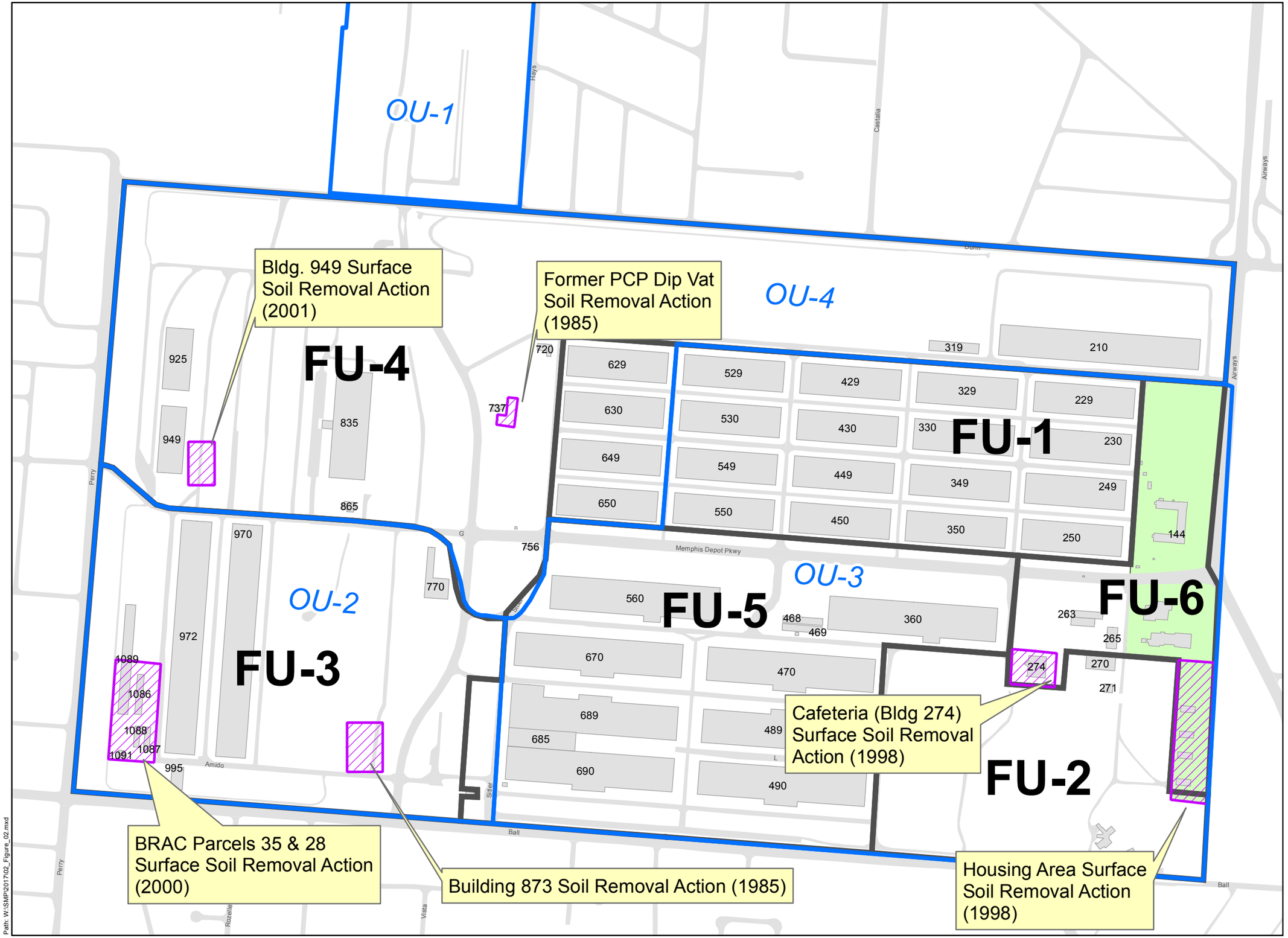

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Figure 2

Main Installation Unit Boundaries and Response Actions

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units (OU-#)
- Past Response Actions
- Functional Unit Boundary (FU-#)
- Area Available for Unrestricted Use
- Buildings *490 - DDMT Assigned Number*
- Roads

N
W E
S

0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 10/18/2016
Edition: Rev 0

CHEMICAL WARFARE MATERIAL REMOVAL ACTION (2001)

PISTOL RANGE REMOVAL ACTION (2003)

GROUNDWATER INTERIM REMEDIAL ACTION (2009)

CHEMICAL WARFARE MATERIAL REMOVAL ACTION (2001)

NORTHEAST OPEN AREA

DISPOSAL AREA

STOCKPILE AREA

McLean

Person

Carver

Hearst

Hays

State

Ferber

Perry

Dunn

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Figure 3

Dunn Field Area Designations, Removal Actions and Interim Remedial Action

2017 Site Management Plan

Defense Depot Memphis, Tennessee

Legend

- IRA Recovery Well
- Railroad
- IRA Discharge Conveyance Line
- Area Designations
- Original Dunn Field Boundary
- Removal Actions
- Unrestricted Use
- Paved Area
- Roads

N W E S

0 250 500

Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

Figure 4

OU-1 Site Locations
Dunn Field

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- Chemical Warfare Manag. Plan Site
- Proposed Early Removal Site
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Paved Area
- Roads
- Railroad

Note:
The site designations were established when the sites were identified and do not reflect the current status as described on Table 2.

N
W E
S

0 250 500
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

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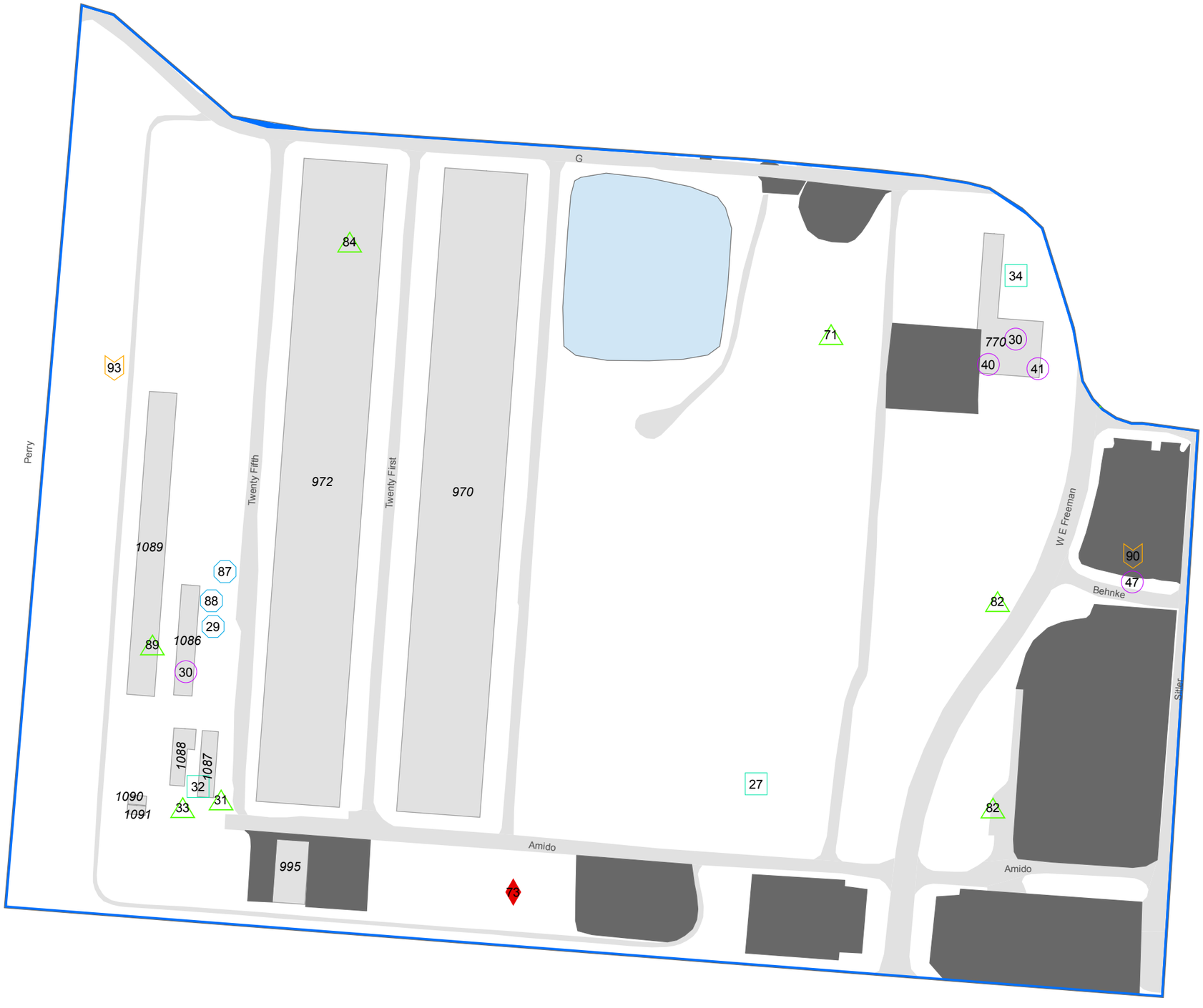

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Figure 5

OU-2 Site Locations Main Installation

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- Proposed Early Removal Site
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Trichloroethene Site
- Paved Area
- Holding Pond
- Buildings *490 - DDMT Assigned Number*
- Roads

Note:
The site designations were established when the sites were identified and do not reflect the current status as described on Table 2.

N
W E
S

0 200 400
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

HDR

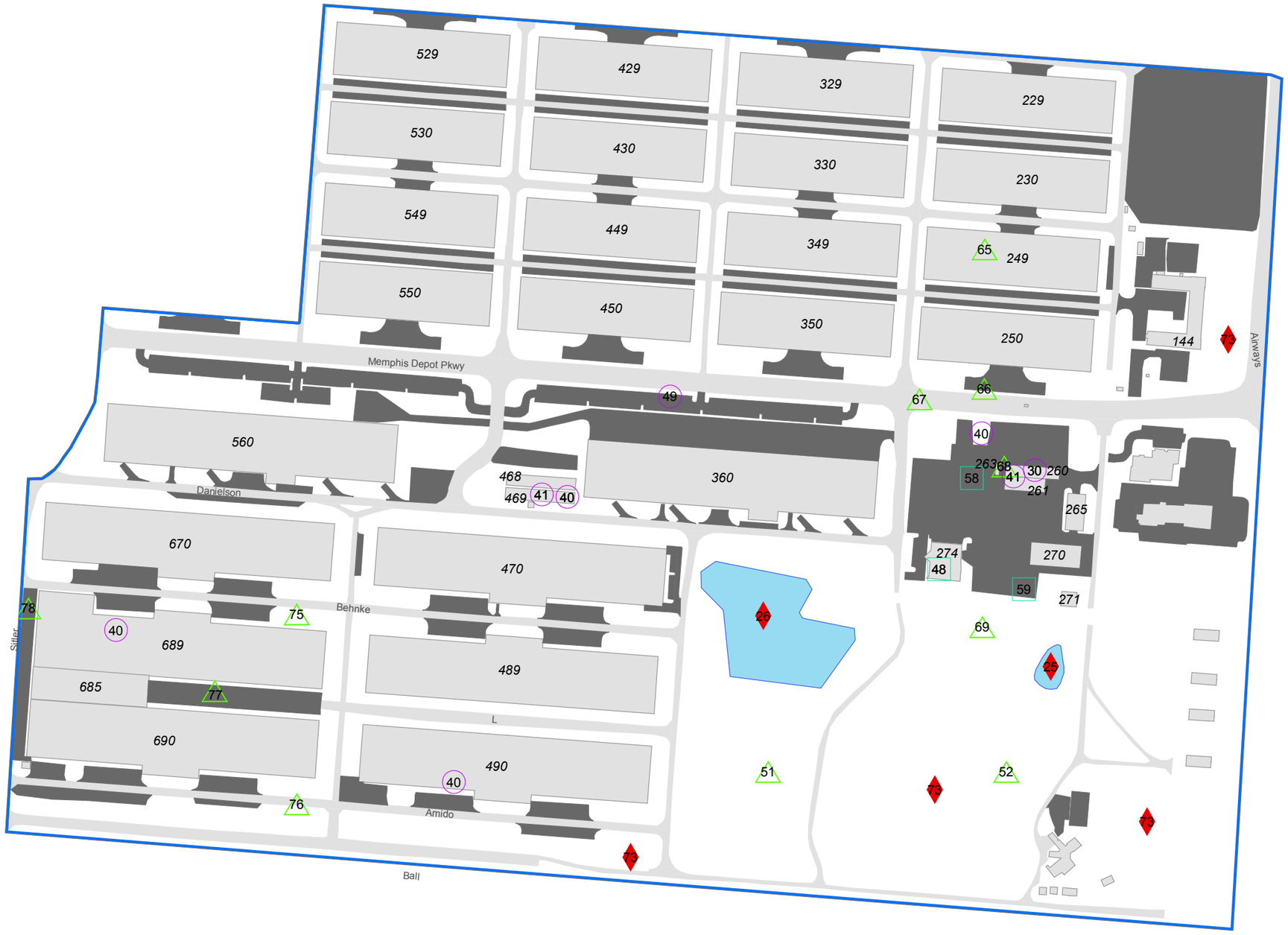

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Figure 6

OU-3 Site Locations
Main Installation

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Surface Water
- Paved Area
- Buildings *490 - DDMT Assigned Number*
- Roads

Note:
The site designations were established when the sites were identified and do not reflect the current status as described on Table 2.

N
W E
S

0 300 600
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

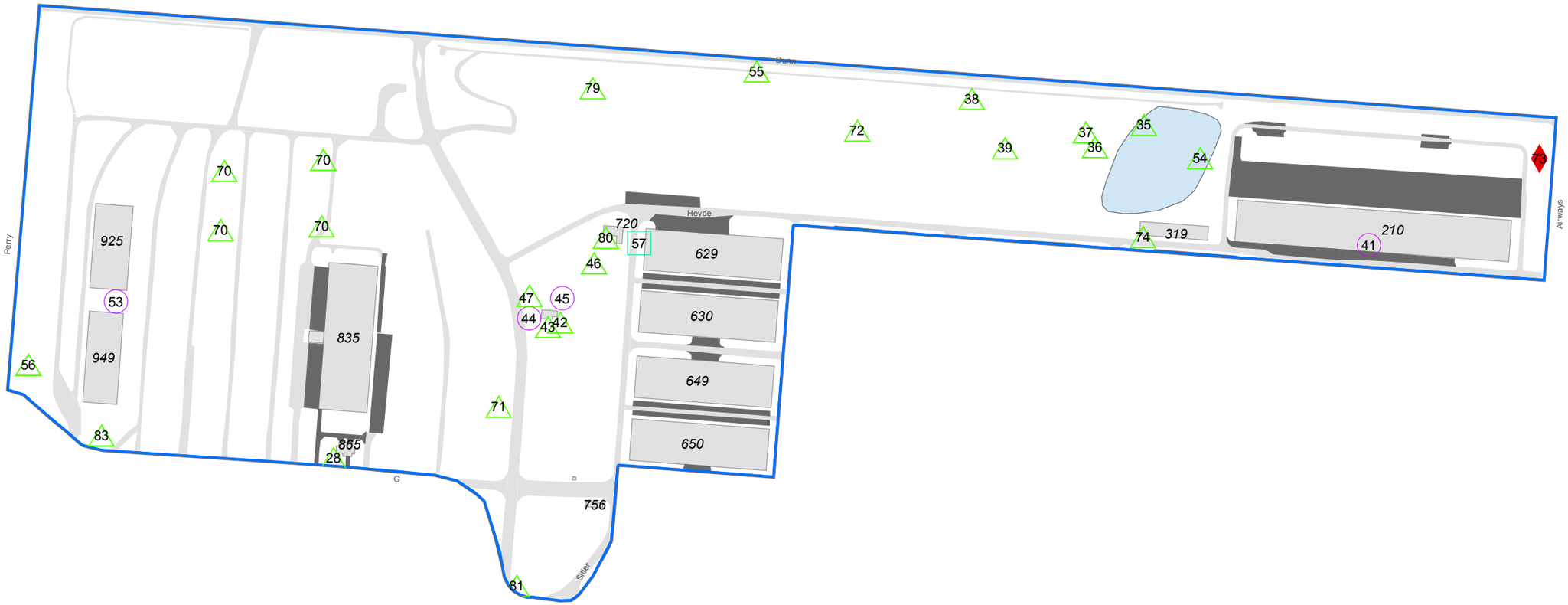

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Figure 7

OU-4 Site Locations
Main Installation

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Operable Units
- Feasibility Study Site
- No Further Action Site
- Remedial Investigation Site
- Screening Site
- Paved Area
- Holding Pond
- Buildings *490 - DDMT Assigned Number*
- Roads

Note:
The site designations were established when the sites were identified and do not reflect the current status as described on Table 2.

N
W E
S

0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

Figure 8

Main Installation
EBT Wells

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- EBT Injection Well
- EBT Performance Monitoring Well
- Fluvial Aquifer Well
- Intermediate Aquifer Well
- Memphis Aquifer Well
- Holding Pond
- Surface Water
- Buildings *490 - DDMT Assigned Number*
- Roads

N
W E
S

0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

HDR

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TTA-1 North

PMW21-04
PMW21-02
PMW21-01
IW21-03A/B
IW21-04A/B
IW21-01A/B
MW-21
IW21-02A/B
1089
1086

TTA-1 South

PMW101-02A/B
PMW101-04A/B
IW101-05A/B/C
IW101-04A/B/C
IW101-02A/B/C
IW101-03A/B/C
PMW101-07A/B
IW101-07A/B/C
DR1-6
DR1-6A
970
972
Twenty First
Amido

TTA-2

IW92-08
DR2-5
IW85-05
PMW85-01
IW85-06
PMW85-05
MW-85
MW-113
IW92-01
DR2-2
IW92-02
IW92-07
IW92-03
PMW92-03
263
260
261
265
360
274
270
271
Danielson
Truitt

Figure 9

Main Installations Plume Designations

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

NORTH-CENTRAL

BUILDING 835

WEST-CENTRAL

TTA-1N

TTA-1S

SOUTH-CENTRAL

TTA-2

Notes:
1. PCE and TCE isopleths are based on analytical results from the October 2015 Long Term Monitoring event.
2. Water level contours are from the October 2015 Long Term Monitoring event.

Legend

- Property Boundary
- Fluvial Aquifer Well
- Transition Zone Well
- Intermediate Aquifer Well
- Memphis Aquifer Well
- PCE
- TCE
- Buildings *490 - DDMT Assigned Number*
- Roads
- Clay Elevation Exceeds Groundwater Elevation

Potentiometric Surface

- Fluvial Aquifer 1-ft. contour
- Fluvial Aquifer 5-ft. contour
- Intermediate Aquifer 5-ft. contour

N
W E
S

0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

Path: W:\SMP2017\09_Figure_09.mxd

Legend

Well Classification

- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in the Intermediate Aquifer
- Monitoring Well Screened in the Transition Zone
- Monitoring Well Screened in the Memphis Aquifer

MW-16	Background
MW-219	Boundary
MW-21	EBT-Performance
MW-88	Performance
MW-34	Sentinel
MW-268	To Be Determined

- Property Boundary
- Buildings *490 - DDMT Assigned Number*
- Roads
- Surface Water
- Holding Pond

Figure 10

Main Installation
LTM Wells

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N
W E
S

0 250 500
Feet

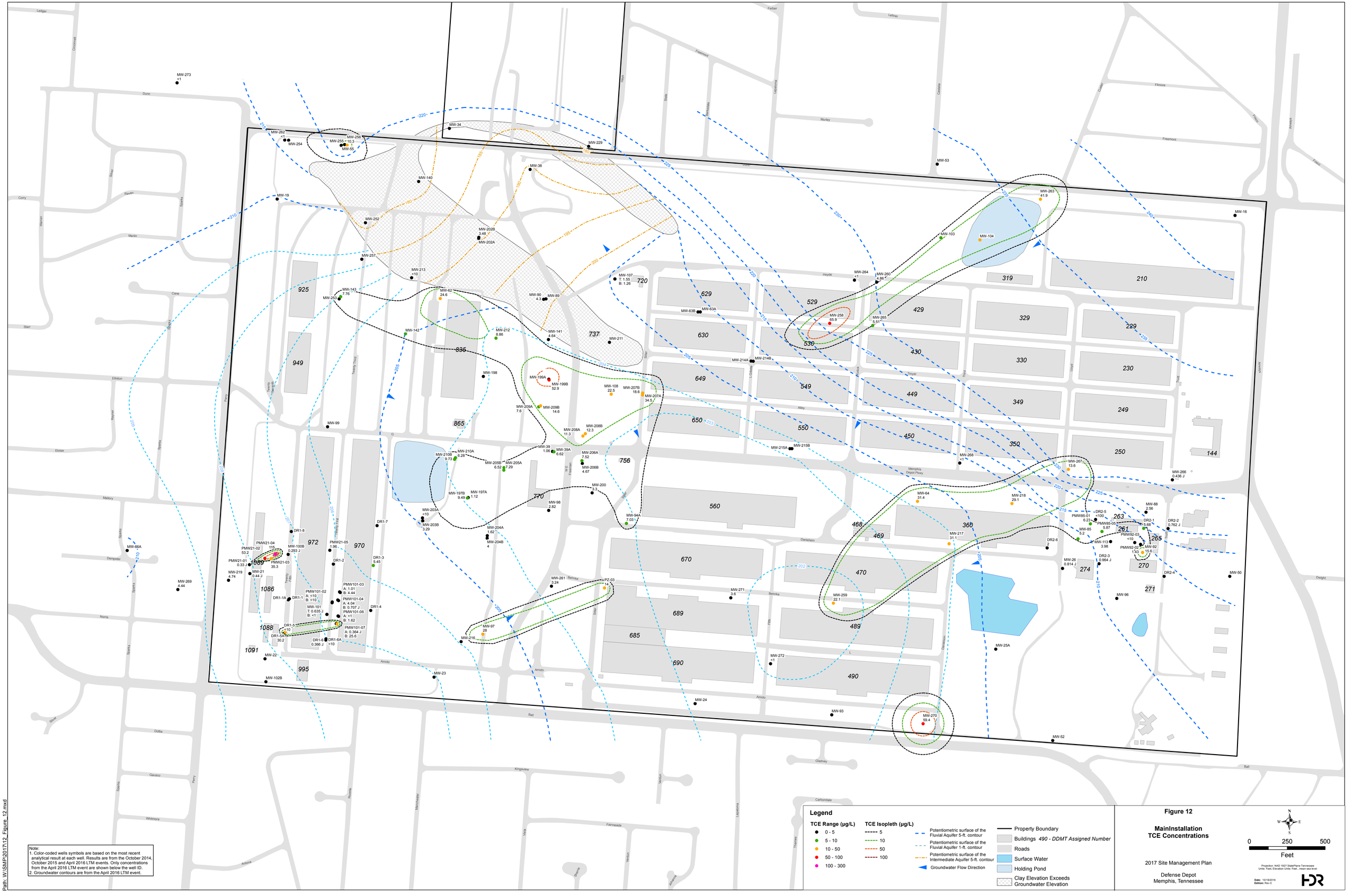
Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: June 2016
Edition: Rev 0

HDR

Figure 11

Main Installation PCE Concentrations



Note:
1. Color-coded wells symbols are based on the most recent analytical result at each well. Results are from the October 2014, October 2015 and April 2016 LTM events. Only concentrations from the April 2016 LTM event are shown below the well ID.
2. Groundwater contours are from the April 2016 LTM event.

Legend

TCE Range (µg/L)
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth (µg/L)
- 5
- 10
- 50
- 100

- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Potentiometric surface of the Intermediate Aquifer 5-ft. contour
- Groundwater Flow Direction
- Property Boundary
- Buildings *490 - DDMT Assigned Number*
- Roads
- Surface Water
- Holding Pond
- Clay Elevation Exceeds Groundwater Elevation

Figure 12

MainInstallation
TCE Concentrations

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

0 250 500
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 10/18/2016
Edition: Rev 0

A North

A' South

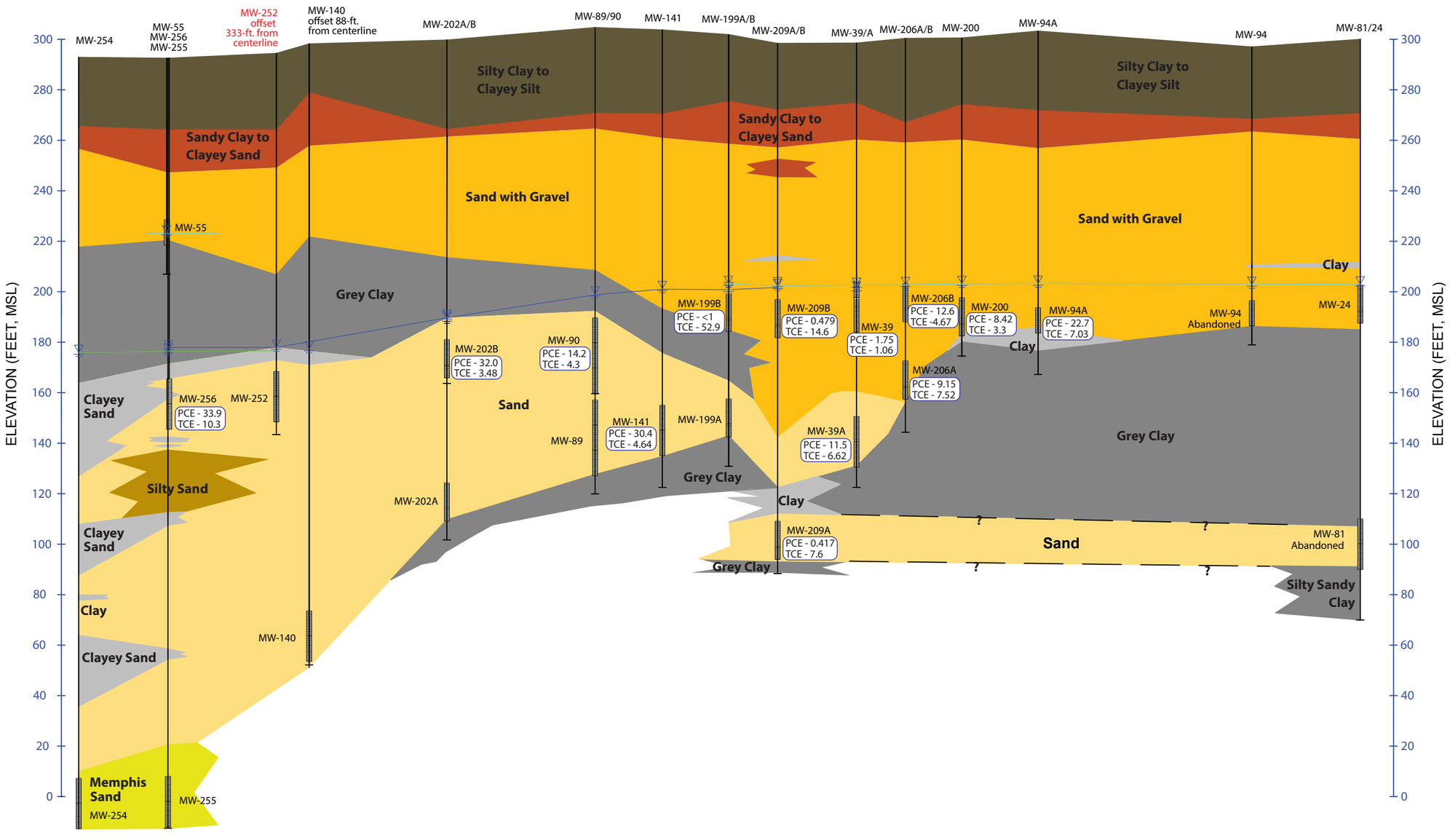


Figure 13

Main Installation
Cross Section A with PCE and TCE Concentrations

2017 Site Management Plan

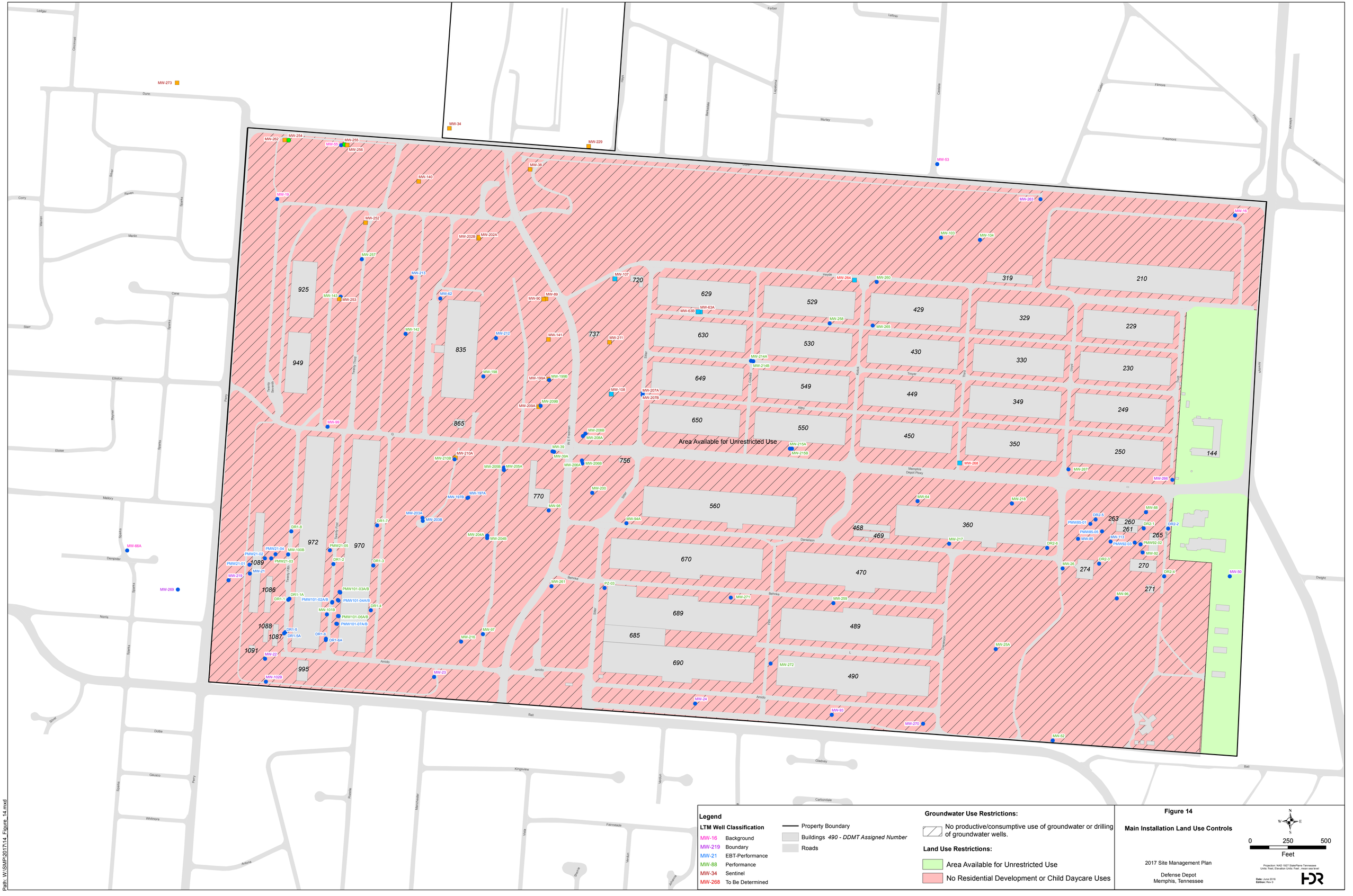
DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Silty Clay to Clayey Silt
- Sandy Clay to Clayey Sand
- Fluvial Sand or Sand with Gravel
- Clayey Sand to Silty Clay
- Silty Sand-Sandy Silt
- Intermediate Sand
- Clay
- Memphis Sand
- Groundwater Elevation
- Fluvial Aquifer Groundwater Elevation 4/19/2016
- Intermediate Aquifer Groundwater Elevation 4/19/2016
- Memphis Aquifer Groundwater Elevation 4/19/2016
- Well Screen Interval

Note: PCE and TCE concentrations in µg/L for LTM samples collected in April 2016.

20
0
200

Date: 3/16/2016
Edition:Rev 0



Legend

LTM Well Classification

MW-16	Background
MW-219	Boundary
MW-21	EBT-Performance
MW-88	Performance
MW-34	Sentinel
MW-268	To Be Determined

- Property Boundary
- Buildings *490 - DDMT Assigned Number*
- Roads

Groundwater Use Restrictions:

No productive/consumptive use of groundwater or drilling of groundwater wells.

Land Use Restrictions:

- Area Available for Unrestricted Use
- No Residential Development or Child Daycare Uses

Figure 14

Main Installation Land Use Controls

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

0 250 500
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: June 2016
Edition: Rev 0

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Figure 15

Dunn Field Disposal Sites, Source Areas and Off-Depot Groundwater Remedial Actions

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

DS 4.1(2005)
DS10 (2006)
EISR Treatment Area
DS 3 (2006)
Off-Depot Groundwater Remedial Action
DS 13 (2005)
DS31 (2005)
Person
Rozelle
McLean
Glory
Silver
Rayner
Ragan
Boyle
State
Barksdale
Menager
Carver
Hays
Hearst
Ferber
Freemont
Dunn

Legend

- Original Dunn Field Boundary
- Fluvial SVE Conveyance Line
- Disposal Sites Excavation Area
- Off Site Treatment Areas
- Off Depot Air Sparge Area
- EISR Treatment Area
- *Loess Excavation Areas*
- *Loess Thermal-Enhanced SVE Treatment Areas*
- Fluvial SVE Well 60-foot radius of influence
- Unrestricted Use Area from ROD
- Buildings
- Paved Area
- Roads
- Railroad

N
W E
S

0 250 500
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

Path: W:\SMP\2017\15_Figure_15.mxd

Figure 16

Fluvial SVE System

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Current Federal Property Boundary
- SVE Well *(Soil Vapor Extraction)*
- VMP *(Vapor Monitoring Point)*
- Monitoring Well Screened in the Fluvial Aquifer
- Monitor Well Screened in the Intermediate Aquifer
- Conveyance Line
- Control Building
- Concrete Pad
- 60-foot Radius of Influence

MW-06: Post Shutdown Monitoring Well

N E S W

0 100 200

Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

Path: W:\SMP\2017\16_Figure_16.mxd

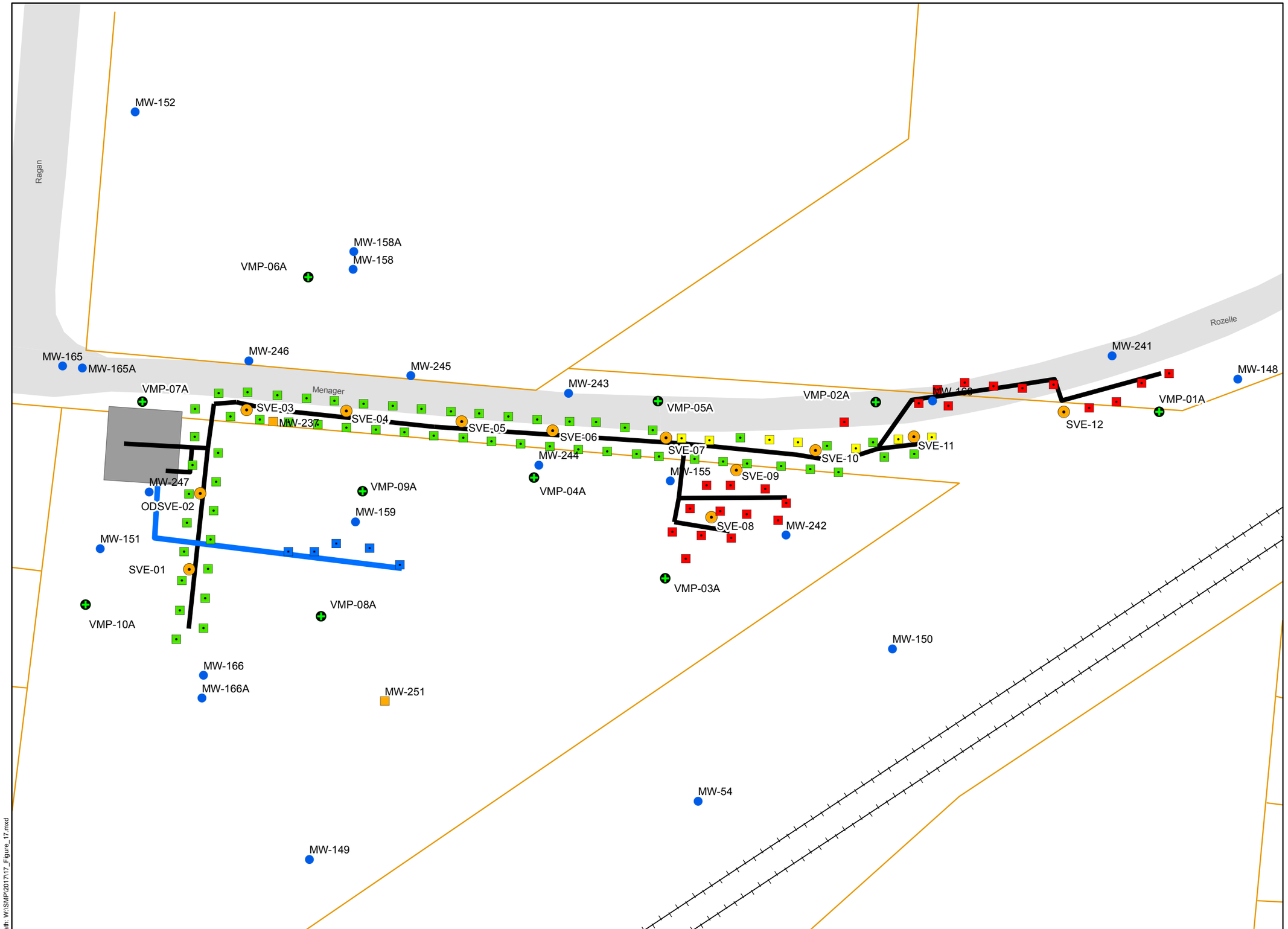

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Figure 17

AS/SVE System

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

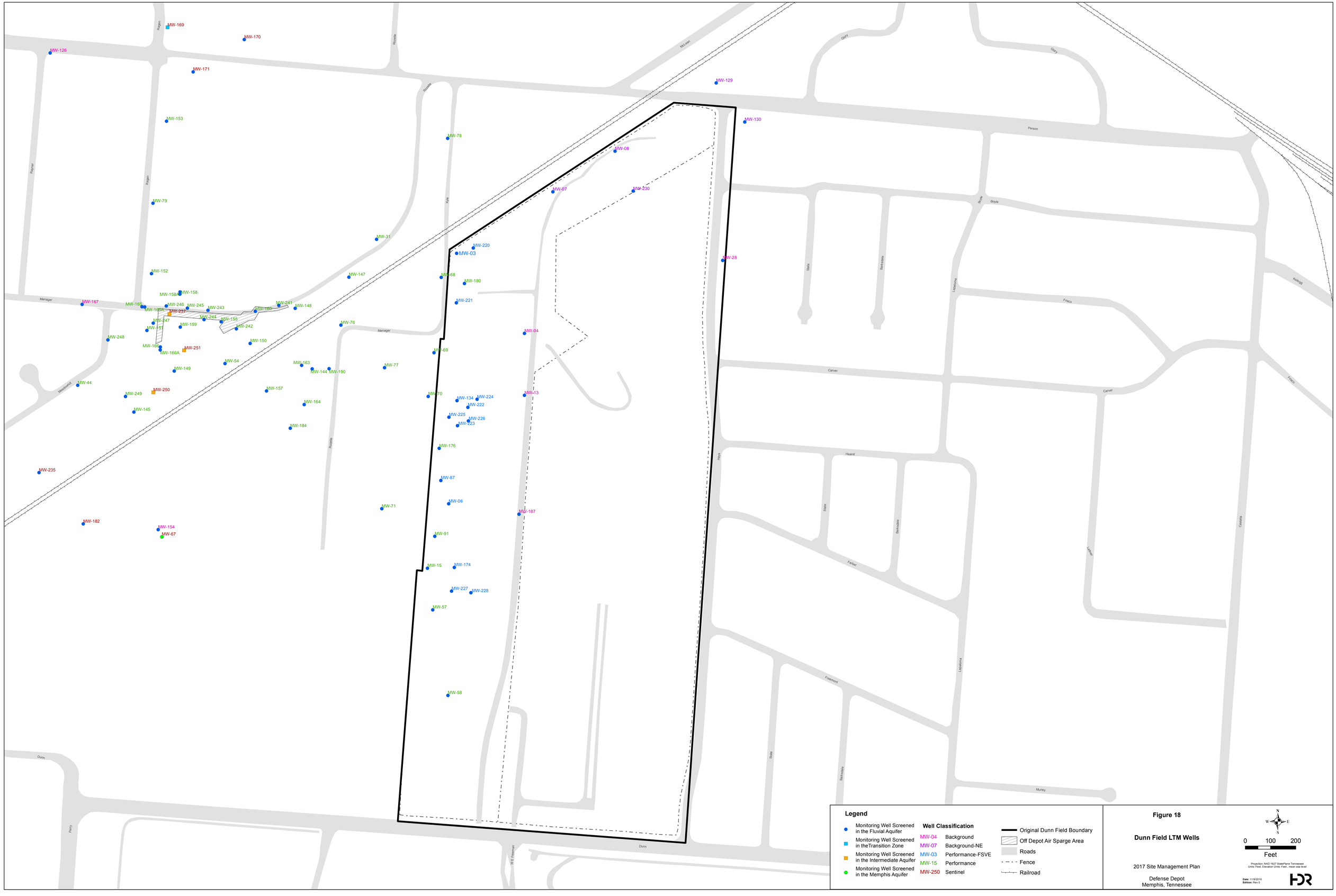
- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in the Intermediate Aquifer
- AS Location (1/2 time)
- AS Location (full time)
- AS Location (closed)
- New AS Location
- VMP Location
- SVE Location
- Conveyance Lines
- New Conveyance Line
- SVE Compound
- Roads
- Railroad
- Parcel Boundary

N
W E
S

0 25 50
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0



Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Monitoring Well Screened in theTransition Zone
- Monitoring Well Screened in the Intermediate Aquifer
- Monitoring Well Screened in the Memphis Aquifer

Well Classification

MW-04	Background
MW-07	Background-NE
MW-03	Performance-FSVE
MW-15	Performance
MW-250	Sentinel

- Original Dunn Field Boundary
- Off Depot Air Sparge Area
- Roads
- Fence
- Railroad

Figure 18

Dunn Field LTM Wells

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N W E S

0 100 200
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

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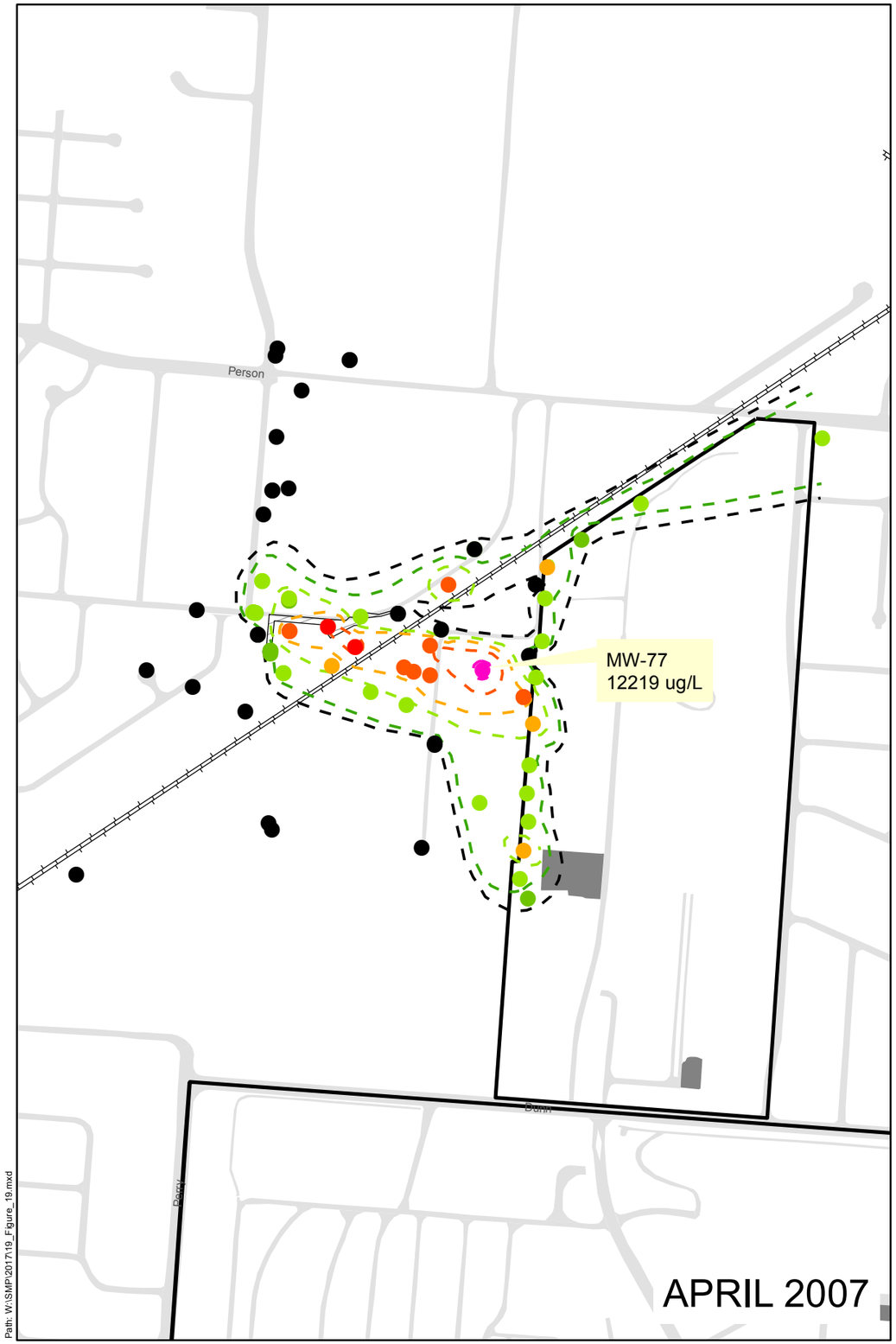

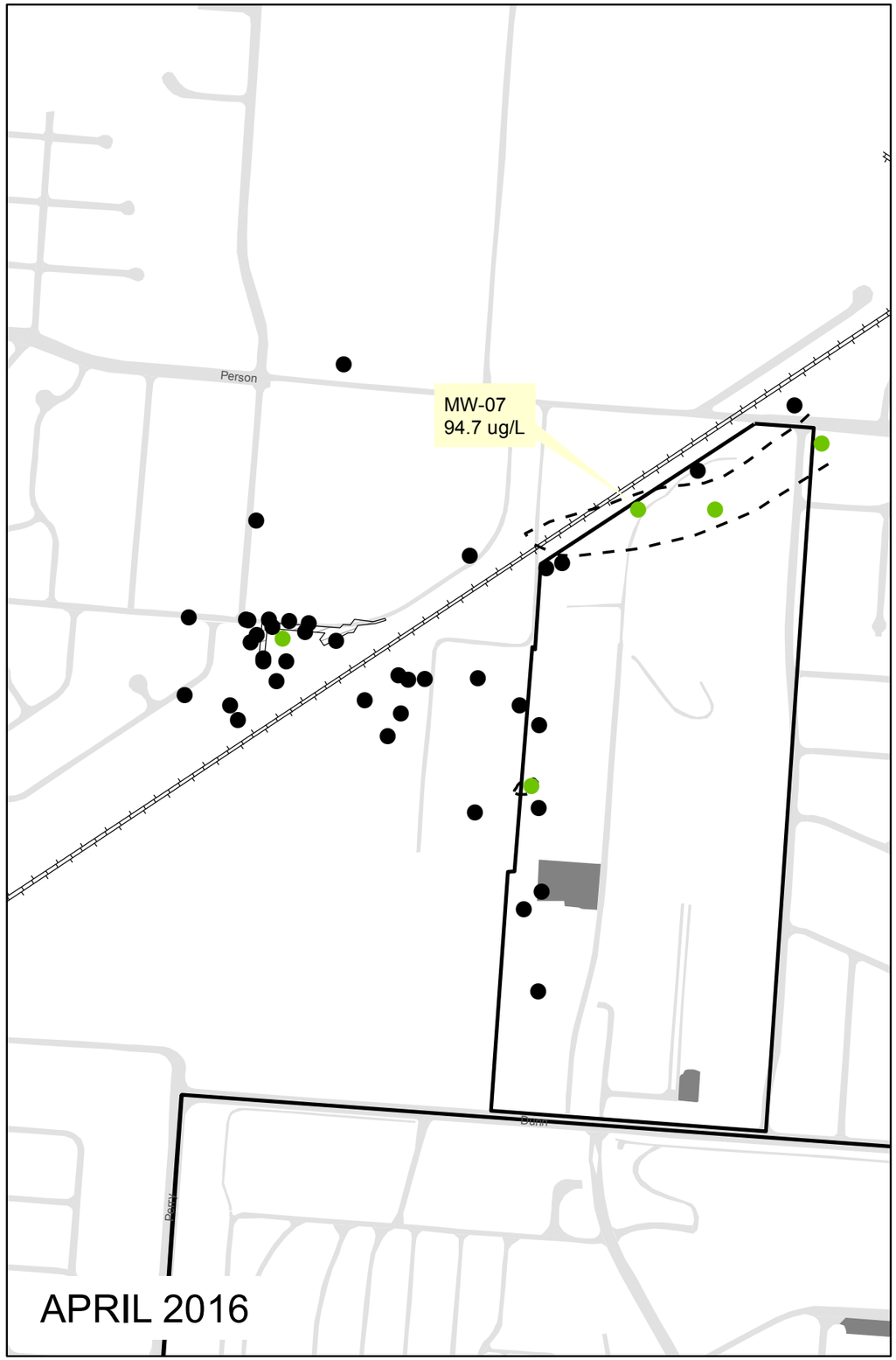

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Figure 19

Dunn Field Total CVOC Concentrations, 2007 - 2016

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

Total CVOC Isopleth (ug/L)

- 0-50
- 50-100
- 100-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-50000

Total CVOC Ranges (ug/L)

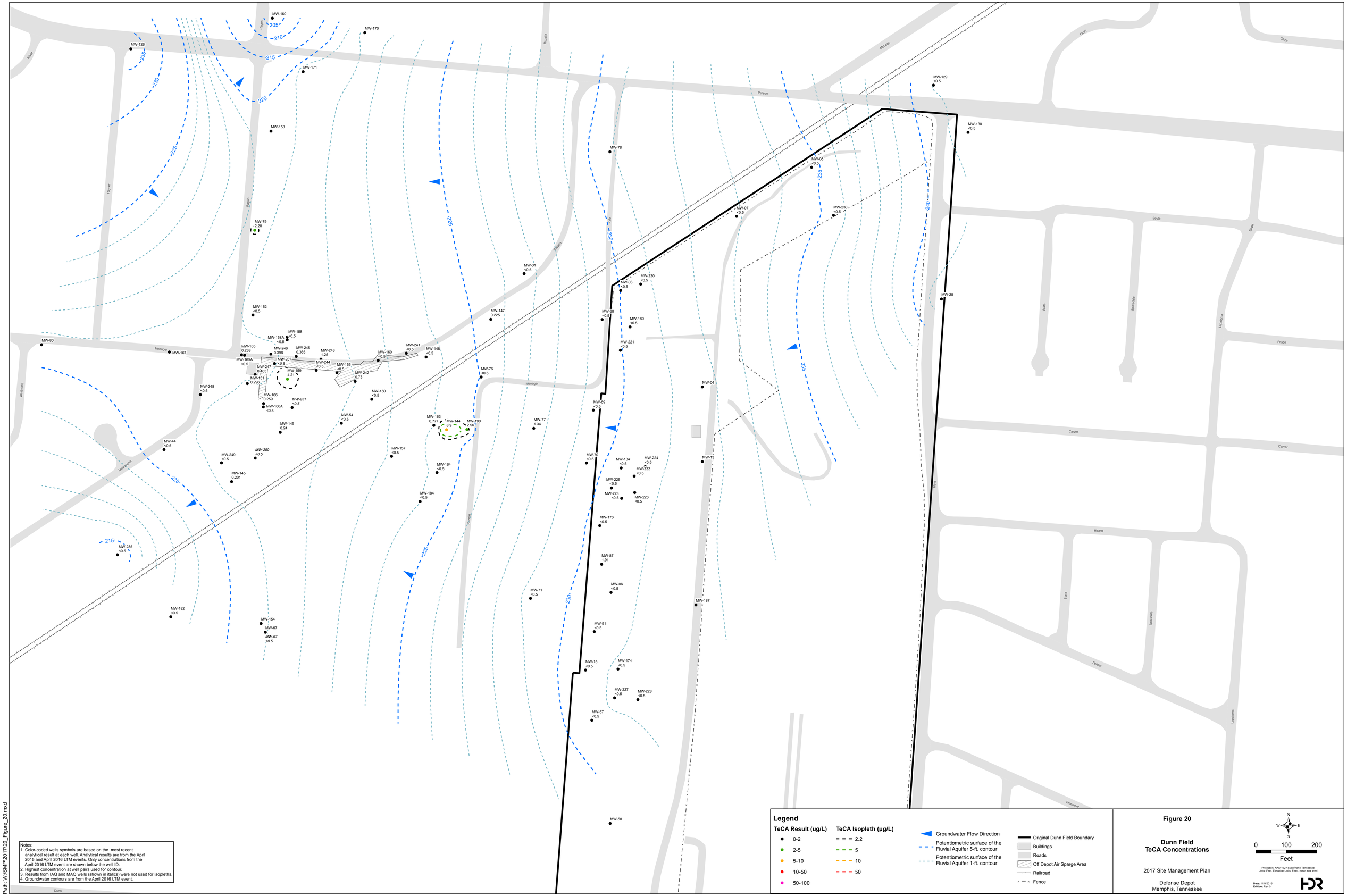
- 50
- 100
- 500
- 1000
- 5000
- 10000
- Original Property Boundary
- Off Depot Air Sparge Area
- Paved Area
- Roads
- Railroad

N
W E
S

0 250 500
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0



Notes:
1. Color-coded wells symbols are based on the most recent analytical result at each well. Analytical results are from the April 2015 and April 2016 LTM events. Only concentrations from the April 2016 LTM event are shown below the well ID.
2. Highest concentration at well pairs used for contour.
3. Results from IAQ and MAQ wells (shown in italics) were not used for isopleths.
4. Groundwater contours are from the April 2016 LTM event.

Legend

TeCA Result (ug/L)
- 0-2
- 2-5
- 5-10
- 10-50
- 50-100

TeCA Isopleth (µg/L)
- 2.2
- 5
- 10
- 50

- Groundwater Flow Direction
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Original Dunn Field Boundary
- Buildings
- Roads
- Off Depot Air Sparge Area
- Railroad
- Fence

Figure 20

Dunn Field
TeCA Concentrations

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N W E S

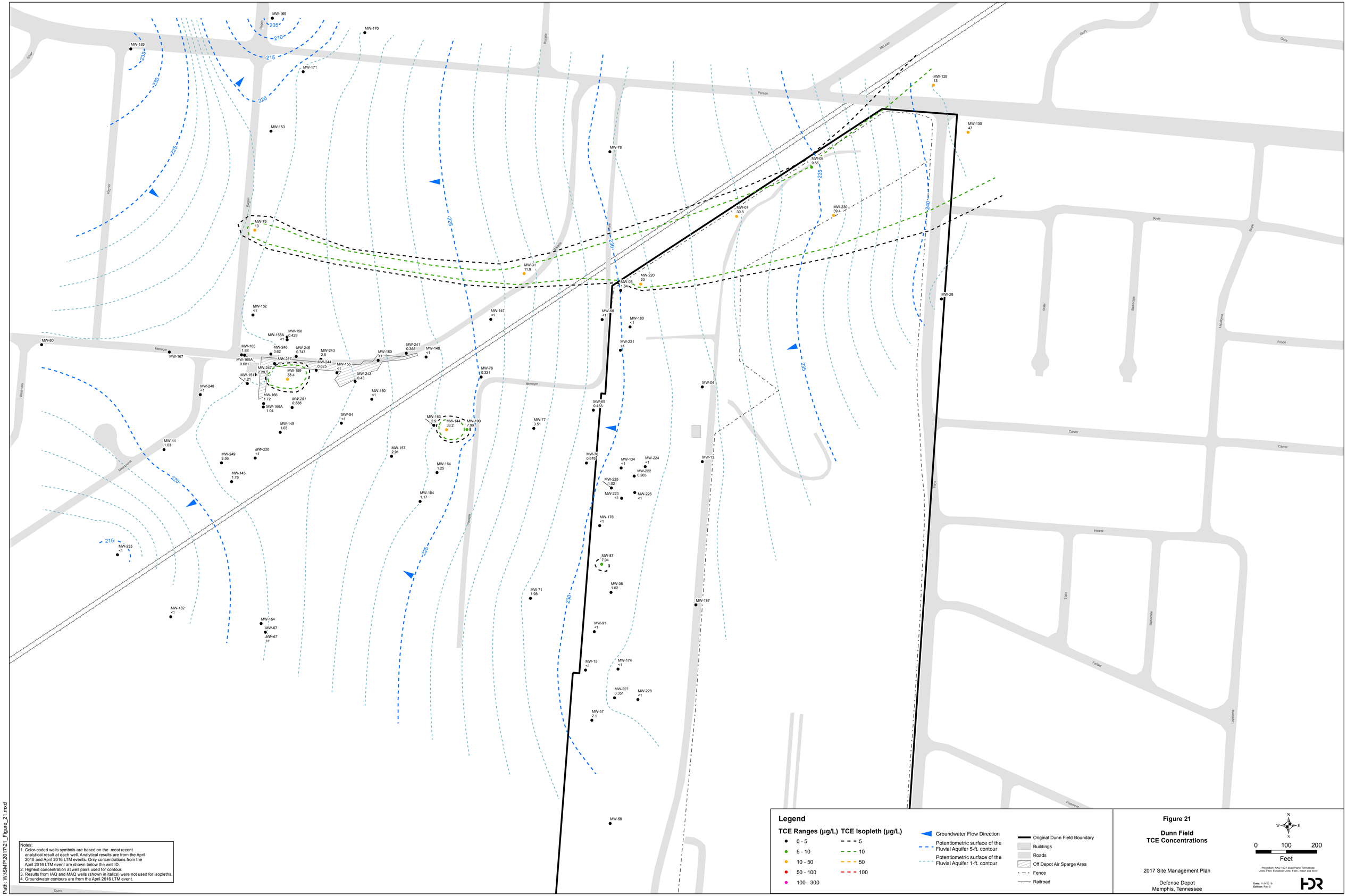
0 100 200
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

HDR

Path: W:\SMP\201720_Figure_20.mxd



Notes:
1. Color-coded wells symbols are based on the most recent analytical result at each well. Analytical results are from the April 2015 and April 2016 LTM events. Only concentrations from the April 2016 LTM event are shown below the well ID.
2. Highest concentration at well pairs used for contour.
3. Results from IAQ and MAQ wells (shown in italics) were not used for isopleths.
4. Groundwater contours are from the April 2016 LTM event.

Legend

TCE Ranges (µg/L)
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth (µg/L)
- 5
- 10
- 50
- 100

- Groundwater Flow Direction
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Original Dunn Field Boundary
- Buildings
- Roads
- Off Depot Air Sparge Area
- Fence
- Railroad

Figure 21

Dunn Field
TCE Concentrations

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N W E S

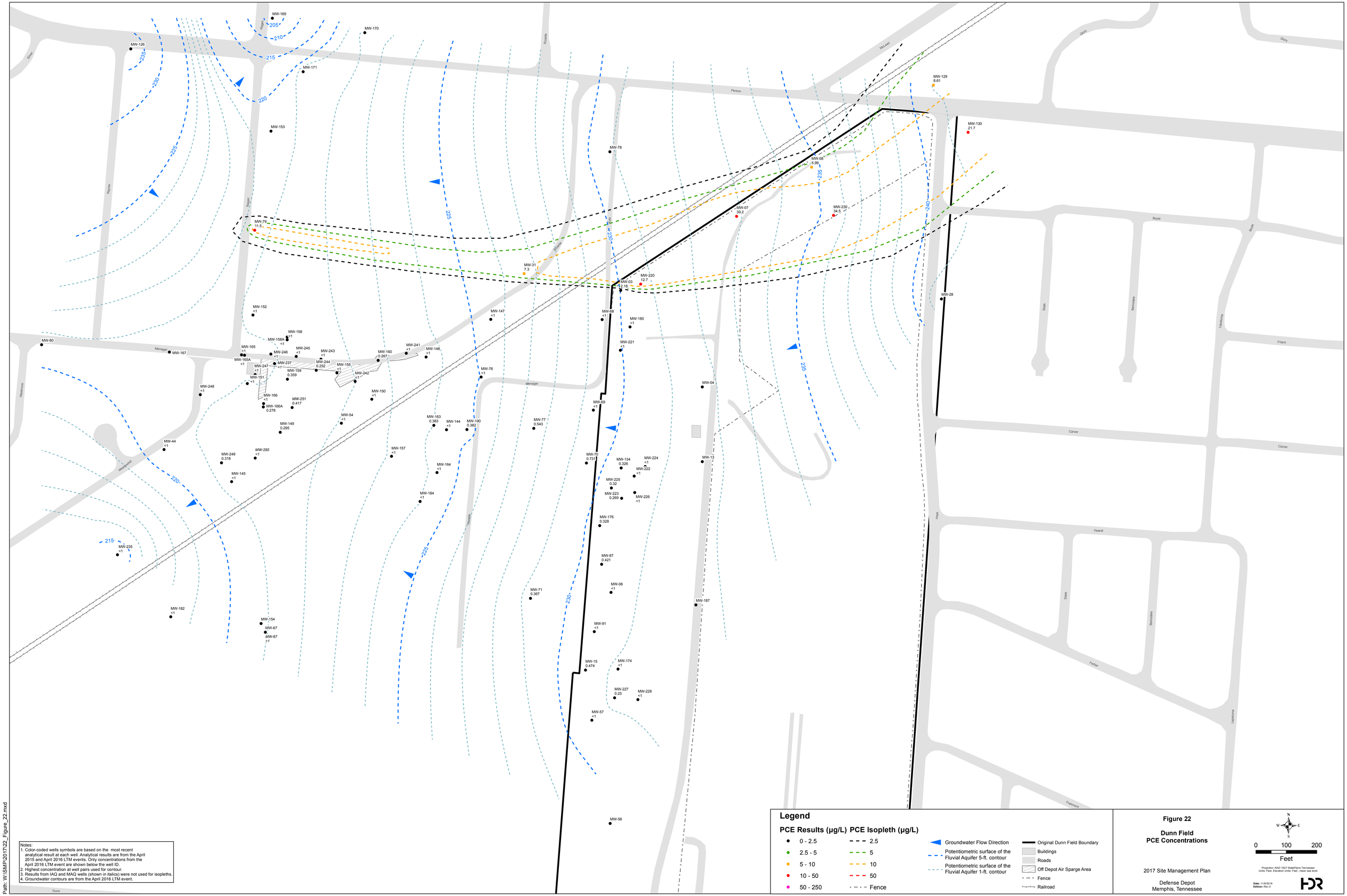
0 100 200
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

HDR

Path: W:\SMP\201721_Figure_21.mxd



Notes:
1. Color-coded wells symbols are based on the most recent analytical result at each well. Analytical results are from the April 2015 and April 2016 LTM events. Only concentrations from the April 2016 LTM event are shown below the well ID.
2. Highest concentration at well pairs used for contour.
3. Results from IAQ and MAQ wells (shown in italics) were not used for isopleths.
4. Groundwater contours are from the April 2016 LTM event.

Legend

PCE Results (µg/L)
- 0 - 2.5
- 2.5 - 5
- 5 - 10
- 10 - 50
- 50 - 250

PCE Isopleth (µg/L)
- 2.5
- 5
- 10
- 50
- Fence

- Groundwater Flow Direction
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Original Dunn Field Boundary
- Buildings
- Roads
- Off Depot Air Sparge Area
- Fence
- Railroad

Figure 22

Dunn Field
PCE Concentrations

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N
W E
S

0 100 200
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

HDR

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Note:
MIP locations from Membrane Interface Probe Survey Work Plan, Dunn Field (Trinity 2016)

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Figure 23

Dunn Field MIP Survey

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- MIP Boring Locations
- Study Area
- Original Dunn Field Boundary

N
W E
S

0 50 100
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

Legend

LTM Well Classification

MW-04	Background
MW-07	Background-NE
MW-03	Performance-FSVE
MW-15	Performance
MW-250	Sentinel

- Original Dunn Field Boundary
- Fence
- Roads
- Railroad

Land Use Restrictions:

- Unrestricted Use Area
- No residential development or child daycare uses.

Groundwater Use Restrictions:

- No productive or consumptive use or drilling of groundwater wells.
- No placement of groundwater wells within plume.
- No placement of groundwater wells within a half mile of plume boundaries.

Figure 24

Dunn Field Land Use Controls

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

N W E S

0 100 200
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/30/2016
Edition: Rev 0

HDR

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Figure 25

Finding of Suitability to Transfer Map

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

Legend

- Property Boundary
- FOST 1 — *signed 02/23/01, deeds signed 02/06/02 and 05/06/02.*
- FOST 2 — *signed 9/27/01, deed signed 9/18/01*
- FOST 3 — *signed 07/01/04, deeds signed 04/04/05, 08/18/06 and 10/12/06.*
- FOST 4 — *signed 03/04/05, deed signed 10/17/07.*
- FOST 5 — *signed 7/12/10; property not transferred.*
- FOST 6 — *signed 8/3/10; deed signed 3/30/11.*
- Buildings *490 - DDMT Assigned Number*
- Roads

N
W E
S

0 500 1,000
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: 11/9/2016
Edition: Rev 0

Path: W:\SMP\2017\25_Figure_25.mxd

I-1 (MW-274)
F-14 (MW-291)
F-18 (MW-282)
F-15 (MW-292)
F-17 (MW-281)
F-19 (MW-294)
F-16 (MW-293)
F-12 (MW-289)
F-11 (MW-280)
F-13 (MW-290)
F-20 (MW-295)
F-10 (MW-288)
F-21 (MW-296)
F-22 (MW-297)
F-7 (MW-286)
F-6 (MW-278)
F-8 (MW-287)
F-9 (MW-279)
F-26 (MW-301)
I-2 (MW-285)
F-24 (MW-299)
F-25 (MW-300)
F-23 (MW-298)
F-27 (MW-302)
F-3 (MW-276)
F-1 (MW-283)
F-5 (MW-277)
F-4 (MW-284)
F-2 (MW-275)

Note:
1. PCE and TCE isopleths based on highest historical concentrations at each well confirmed by results in a second sample.
2. Groundwater elevation contours from October 2015 LTM event.
3. Phase 2 wells are to be installed in October-November 2016.
4. Planned Phase 3 well locations are to be finalized based on Phase 2 results and installed in 2017.

Legend

- Fluvial Well
- Intermediate/Memphis Well
- MW-25A - Active Well
- MW-25 - Abandoned Well
- PCE
- TCE
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour
- Potentiometric surface of the Fluvial Aquifer 5-ft. contour
- Potentiometric surface of the Intermediate Aquifer 5-ft. contour
- Property Boundary
- Buildings *490 - DDMT Assigned Number*
- Roads
- Clay Elevation Exceeds Groundwater Elevation
- **I-1 (MW-274)** Phase 2 Well
- Fluvial Well
- Intermediate Well
- **F-1 (MW-283)** Planned Phase 3 Well
- Planned Fluvial Well
- Planned Intermediate Well

Figure 26
SRI Phase 2 and Phase 3 Well Locations

2017 Site Management Plan

Defense Depot
Memphis, Tennessee

0 250 500
Feet

Projection: NAD 1927 StatePlane Tennessee
Units: Feet, Elevation Units: Feet , mean sea level

Date: March 2015
Edition: Rev 0

Path: W:\SMP\2017\26_Figure_26.mxd

Figure 27
Master Schedule

ID	Status	Task Name	Duration	Start	Finish
1		**MAIN INSTALLATION**	**7046 d**	**Mon 9/11/06**	**Thu 12/25/25**
2		**Main Installation Remedial Action (RA)**	**6454 d**	**Mon 9/11/06**	**Sun 5/12/24**
3		MI RA-O Initial Enhanced Bioremediation Treatment (Y1 and Y2)	900 d	Mon 9/11/06	Thu 2/26/09
4		MI RA-O Additional Enhanced Bioremediation Treatment	977 d	Mon 9/17/12	Thu 5/21/15
5		**Supplemental Remedial Investigation (SRI) Phases 1 and 2**	**957 d**	**Mon 10/27/14**	**Fri 6/9/17**
6	P	**SRI Phase 1 Work Plan**	**164 d**	**Mon 10/27/14**	**Wed 4/8/15**
10		SRI Phase 1 Field Activities	96 d	Mon 4/27/15	Fri 7/31/15
11	S	**SRI Review/Phase 1 Summary Report**	**209 d**	**Sat 8/1/15**	**Thu 2/25/16**
13	P	**SRI Phase 2 Work Plan**	**185 d**	**Sun 2/28/16**	**Tue 8/30/16**
17		SRI Phase 2 Field Activities	70 d	Fri 9/30/16	Thu 12/8/16
18	P	**SRI Phase 1-2 Report**	**181 d**	**Sun 12/11/16**	**Fri 6/9/17**
19		Prepare and Submit Rev. 0 SRI Phase 1-2 Report	90 d	Sun 12/11/16	Fri 3/10/17
20		Agency Review and Submit Comments on Rev. 0 SRI Phase 1-2 Report	63 d	Sat 3/11/17	Fri 5/12/17
21		Prepare and Submit Rev. 1 SRI Phase 1-2 Report	28 d	Sat 5/13/17	Fri 6/9/17
22		**Authorization for 2017 Task Order Scope**	0 d	Wed 3/1/17	Wed 3/1/17
23		**SRI Phases 3 and 4**	**730 d**	**Wed 3/1/17**	**Thu 2/28/19**
24	P	**SRI Phase 3 Work Plan**	**135 d**	**Wed 3/1/17**	**Thu 7/13/17**
25		Prepare and Submit Rev. 0 SRI Phase 3 Work Plan	45 d	Wed 3/1/17	Fri 4/14/17
26		Agency Review and Submit Comments on Rev. 0 SRI Phase 3 Work Plan	60 d	Sat 4/15/17	Tue 6/13/17
27		Prepare and Submit Rev. 1 SRI Phase 3 Work Plan	30 d	Wed 6/14/17	Thu 7/13/17
28		SRI Phase 3 Field Activities	70 d	Fri 8/4/17	Thu 10/12/17
29	S	**SRI Phase 3 Summary Report**	**90 d**	**Sun 10/15/17**	**Fri 1/12/18**
30		Prepare and Submit SRI Phase 3 Summary Report	90 d	Sun 10/15/17	Fri 1/12/18
31	P	**SRI Phase 4 Work Plan**	**135 d**	**Fri 12/29/17**	**Sat 5/12/18**
32		Prepare and Submit Rev. 0 SRI Phase 4 Work Plan	45 d	Fri 12/29/17	Sun 2/11/18
33		Agency Review and Submit Comments on Rev. 0 SRI Phase 4 Work Plan	60 d	Mon 2/12/18	Thu 4/12/18
34		Prepare and Submit Rev. 1 SRI Phase 4 Work Plan	30 d	Fri 4/13/18	Sat 5/12/18
35		SRI Phase 4 Field Activities	70 d	Sun 6/3/18	Sat 8/11/18
36	P	**Final SRI Report (Phases 3 and 4)**	**181 d**	**Tue 8/14/18**	**Sun 2/10/19**
37		Prepare and Submit Rev. 0 Final SRI Report	90 d	Tue 8/14/18	Sun 11/11/18
38		Agency Review and Submit Comments on Rev. 0 Final SRI Report	63 d	Mon 11/12/18	Sun 1/13/19
39		Prepare and Submit Rev. 1 Final SRI Report	28 d	Mon 1/14/19	Sun 2/10/19
40		**Risk Assessment Update and Review**	**165 d**	**Wed 3/1/17**	**Sat 8/12/17**
41	S	Prepare and Submit Risk Assessment Protocol Technical Memorandum	30 d	Wed 3/1/17	Thu 3/30/17
42		Site Information Review and and Risk Estimation	75 d	Fri 3/31/17	Tue 6/13/17
43	S	Prepare and Submit Risk Assessment Summary Technical Memorandum	60 d	Wed 6/14/17	Sat 8/12/17
44		**SRI Groundwater Model**	**221 d**	**Wed 3/1/17**	**Sat 10/7/17**
45		Data Collection and Compilation (including MLGW Data Request)	28 d	Wed 3/1/17	Tue 3/28/17
46		Conceptual Site Model (CSM) Development	28 d	Wed 3/29/17	Tue 4/25/17
47	S	Prepare and Submit CSM, Objectives and Model Construction Technical Memorandum	40 d	Wed 4/26/17	Sun 6/4/17
48		Final Model Construction, Calibration and Predictive Scenarios	80 d	Mon 6/5/17	Wed 8/23/17
49	S	Prepare and Submit SRI Groundwater Model Summary Technical Memorandum	45 d	Thu 8/24/17	Sat 10/7/17
50		**MI Vapor Intrusion Study**	**724 d**	**Wed 3/1/17**	**Fri 2/22/19**
51		Screening Level VI Assessment	21 d	Wed 3/1/17	Tue 3/21/17
52		Prepare and Submit Screening Level VI Assessment Technical Memorandum	28 d	Wed 3/22/17	Tue 4/18/17
53		**Site Specific VI Pathway Evaluation**	**690 d**	**Tue 4/4/17**	**Fri 2/22/19**
54		**Soil Gas Sampling**	**194 d**	**Tue 4/4/17**	**Sat 10/14/17**
55	S	**Soil Gas Sampling Work Plan**	**126 d**	**Tue 4/4/17**	**Mon 8/7/17**
56		Prepare and Submit Rev. 0 Soil Gas Sampling Work Plan	45 d	Tue 4/4/17	Thu 5/18/17
57		Agency Review and Submit Comments on Rev. 0 Soil Gas Sampling Work Plan	60 d	Fri 5/19/17	Mon 7/17/17
58		Prepare and Submit Rev. 1 Soil Gas Sampling Work Plan	21 d	Tue 7/18/17	Mon 8/7/17
59		Soil Gas Sampling Field Activities	7 d	Tue 8/22/17	Mon 8/28/17
60	S	Prepare and Submit Soil Gas Sampling Technical Memorandum	45 d	Thu 8/31/17	Sat 10/14/17

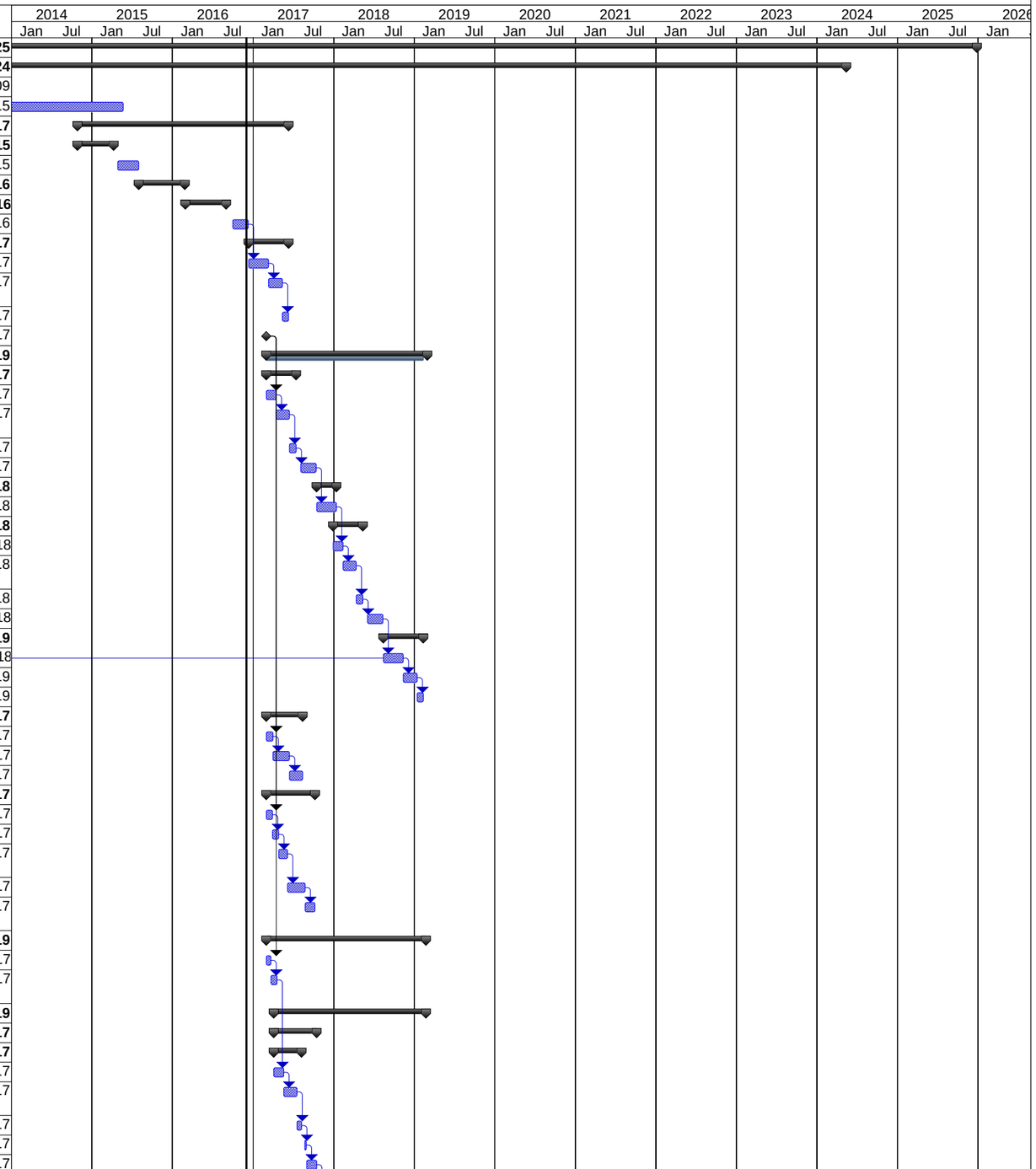


Figure 27
Master Schedule

ID	Status	Task Name	Duration	Start	Finish
61		**Indoor Air Sampling**	**360 d**	**Mon 9/25/17**	**Wed 9/19/18**
62	**S**	**Indoor Air Sampling Work Plan**	**126 d**	**Mon 9/25/17**	**Sun 1/28/18**
63		Prepare and Submit Rev. 0 Indoor Air Sampling Work Plan	45 d	Mon 9/25/17	Wed 11/8/17
64		Agency Review and Submit Comments on Rev. 0 Indoor Air Sampling Work Plan	60 d	Thu 11/9/17	Sun 1/7/18
65		Prepare and Submit Rev. 1 Indoor Air Sampling Work Plan	21 d	Mon 1/8/18	Sun 1/28/18
66		**Indoor Air Sampling Field Activities**	**187 d**	**Mon 1/29/18**	**Fri 8/3/18**
67		Sample Round 1	7 d	Mon 1/29/18	Sun 2/4/18
68		Sample Round 2	7 d	Sat 7/28/18	Fri 8/3/18
69	S	Prepare and Submit Indoor Air Sampling Technical Memorandum	45 d	Mon 8/6/18	Wed 9/19/18
70		**Mitigation/Remediation Evaluation**	**21 d**	**Thu 9/20/18**	**Wed 10/10/18**
71		Evaluation of Alternatives and Selection of Mitigation and/or Remediation Alternatives	21 d	Thu 9/20/18	Wed 10/10/18
72	**S**	**Comprehensive VI Study Report**	**135 d**	**Thu 10/11/18**	**Fri 2/22/19**
73		Prepare and Submit Rev. 0 Comprehensive VI Study Report	45 d	Thu 10/11/18	Sat 11/24/18
74		Agency Review and Submit Comments on Rev. 0 Comprehensive VI Study Report	60 d	Sun 11/25/18	Wed 1/23/19
75		Prepare and Submit Rev. 1 Comprehensive VI Study Report	30 d	Thu 1/24/19	Fri 2/22/19
76		**Focused Feasibility Study (FFS)**	**240 d**	**Thu 9/13/18**	**Fri 5/10/19**
77		Document Review/Develop Alternatives	35 d	Thu 9/13/18	Wed 10/17/18
78		Screen Alternatives/Selected Preferred Alternatives	35 d	Thu 10/18/18	Wed 11/21/18
79	**P**	**FFS Report**	**170 d**	**Thu 11/22/18**	**Fri 5/10/19**
80		Prepare and Submit Rev. 0 FFS Report	75 d	Thu 11/22/18	Mon 2/4/19
81		Agency Review and Submit Comments on Rev. 0 FFS Report	60 d	Tue 2/5/19	Fri 4/5/19
82		Prepare and Submit Rev. 1 FFS Report	35 d	Sat 4/6/19	Fri 5/10/19
83		**Record of Decision (ROD) Amendment**	**402 d**	**Fri 4/26/19**	**Sun 5/31/20**
84	**P**	**Revised Proposed Plan (RPP)**	**151 d**	**Fri 4/26/19**	**Mon 9/23/19**
85		Prepare and Submit Rev. 0 RPP	70 d	Fri 4/26/19	Thu 7/4/19
86		Agency Review and Submit Comments on Rev. 0 RPP	60 d	Fri 7/5/19	Mon 9/2/19
87		Prepare and Submit Rev. 1 RPP	21 d	Tue 9/3/19	Mon 9/23/19
88		**Public Comment Period**	**53 d**	**Wed 10/2/19**	**Sat 11/23/19**
89		Notice of RPP Comment Period and Public Meeting	7 d	Wed 10/2/19	Tue 10/8/19
90		RPP Public Comment Period	31 d	Thu 10/24/19	Sat 11/23/19
91		Public Meeting	7 d	Sun 11/3/19	Sat 11/9/19
92	**P**	**ROD Amendment**	**251 d**	**Tue 9/24/19**	**Sun 5/31/20**
93		Prepare and Submit Rev. 0 ROD Amendment	119 d	Tue 9/24/19	Mon 1/20/20
94		Agency Review and Submit Comments on Rev. 0 ROD Amendment	60 d	Tue 1/21/20	Fri 3/20/20
95		Prepare and Submit Rev. 1 ROD Amendment	30 d	Sat 3/21/20	Sun 4/19/20
96		Process MI ROD Amendment through ODB, TDEC, EPA	30 d	Mon 4/20/20	Tue 5/19/20
97		Final MI ROD Amendment	0 d	Tue 5/19/20	Tue 5/19/20
98		Notice of MI ROD Amendment	7 d	Mon 5/25/20	Sun 5/31/20
99		**New MI Remedial Action**	**1714 d**	**Tue 9/3/19**	**Sun 5/12/24**
100	**P**	**New MI Remedial Design**	**163 d**	**Tue 9/3/19**	**Wed 2/12/20**
101		Prepare and Submit Rev. 0 New MI RD	75 d	Tue 9/3/19	Sat 11/16/19
102		Agency Review and Submit Comments on Rev. 0 New MI RD	60 d	Sun 11/17/19	Wed 1/15/20
103		Prepare and Submit Rev. 1 New MI RD	28 d	Thu 1/16/20	Wed 2/12/20
104	**P**	**New MI Remedial Action Work Plan**	**158 d**	**Thu 2/13/20**	**Sun 7/19/20**
105		Prepare and Submit Rev. 0 New MI RAWP	70 d	Thu 2/13/20	Wed 4/22/20
106		Agency Review and Submit Comments on Rev. 0 New MI RAWP	60 d	Thu 4/23/20	Sun 6/21/20
107		Prepare and Submit Rev. 1 New MI RAWP	28 d	Mon 6/22/20	Sun 7/19/20
108		**New MI RA Construction**	90 d	Mon 8/17/20	Sat 11/14/20
109		**New MI Remedial Action Years 1-3**	1095 d	Sun 11/15/20	Tue 11/14/23
110	**S**	**New MI RA Annual Report Year 1**	**180 d**	**Mon 11/15/21**	**Fri 5/13/22**
111		Prepare & Submit Rev. 0 Y1 MI RA Report	90 d	Mon 11/15/21	Sat 2/12/22
112		Agency Review & Submit Comments on Rev. 0 Y1 MI RA Report	60 d	Sun 2/13/22	Wed 4/13/22
113		Prepare & Submit Rev. 1 Y1 MI RA Report	30 d	Thu 4/14/22	Fri 5/13/22
114	**S**	**New MI RA Annual Report Year 2**	**180 d**	**Tue 11/15/22**	**Sat 5/13/23**
115		Prepare & Submit Rev. 0 Y3 MI RA Report	90 d	Tue 11/15/22	Sun 2/12/23
116		Agency Review & Submit Comments on Rev. 0 Y2 MI RA Report	60 d	Mon 2/13/23	Thu 4/13/23

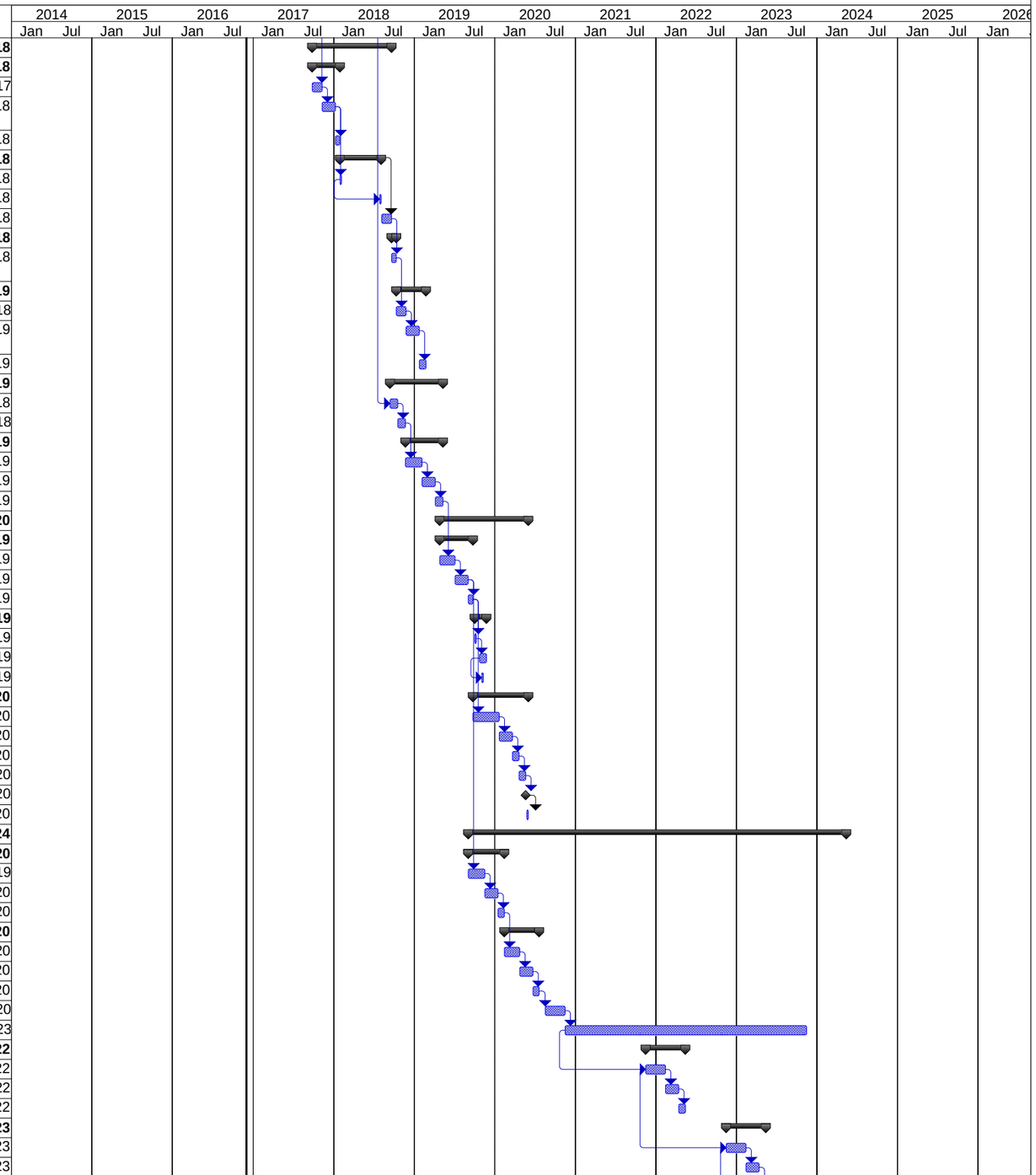


Figure 27
Master Schedule

ID	Status	Task Name	Duration	Start	Finish
117		Prepare & Submit Rev. 1 Y2 MI RA Report	30 d	Fri 4/14/23	Sat 5/13/23
118	S	**New MI RA Annual Report Year 3**	**180 d**	**Wed 11/15/23**	**Sun 5/12/24**
119		Prepare & Submit Rev. 0 Y3 MI RA Report	90 d	Wed 11/15/23	Mon 2/12/24
120		Agency Review & Submit Comments on Rev. 0 Y3 MI RA Report	60 d	Tue 2/13/24	Fri 4/12/24
121		Prepare & Submit Rev. 1 Y3 MI RA Report	30 d	Sat 4/13/24	Sun 5/12/24
122		**MI Annual LUCIP Inspections**	**775 d**	**Sat 7/1/17**	**Wed 8/14/19**
123	S	MI Annual LUCIP Inspection and Report - 2017	45 d	Sat 7/1/17	Mon 8/14/17
124	S	MI Annual LUCIP Inspection and Report - 2018	45 d	Sun 7/1/18	Tue 8/14/18
125	S	MI Annual LUCIP Inspection and Report - 2019	45 d	Mon 7/1/19	Wed 8/14/19
126		**MI RA-O Long Term Monitoring (2015 through 2023)**	3287 d	Thu 1/1/15	Sun 12/31/23
127		**Main Installation Compliance Monitoring**	365 d	Mon 1/1/24	Mon 12/30/24
128	P	**Main Installation RA Completion Report**	**270 d**	**Tue 12/31/24**	**Fri 9/26/25**
129		Prepare & Submit Rev. 0 MI RACR	90 d	Tue 12/31/24	Sun 3/30/25
130		Agency Review & Submit Comments on Rev. 0 MI RACR	60 d	Mon 3/31/25	Thu 5/29/25
131		Respond to Agency Comments on Rev. 0 MI RACR	30 d	Fri 5/30/25	Sat 6/28/25
132		Prepare & Submit Rev. 1 MI RACR	60 d	Fri 5/30/25	Mon 7/28/25
133		Agency Review of Rev. 1 MI RACR w/ Concurrence	60 d	Tue 7/29/25	Fri 9/26/25
134		**Main Installation Well Abandonment**	90 d	Sat 9/27/25	Thu 12/25/25
135					
136					
137		**DUNN FIELD**	**4933 d**	**Wed 7/25/07**	**Sun 1/24/21**
138		**Dunn Field Fluvial SVE Remedial Action**	**3982 d**	**Wed 7/25/07**	**Mon 6/18/18**
139		Fluvial SVE Operations Years 1 to 5	1827 d	Wed 7/25/07	Tue 7/24/12
140		Fluvial SVE Rebound Monitoring	1986 d	Wed 7/25/12	Sun 12/31/17
141		**Abandon Fluvial SVE System**	84 d	Tue 3/27/18	Mon 6/18/18
142		**Dunn Field Off Depot GW Remedial Action**	**3355 d**	**Fri 12/18/09**	**Sat 2/23/19**
143		**Dunn Field Off Depot RA-O AS/SVE Operations Years 1 to 5**	2205 d	Fri 12/18/09	Thu 12/31/15
144	S	**Year 5 Extended AS/SVE Report**	**239 d**	**Wed 1/6/16**	**Wed 8/31/16**
148		**AS Well Installation**	**387 d**	**Fri 5/6/16**	**Sat 5/27/17**
149	S	**AS Well Installation Work Plan**	**194 d**	**Fri 5/6/16**	**Tue 11/15/16**
150		Prepare and Submit Rev. 0 AS Well Installation Work Plan	103 d	Fri 5/6/16	Tue 8/16/16
151		Agency Review and Submit Comments on Rev. 0 AS Well Installation Work Plan	70 d	Wed 8/17/16	Tue 10/25/16
152		Prepare and Submit Rev. 1 AS Well Installation Work Plan	21 d	Wed 10/26/16	Tue 11/15/16
153		AS Well Installation Field Activities	10 d	Mon 11/28/16	Wed 12/7/16
154	S	**AS Well Installation Summary Report**	**171 d**	**Thu 12/8/16**	**Sat 5/27/17**
155		Prepare and Submit Rev. 0 AS Well Installation Summary Report	97 d	Thu 12/8/16	Tue 3/14/17
156		Agency Review and Submit Comments on Rev. 0 AS Well Installation Summary Report	60 d	Wed 3/15/17	Sat 5/13/17
157		Prepare and Submit Rev. 0 AS Well Installation Summary Report	14 d	Sun 5/14/17	Sat 5/27/17
158		**Dunn Field Off Depot RA-O AS/SVE Operations Years 6 to 7**	730 d	Sun 5/15/16	Mon 5/14/18
159	S	**Year 6 AS/SVE Report**	**195 d**	**Mon 5/15/17**	**Sat 11/25/17**
160		Prepare & Submit Rev. 0 Y6 AS/SVE Report	75 d	Mon 5/15/17	Fri 7/28/17
161		Agency Review & Submit Comments on Rev. 0 Y6 AS/SVE Report	60 d	Sat 7/29/17	Tue 9/26/17
162		Prepare & Submit Rev. 1 Y6 AS/SVE Report	60 d	Wed 9/27/17	Sat 11/25/17
163	S	**Year 7 AS/SVE Report**	**195 d**	**Tue 5/15/18**	**Sun 11/25/18**
164		Prepare & Submit Rev. 0 Y7 AS/SVE Report	75 d	Tue 5/15/18	Sat 7/28/18
165		Agency Review & Submit Comments on Rev. 0 Y7 AS/SVE Report	60 d	Sun 7/29/18	Wed 9/26/18
166		Prepare & Submit Rev. 1 Y7 AS/SVE Report	60 d	Thu 9/27/18	Sun 11/25/18
167		**Abandon AS/SVE System**	90 d	Mon 11/26/18	Sat 2/23/19
168		**NE Dunn Field MIP Survey**	**401 d**	**Fri 5/6/16**	**Sat 6/10/17**
169	S	**MIP Survey Work Plan**	**194 d**	**Fri 5/6/16**	**Tue 11/15/16**
170		Prepare and Submit Rev. 0 MIP Survey Work Plan	110 d	Fri 5/6/16	Tue 8/23/16
171		Agency Review and Submit Comments on Rev. 0 MIP Survey Work Plan	63 d	Wed 8/24/16	Tue 10/25/16
172		Prepare and Submit Rev. 1 MIP Survey Work Plan	21 d	Wed 10/26/16	Tue 11/15/16
173		MIP Survey Field Activities	15 d	Wed 11/30/16	Wed 12/14/16
174	S	**MIP Survey Summary Report**	**171 d**	**Thu 12/22/16**	**Sat 6/10/17**
175		Prepare and Submit Rev. 0 MIP Survey Report	90 d	Thu 12/22/16	Tue 3/21/17
176		Agency Review and Submit Comments on Rev. 0 MIP Survey Report	60 d	Wed 3/22/17	Sat 5/20/17

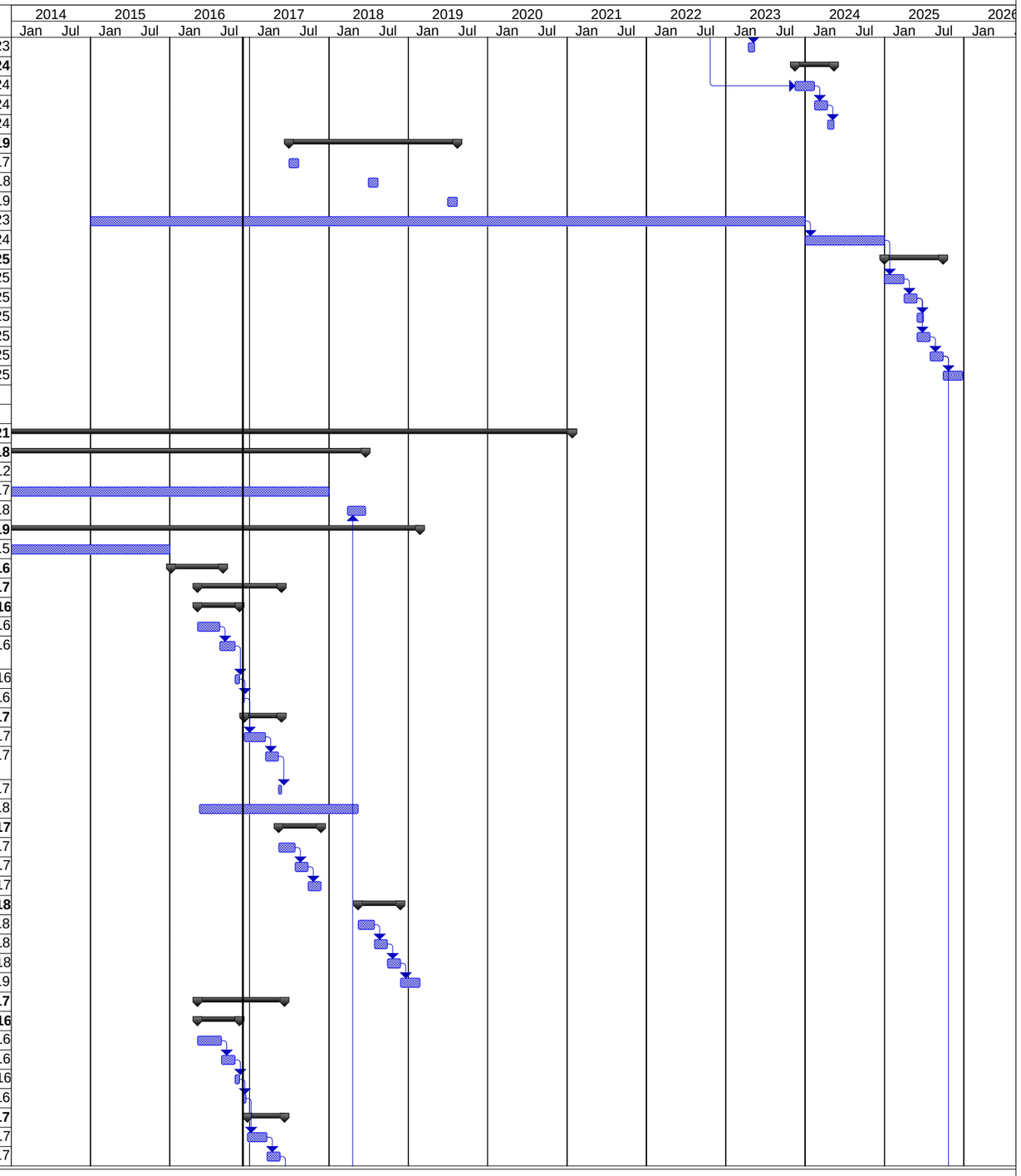


Figure 27
Master Schedule

ID	Status	Task Name	Duration	Start	Finish
177		Prepare and Submit Rev. 1 MIP Survey Report	21 d	Sun 5/21/17	Sat 6/10/17
178		**Dunn Field Annual LUCIP Inspections**	**775 d**	**Sat 7/1/17**	**Wed 8/14/19**
179	S	Dunn Field Annual LUCIP Inspection and Report - 2017	45 d	Sat 7/1/17	Mon 8/14/17
180	S	Dunn Field Annual LUCIP Inspection and Report - 2018	45 d	Sun 7/1/18	Tue 8/14/18
181	S	Dunn Field Annual LUCIP Inspection and Report - 2019	45 d	Mon 7/1/19	Wed 8/14/19
182		**Dunn Field RA-O Long Term Monitoring**	1826 d	Wed 1/1/14	Mon 12/31/18
183		**Dunn Field Compliance Monitoring**	365 d	Tue 1/1/19	Tue 12/31/19
184	P	**Dunn Field RA Completion Report**	**300 d**	**Wed 1/1/20**	**Mon 10/26/20**
185		Prepare & Submit Rev. 0 Dunn Field RACR	60 d	Wed 1/1/20	Sat 2/29/20
186		Agency Review & Submit Comments on Rev. 0 Dunn Field RACR	60 d	Sun 3/1/20	Wed 4/29/20
187		Respond to Agency Comments on Rev. 0 Dunn Field RACR	60 d	Thu 4/30/20	Sun 6/28/20
188		Prepare & Submit Rev. 1 Dunn Field RACR	120 d	Thu 4/30/20	Thu 8/27/20
189		Agency Review of Rev. 1 Dunn Field RACR w/ Concurrence	60 d	Fri 8/28/20	Mon 10/26/20
190		**Dunn Field Well Abandonment**	90 d	Tue 10/27/20	Sun 1/24/21
191					
192					
193		**Memphis Depot NPL Site-Wide Activities**	**3482 d**	**Mon 9/12/16**	**Wed 3/25/26**
194		**Site-Wide (MI and Dunn Field) LTM Reports**	**900 d**	**Mon 11/7/16**	**Thu 4/25/19**
195	S	**2016 LTM Report**	**170 d**	**Mon 11/7/16**	**Tue 4/25/17**
196		Prepare & Submit Rev. 0 2016 LTM Report	80 d	Mon 11/7/16	Wed 1/25/17
197		Agency Review & Submit Comments on Rev. 0 2016 LTM Report	60 d	Thu 1/26/17	Sun 3/26/17
198		Prepare & Submit Rev. 1 2016 LTM Report	30 d	Mon 3/27/17	Tue 4/25/17
199	S	**2017 LTM Report**	**170 d**	**Tue 11/7/17**	**Wed 4/25/18**
200		Prepare & Submit Rev. 0 2017 LTM Report	80 d	Tue 11/7/17	Thu 1/25/18
201		Agency Review & Submit Comments on Rev. 0 2017 LTM Report	60 d	Fri 1/26/18	Mon 3/26/18
202		Prepare & Submit Rev. 1 2017 LTM Report	30 d	Tue 3/27/18	Wed 4/25/18
203	S	**2018 LTM Report**	**170 d**	**Wed 11/7/18**	**Thu 4/25/19**
204		Prepare & Submit Rev. 0 2018 LTM Report	80 d	Wed 11/7/18	Fri 1/25/19
205		Agency Review & Submit Comments on Rev. 0 2018 LTM Report	60 d	Sat 1/26/19	Tue 3/26/19
206		Prepare & Submit Rev. 1 2018 LTM Report	30 d	Wed 3/27/19	Thu 4/25/19
207		**Site Management Plan (SMP) Updates**	**870 d**	**Mon 9/12/16**	**Tue 1/29/19**
208	P	**2017 Site Management Plan**	**140 d**	**Mon 9/12/16**	**Sun 1/29/17**
209		Prepare & Submit Rev 0 2017 SMP	80 d	Mon 9/12/16	Wed 11/30/16
210		Agency Review & Submit Comments on Rev 0 2017 SMP	30 d	Thu 12/1/16	Fri 12/30/16
211		Prepare & Submit Rev 1 2017 SMP	30 d	Sat 12/31/16	Sun 1/29/17
212	P	**2018 Site Management Plan**	**140 d**	**Tue 9/12/17**	**Mon 1/29/18**
213		Prepare & Submit Rev 0 2018 SMP	80 d	Tue 9/12/17	Thu 11/30/17
214		Agency Review & Submit Comments on Rev 0 2018 SMP	30 d	Fri 12/1/17	Sat 12/30/17
215		Prepare & Submit Rev 1 2018 SMP	30 d	Sun 12/31/17	Mon 1/29/18
216	P	**2019 Site Management Plan**	**140 d**	**Wed 9/12/18**	**Tue 1/29/19**
217		Prepare & Submit Rev 0 2019 SMP	80 d	Wed 9/12/18	Fri 11/30/18
218		Agency Review & Submit Comments on Rev 0 2019 SMP	30 d	Sat 12/1/18	Sun 12/30/18
219		Prepare & Submit Rev 1 2019 SMP	30 d	Mon 12/31/18	Tue 1/29/19
220	P	**CERCLA Fourth 5-Year Review**	**341 d**	**Mon 2/27/17**	**Fri 2/2/18**
221		Notice of Five-Year Review	14 d	Mon 2/27/17	Sun 3/12/17
222		Document Review, Interviews, Inspection, Technical Assessment	70 d	Mon 3/13/17	Sun 5/21/17
223		Prepare & Submit Rev. 0 4th 5-Year Review	84 d	Mon 3/27/17	Sun 6/18/17
224		Agency Review & Submit Comments on Rev. 0 4th 5-Year Review	61 d	Mon 6/19/17	Fri 8/18/17
225		Respond to Agency Comments on Rev. 0 4th 5-Year Review	28 d	Sat 8/19/17	Fri 9/15/17
226		Prepare & Submit Rev. 1 4th 5-Year Review	63 d	Sat 8/19/17	Fri 10/20/17
227		Agency Review of Rev. 1 4th 5-Year Review	60 d	Sat 10/21/17	Tue 12/19/17
228		Prepare & Submit Final 4th 5-Year Review	21 d	Wed 12/20/17	Tue 1/9/18
229		Final 4th 5-Year Review Signed	10 d	Wed 1/10/18	Fri 1/19/18
230		Notification of 4th 5-Year Review Completion	7 d	Sat 1/27/18	Fri 2/2/18
231	P	**CERCLA Fifth 5-Year Review**	**341 d**	**Sun 2/27/22**	**Thu 2/2/23**
232		Notice of Five-Year Review	14 d	Sun 2/27/22	Sat 3/12/22
233		Document Review, Interviews, Inspection, Technical Assessment	70 d	Sun 3/13/22	Sat 5/21/22
234		Prepare & Submit Rev. 0 5th 5-Year Review	84 d	Sun 3/27/22	Sat 6/18/22

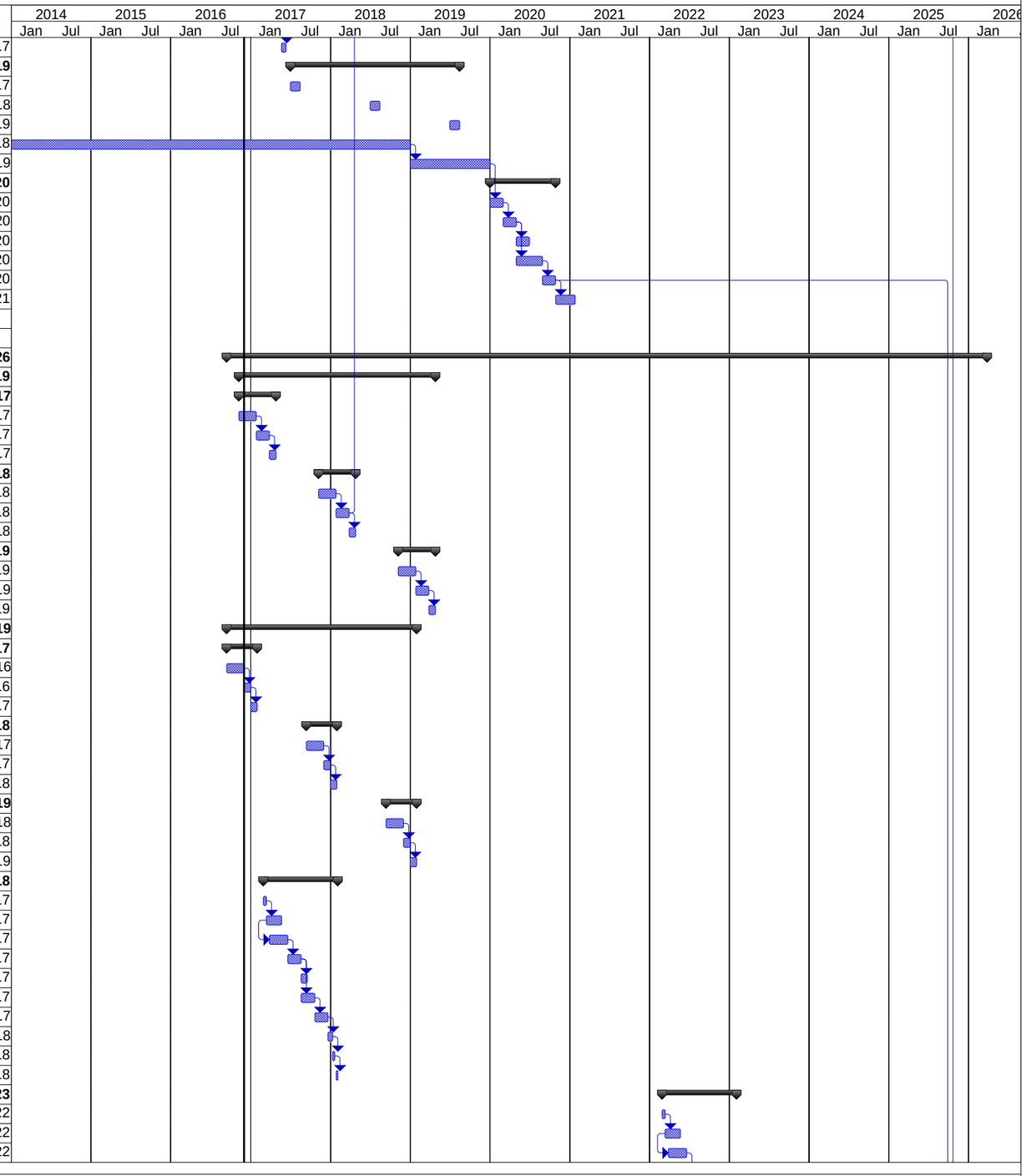
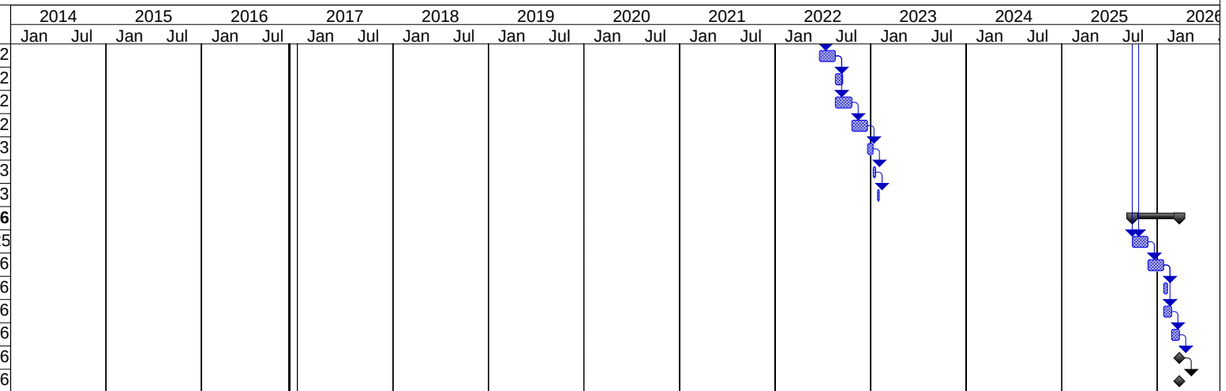


Figure 27
Master Schedule

ID	Status	Task Name	Duration	Start	Finish
235		Agency Review & Submit Comments on Rev. 0 5th 5-Year Review	61 d	Sun 6/19/22	Thu 8/18/22
236		Respond to Agency Comments on Rev. 0 5th 5-Year Review	28 d	Fri 8/19/22	Thu 9/15/22
237		Prepare & Submit Rev. 1 5th 5-Year Review	63 d	Fri 8/19/22	Thu 10/20/22
238		Agency Review of Rev. 1 5th 5-Year Review	60 d	Fri 10/21/22	Mon 12/19/22
239		Prepare & Submit Final 5th 5-Year Review	21 d	Tue 12/20/22	Mon 1/9/23
240		Final 5th 5-Year Review Signed	10 d	Tue 1/10/23	Thu 1/19/23
241		Notification of 5th 5-Year Review Completion	7 d	Fri 1/27/23	Thu 2/2/23
242	P	**Final Closeout Report (FCOR)**	**180 d**	**Sat 9/27/25**	**Wed 3/25/26**
243		Prepare & Submit Rev. 0 FCOR	60 d	Sat 9/27/25	Tue 11/25/25
244		Agency Review & Submit Comments on Rev. 0 FCOR	60 d	Wed 11/26/25	Sat 1/24/26
245		Respond to Agency Comments on Rev. 0 FCOR	15 d	Sun 1/25/26	Sun 2/8/26
246		Prepare & Submit Rev. 1 FCOR	30 d	Sun 1/25/26	Mon 2/23/26
247		Agency Review of Rev. 1 FCOR w/ Concurrence	30 d	Tue 2/24/26	Wed 3/25/26
248		Final FCOR	0 d	Wed 3/25/26	Wed 3/25/26
249		**Site Completion**	0 d	Wed 3/25/26	Wed 3/25/26



APPENDIX A

TDEC AND USEPA APPROVAL LETTERS

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
MEMPHIS ENVIRONMENTAL FIELD OFFICE
8383 WOLF LAKE DRIVE
BARTLETT, TN 38133-4119
PHONE (901) 371-3000 STATEWIDE 1-888-891-8332 FAX (901) 371-3170

January 10, 2017

James C. Foster
BRAC Program Manager
Headquarters Department of the Army,
Assistant Chief of Staff for
Installation Management (DAIM-ODB)
Army Pentagon,
2530 Crystal Drive,
Arlington, VA 22202-3934

Subject: **2017 Site Management Plan**
Defense Depot Memphis, Tennessee
TDoR ID # 79-736

Dear Mr. Foster,

TDEC-DoR has reviewed the contents of the **2017 Site Management Plan**, as submitted by T. Holmes (HDRInc), and approves of the document's contents. If there are questions or concerns, please contact me at (901) 371-3041 or at jamie.woods@tn.gov .

Regards,

Jamie A. Woods, P.G.
Project Manager
Division of Remediation
Memphis Environmental Field Office

cc: Thomas C. Holmes (HDRINC)
Diedre Lloyd (EPA-PM)
Joan Hutton (CALIBRE)
TDoR NCO: file 79-736
TDoR MEFO: file 79-736

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

January 22, 2017

Mr. James Foster
Base Realignment and Closure Division (ACSIM-ODB)
2530 Crystal Drive (Taylor Building), Room 5000
Arlington, VA 22202-3940

Dear Mr. Foster:

The U.S. Environmental Protection Agency (EPA) has received and reviewed the Department of Army, Defense Depot of Memphis 2017 Site Management Plan.

EPA approves the above mentioned report. Should you have any questions or concerns, please feel free to call me at on my cell number 404-229-9500.

Sincerely,

Diedre Lloyd
Remedial Project Manager
Restoration & Sustainability Branch
Superfund Division

cc: Mr. James Foster, (Signed Original)
Mr. Jamie A. Woods, PG, Tennessee, Department of Environment and Conservation, Memphis Environmental Field Office, 8383 Wolf Lake Drive, Bartlett, TN 38133-4119
Ms. Joan Hutton, CALIBRE, 3898 Mountain View Road, Kennesaw, GA 30152
Mr. Thomas Holmes, HDR Environmental, P.O. Box 728, Highlands, NC 28741