FINAL

FORSCOM

CORRECTIVE ACTION PLAN PART B ADDENDUM #1 AND FIRST ANNUAL PILOT STUDY PROGRESS REPORT

3d Inf Div (Mech)

Former Building 728
Facility ID #9-025049
Hunter Army Airfield, Georgia

Prepared for

U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT

Contract No. DACA21-95-D-0022
Delivery Order 0041

August 2000

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AND
FIRST ANNUAL PILOT STUDY PROGRESS REPORT
FOR
FORMER BUILDING 728
FACILITY ID #9-025049
HUNTER ARMY AIRFIELD
SAVANNAH, GEORGIA

Prepared for:
U.S. Army Corps of Engineers
Savannah District
Under Contract Number DACA21-95-D-022
Delivery Order 0041

Prepared by:
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P.O. Box 2502
Oak Ridge, Tennessee 37831

August 2000

TABLE OF CONTENTS

List of Appendices

LIST OF ACRONYMS

ACL	alternate concentration limit
AMSL	above mean sea level
AST	aboveground storage tank
ATL	alternate threshold level
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
BTOC	below top of casing
CAP	Corrective Action Plan
COPC	chemical of potential concern
DAF	dilution attenuation factor
DO	dissolved oxygen
DPW	Directorate of Public Works
DRO	diesel range organics
EPA	U.S. Environmental Protection Agency
GA EPD	Georgia Environmental Protection Division
GRO	gasoline range organics
GUST	Georgia Underground Storage Tank
HAAF	Hunter Army Airfield
IWQS	In-stream Water Quality Standards
MCL	Maximum Contaminant Level
MW	monitoring well
NRC	no regulatory criteria
ORP	oxygen reduction potential
PAH	polyaromatic hydrocarbon
PVC	polyvinyl chloride
STL	soil threshold level
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TOC	total organic carbon
TPH	total petroleum hydrocarbon
USGS	U.S. Geological Survey
UST	underground storage tank
USTMP	Underground Storage Tank Management Program
VOC	volatile organic compound

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I. CORRECTIVE ACTION PLAN CERTIFICATION – PART B

A revised certification form for the Corrective Action Plan (CAP)-Part B follows this page.

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Georgia Department of Natural Resources
Environmental Protection Division
Land Protection Branch
Underground Storage Tank Management Program
4244 International Parkway, Suite 104
Atlanta, Georgia 30354
Phone (404) 362-2687
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CORRECTIVE ACTION PLAN
PART B

Facility Name: Former Building 728 and Northern Fuel Battern

Street Address: Douglas Street and Duncan Drive

City: Hunter Army Airfield **County:** Chatham

Facility ID #: 9-025049

Submitted by UST Owner/Operator:

Name: Thomas C. Fry/Environmental Branch
Company: US Army/HQ 3d Inf. Div (Mech)
Address: Directorate of Public Works, Bldg 1137
1550 Frank Cochran Drive
City: Fort Stewart State: GA
Zip Code: 31314-4927

Prepared by:

Name: Patricia Stoll
Company: Science Applications International Corp.
Address: P.O. Box 2502
City: Oak Ridge State: TN
Zip Code: 37831

I. PLAN CERTIFICATION

A. UST Owner/Operator

I hereby certify that the information contained in this plan and in all the attachments is true, accurate, and complete, and the plan satisfies all criteria and requirements of Rule 391-3-15-.09 of the Georgia Rules for Underground Storage Tank Management.

Name: Thomas C. Fry
Signature: Thomas C. Fry Date: 08/29/00

B. Professional Engineer or Professional Geologist

Name: Patricia Stoll
Signature: Patricia A. Stoll
Date: 8/22/00

GEORGIA REGISTERED 22851 PROFESSIONAL ENGINEER P. A. STOLL

Patricia A. Stoll 8/22/00
Georgia Stamp or Seal

Check all boxes below that apply. Attach supporting documentation, i.e., narrative, figures, tables, maps, boring/well logs, etc., for all items checked. Supporting documentation should be three-hole punched and prepared in conformity with the guidance document "Underground Storage Tank (UST) Release: Corrective Action Plan – Part B (CAP-B) Content", GUST-7B.

II. SITE INVESTIGATION REPORT

A. Horizontal and Vertical Extent of Contamination:

- ☒ Soil [CAP-Part B (1997)]
- ☒ Groundwater [CAP-Part B (1997)]
- ☒ Free Product [CAP-Part B (1997)]
- ☒ Surface Water [CAP-Part B (1997)]

B. Local and Site Hydrogeology

- ☒ Documentation of Local Groundwater Conditions [CAP-Part B (1997)]
- ☒ Stratigraphic Boring Logs [CAP-Part B (1997)]
- ☒ Stratigraphic Cross Sections [CAP-Part B (1997)]
- ☒ Referenced or Documented Calculations of Relevant Aquifer Parameters [CAP-Part B (1997)]
- ☒ Direction of Groundwater Flow [CAP-Part B (1997)]
  - ☒ Table of Monitoring Well Data [CAP-Part B (1997)]
  - ☒ Potentiometric Map [CAP-Part B (1997)]
  - ☒ Flow Net Superimposed on a Base Map [CAP-Part B (1997)]

III. REMEDIAL ACTION PLAN:

A. Corrective Action Completed or In-Progress:

- ☒ Recovery/Removal of Free-Product (Non-aqueous Phase Hydrocarbons)
- ☒ Remediation/Treatment of Contaminated Backfill Material & Native Soils
- ☒ Other (specify) Remediation of Contaminated Groundwater

B. Objective of Corrective Action:

- ☒ Remove Free Product That Exceeds One-Eighth Inch
- ☐ Remediate Groundwater Contamination That Exceeds:
  - ☐ Maximum Contaminant Levels (MCLs)

    OR
  - ☐ In-stream Water Quality Standards

B. Objective of Corrective Action (continued):

☐ Remediate Soil Contamination That Exceeds:

☐ Threshold Values Listed in Table A

OR

☐ Threshold Values Listed in Table B

OR

☐ Alternate Threshold Levels (ATLs)

☒ Provide Risk Based Corrective Action (Reference CAP B App. VI) (Section III.B.4)

☒ Remediate Soil and/or Groundwater Contamination That Exceeds Alternate Concentration Limits (ACLs) and Monitor Residual Contaminants

OR

☐ Monitor Soil and/or Groundwater Contamination That Exceeds Levels in Rule -.09 (3) But Is Less Than ACLs

OR

☐ No Further Action Required - Soil and/or Groundwater Contamination is Below Levels in Rule -.09 (3)

C. Design Operation of Corrective Action Systems

☒ Soil ☒ Groundwater ☒ Free Product ☐ Surface Water ☐ Not Applicable

D. Implementation (Section III.D)

Includes, as a minimum, the following:

- Milestone schedule for site remediation
- Inspection and preventive maintenance schedule for all specialized remediation equipment
- Monitoring/sampling and reporting plan for measuring interim progress and project completion
- Plan to decommission equipment/wells and close site

IV. PUBLIC NOTICE

☐ Certified Letters to Adjacent, and Potentially Affected Property Owners and Local Officials

☒ Legal Notice in Newspaper, as approved by EPD [CAP-Part B Report (1997)]

☐ Other EPD-approved Method (specify)_____

V. **CLAIM FOR REIMBURSEMENT:** (For GUST Trust Fund sites only)

- ☐ GUST Trust Fund Application (GUST-36), must be attached if applicable
- ☐ Cost Proposal
  - ☐ Non-Reimbursable Costs

    OR
  - ☐ Reimbursable Costs
    - ☐ Total Project Costs
      - ☐ Costs incurred to date, per GUST-92
      - ☐ Estimated costs to complete corrective action, per GUST-92
    - ☐ Invoices and Proofs-of-Payment for Costs Incurred to Date
- ☐ Proposed Schedule For Reimbursement
  - ☐ Lump Sum Payment Upon Completion Of Corrective Action

    OR
  - ☐ Interim Payments With Final Payment Upon Completion
- ☒ Not Applicable

II. SITE INVESTIGATION REPORT

The results of the CAP-Part B investigation at Former Building 728 conducted in 1997 are presented in the CAP-Part B Report (Metcalf & Eddy 1997).

The Former Building 728 site is located at the southeast corner of Douglas Street and Duncan Drive within the confines of Hunter Army Airfield (HAAF), as illustrated in Figure 1. The Former Building 728 site is located within an average or higher groundwater pollution susceptibility area and is less than 500 feet from a withdrawal point and is less than 500 feet from a surface water body. As defined in Georgia Underground Storage Tank (GUST) Management Rule 391-5-15.09, the appropriate soil threshold levels (STLs) are those presented in Table A, Column 1 of GUST Rules 291-5-15 because a withdrawal point is located less than 500 feet from the site and Table B, Column 1 of GUST Rules 391-5-15 because a surface water body is located less than 500 feet from the site. Thus, the CAP-Part B Report (Metcalf & Eddy 1997) utilized the most conservative value for each compound as the applicable STL. The closest surface water body is a man-made open-channel drainage ditch that is fed by an underground storm drain, thus Georgia In-Stream Water Quality Standards (IWQS) were utilized as screening criteria for groundwater.

The horizontal extent of the soil and groundwater contamination was determined during the CAP-Part B investigation as shown in Figure 2. As part of the CAP-Part B Report, a corrective action was proposed to address the free product, soil contamination, and groundwater contamination. The corrective action consisted of a combination of free product removal, air sparging, and soil vapor extraction. The CAP-Part B Report was approved by the Georgia Environmental Protection Division (GA EPD) in correspondence dated September 4, 1998 (Coughlan 1998). Pending the availability of funding for the corrective action, quarterly monitoring was initiated at the site in May 1998.

During a site visit by GA EPD on September 15, 1998, Fort Stewart proposed to implement a pilot study consisting of oxygen injection across the entire groundwater plume to enhance the microbial biodegradation. During the oxygen injection, free product removal would continue in the product recovery wells. In correspondence dated October 7, 1998 (Perez 1998), Fort Stewart indicated that an addendum to the CAP-Part B Report would be prepared documenting the revised corrective action and the results of the pilot study.

This addendum is being submitted to GA EPD Underground Storage Tank Management Program (USTMP) to document the changes to the corrective action proposed in the CAP-Part B Report and summarize the results of an ongoing remediation pilot study associated with the corrective action at the Former Building 728 site.

III. REMEDIAL ACTION PLAN

III.A. CORRECTIVE ACTION COMPLETED OR IN PROGRESS

III.A.1. Recovery/Removal of Free Product

During the CAP-Part B investigation, free product recovery was initiated in March 1996 from monitoring well MW8 at the former Building 728 site. An automated belt skimmer device continued to be used to recover free product in MW8 until the start of the pilot study in May 1999. The device removed product from the well by continuously rotating a belt of hydrocarbon absorbent material through the product layer in the well and extracting the absorbed product from the belt at the surface. The recovered fuel flowed by

gravity to a temporary above ground storage vessel. In May 1997, absorbent socks were also utilized for the product recovery from MW59 and MW62, and the socks were changed monthly until implementation of the active remediation pilot study in May 1999. As of May 1999, approximately 240 gallons of free product had been removed at the site. The use of the belt skimmer and absorbent socks was discontinued in May 1999 in lieu of the product recovery system implemented as part of the pilot study.

During the pilot study, six product recovery wells were installed at the site and Ferret™ product recovery systems were installed in each of the recovery wells. Specifics regarding the installation of these systems are discussed in Section V.

III.A.2. Remediation/Treatment of Contaminated Backfill Material and Native Soils

The CAP-Part A Report (Metcalf & Eddy 1996) reported that a total of 2,623.91 tons of contaminated soil was removed, transported, and incinerated as part of the June 1994 tank removal exercise at the former Northern Fuel Battery site and the former Building 728 site. No other soil remedial activities have been performed since that time.

III.B. OBJECTIVES OF CORRECTIVE ACTION

The objectives of the corrective action at this site are to remediate petroleum hydrocarbons that exist in the subsurface at concentrations that pose a threat to human health and the environment. The focus of the remedial evaluation/pilot study was to remediate soil that contains hydrocarbons at concentrations that exceed the GUST STLs, to protect surface water from being adversely impacted by groundwater, and to meet the Georgia IWQS for groundwater.

III.B.1. Removal of Free Product That Exceeds One-Eight Inch

During the CAP-Part A and CAP-Part B investigations, free product was present in wells MW08, MW59, and MW62 at the Former Building 728 site. The CAP-Part B Report concluded that the free product in excess of 1/8-inch was confined to the northwest corner of the Northern Fuel Battery in the vicinity of MW8 and covered an area of 70 feet × 90 feet as shown in Figure 2. Therefore, active removal of the free product was recommended.

III.B.2. Remediate Groundwater Contamination

The CAP-Part B investigation indicated groundwater contamination exceeding the IWQS for benzene in wells MW11, MW60, MW61, MW63, and MW64, which are all located in the northwest corner of the former Northern Fuel Battery as shown in Figure 2. Wells MW8, MW59, and MW62 are also located in the vicinity of these five wells, but were not sampled because of the presence of free product. An underground storm drain is located 65 feet north of MW8 and empties into a man-made, open-channel drainage ditch approximately 290 feet northwest of MW8. A surface water sample was collected during the CAP-Part B investigation from the open drainage ditch at a location approximately 330 feet northwest (i.e., downgradient) of MW8. Although benzene, toluene, ethylbenzene, and xylene (BTEX) constituents were present, they were not above their respective maximum contaminant levels (MCLs) or IWQS.

During the CAP-Part B investigation in 1997, the area of benzene contamination in excess of the IWQS was approximately 120 feet × 260 feet. Benzene was not detected in the wells on the north side of the underground storm drain, thus the underground storm drain appears to be acting as a preferential pathway for contaminant migration. Therefore, active remediation of groundwater was recommended.

III.B.3. Remediate Soil Contamination

The CAP-Part B investigation identified soil contamination above applicable GUST STLs [Table A, Column 1 for BTEX and Table B, Column 2 for polyaromatic hydrocarbons (PAHs)]. The contaminants that exceeded threshold levels included benzene, ethylbenzene, toluene, xylenes, and several PAHs. The three areas where the soil concentrations exceeded STLs are shown in Figure 2. The areas were in the vicinity of MW8, SB150, and MW56. The area of contamination around MW8 is the largest of the areas and is associated with the free product and highest groundwater concentrations. Therefore, active remediation of soil was recommended.

III.B.4. Provide Risk-based Corrective Action

A risk-based approach for the corrective action was not developed as part of the CAP-Part B Report dated December 1997. As a result, fate and transport modeling was conducted as part of this addendum to develop alternate threshold levels (ATLs) for soil constituents that exceeded STLs and alternate concentration limits (ACLs) for groundwater constituents that exceeded IWQS.

III.B.4.a. Potential receptor survey

A potential receptor survey was performed as part of the baseline pilot study field activities. The survey indicated that the only likely potential point of human exposure was a man-made open-channel drainage ditch located approximately 290 feet northwest of MW8. An underground storm drain that is located 65 feet north of MW8 feeds the man-made, open-channel drainage ditch. The invert of the underground storm drain is at or below the water table, thus the storm drain is considered a preferential pathway. The man-made surface water drainage feature eventually empties into Lamar Canal which flows southwest toward Springfield Canal and eventually joins the Little Ogeechee River more than 3 miles downstream of the site. Interviews with HAAF personnel indicated that the open drainage ditch is not used for any recreational purposes.

A visual survey of the site and adjacent areas indicate that no buildings exist within the documented contamination plume thereby making the potential for human exposure to hydrocarbon vapors unlikely. The Former Building 728 area has been completely razed except for the former concrete piping vaults, railroad tracks, and rail bed.

III.B.4.b. Screening for chemicals of potential concern

During the CAP-Part B investigation, BTEX constituents were detected in soil at concentrations above their respective STLs (i.e., Table A, Column 1). Several PAH compounds were also detected in soil at concentrations above their respective STLs (i.e., Table B, Column 2). However, the PAH concentrations were not considered significant when compared to risk-based screening levels developed by the GA EPD Hazardous Sites Response Act and the U.S. Environmental Protection Agency (EPA). The PAH concentrations were an order of magnitude below risk reduction standards developed by GA EPD for residential scenarios (Metcalf & Eddy 1997). As a result, only BTEX constituents were selected as chemicals of potential concern (COPCs) for soil at the Former Building 728 site.

During the CAP-Part B investigation, benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected in groundwater at concentrations above their respective IWQS and are considered COPCs in groundwater at the Former Building 728 site.

III.B.4.c. Fate and Transport Model

Fate and transport modeling was conducted utilizing the CAP-Part B data to develop ATLs and ACLs that would be utilized as site-specific remedial levels for the corrective action.

Site-specific dilution attenuation factors (DAFs) between the source and the receptor locations were developed. The DAF is a numerical value that represents the attempt to mathematically quantify the natural physical, chemical, and biological processes (e.g., advection-dispersion, sorption-retardation, biodegradation, and volatilization) that result in the decrease of a chemical concentration in an environmental medium. In simple terms, the DAF is the ratio of chemical concentration at the source (or the point of origin) to the concentration at the exposure point. The DAFs reflect the natural attenuation concepts outlined in the American Society for Testing and Materials' Risk-Based Corrective Action protocol (ASTM 1995).
Fate and transport models are used as tools for developing DAFs. The application of fate and transport models at any release site must ensure that the modeling results are protective of human health and the environment. Therefore, the selection process of a predictive model at a release site must consider its performance, characteristics, and applicability to the site being considered. The following characteristics were considered before selecting an appropriate model for the Installation:

- the model provides conservative predictions,
- the model is technically sound,
- the model is a public-domain model or is readily available,
- the model has received adequate peer review,
- the model has been applied to other similar sites, and
- the model is easy to use.

The AT123D meets all of the above criteria and was selected for performing fate and transport analysis for this site. AT123D is a well-known and commonly used analytical groundwater pollutant fate and transport model. This model computes the spatial-temporal concentration distribution of chemicals in the aquifer system and predicts the transient spread of a chemical plume through a groundwater aquifer. The fate and transport processes accounted for in AT123D are advection, dispersion, adsorption/retardation, and decay. This model can be used as a tool for estimating the dissolved concentration of a chemical in one, two, or three dimensions in the groundwater resulting from a mass release (either continuous, instant, or depleting source) over a source area (i.e., point, line, area, or volume source).

Vertical migration of the contaminant plume through the confining unit to the Principal Artesian aquifer is improbable. The confining unit has a vertical hydraulic conductivity on the order of 10^{-8} cm/sec and ranges from 15 to 90 feet in thickness. Assuming a vertical gradient of 1.0 ft/ft and an effective porosity of 0.06 (Mills et al. 1985) for the confining unit, the groundwater travel time is estimated to be 87 years. Therefore, it would take more than 400 years for the benzene contamination to migrate through the confining layer. The surficial aquifer in which the contaminant plume is located is not used as a source of drinking water.

The AT123D model was used to determine the impact of dissolved hydrocarbons on potential receptors. A steady-state AT123D model was developed by calibrating the model against observed maximum concentrations in the groundwater beneath the Former Building 728 site. Modeling of the leaching of soil contamination to the groundwater was not performed because the additional contaminant contribution to the groundwater was negligible compared to the existing groundwater contamination. Potential receptors are an underground storm drain located 65 feet north of MW8 and Lamar Canal located approximately 850 feet northwest of the site. The storm drain is constructed of three 48-inch diameter rigid corrugated pipe and is considered a preferential pathway because the invert elevation of the pipes are at or below the water table. At the northwest corner of the site, the underground storm drain empties into a man-made, open-channel drainage ditch (i.e., the ditch located 290 ft northwest of MW8) that eventually flows into Lamar Canal.

At the Former Building 728 site, there is an area of free product and soil contamination located at the soil/water interface. Therefore, leaching to groundwater by percolating rainwater was not modeled. The source dimension was assumed to be the area of free product observed during the CAP-Part B investigation in 1997, which was approximately 70 feet × 90 feet with the center of the source area located near MW8. The steady-state (i.e., continuous concentration at the source) model was developed by calibrating the model against the maximum observed benzene concentration at the site during the CAP-Part B, which occurred in well MW63 (i.e., 2,400 µg/L) in April 1997. Because the maximum observed benzene concentration occurred in a well located outside of the free product area, the model was calibrated to predict the concentration at the source (i.e., within the free product area). The model predicted that the concentration at the center of the source would have been 3,250 µg/L. Modeling of the lateral migration to the receptor was performed using AT123D. An underground storm drain is located approximately 65 feet north (downgradient) from the center of the source area. This is the nearest potential preferential pathway that might encounter migrating groundwater contamination due to a possible hydraulic connection between the groundwater and the utility line. The fate and transport modeling results are presented in Attachment A.

Currently, the source of benzene is depleting because of the pilot study currently being implemented at the site. However, the 1997 CAP-Part B concentrations were used to develop ATLs and ACLs as remedial levels for the corrective action. The modeling results indicate that in 1997 benzene should have reached the underground storm drain at a concentration of 2880 µg/L, which is above the state IWQS of 71.28 µg/L. Actual 1997 CAP-Part B groundwater results indicated that groundwater contamination in excess of the IWQS reached the storm drain. In 1997, benzene was detected in MW11, MW61, and MW63 at 1,700 µg/L, 910J µg/L,, and 2,400 µg/L, respectively. However, the results of the CAP-Part B investigation revealed that contamination was not present on the north side of the storm drain indicating that the storm drain was acting as a preferential pathway.

Based on modeling results for the Former Building 728 site, the estimated DAFs for benzene are 1.1 at the storm drain and 11 at Lamar Canal. Simulations were also performed to predict the maximum concentrations of benzene over a simulation period of 2 years in the monitoring wells at the Former Building 728 site. The predicted maximum benzene concentrations, assuming natural attenuation, are presented in Attachment A.

III.B.4.d. Site-specific Levels

The 1997 CAP-Part B data were screened against regulatory levels. Detections exceeding the regulatory levels are considered COPCs. ATLs and ACLs were developed for the COPCs, when appropriate, using site-specific information obtained from field investigations, fate and transport modeling, and applicable regulatory levels.

III.B.4.d.1. Alternate Threshold Levels

BTEX were selected as COPCs for soil. ATL calculations for these constituents are presented in Appendix VI and are based on the results of the AT123D modeling. The ATLs for soil in the pilot study area were determined to be:

- 0.012 mg/kg for benzene,
- 58.5 mg/kg for toluene,
- 11.1 mg/kg for ethylbenzene, and
- 20 mg/kg for total xylenes.

Benzene and total xylenes were the only compounds to exceed their respective ATL in the pilot study area.

III.B.4.d.2. Alternate Concentration Limits

Benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were identified as COPCs for groundwater at the site. Benzene was modeled to a potential downgradient location where a receptor might encounter migrating groundwater contamination. The location was a storm drain 65 feet north of the MW8. Fate and transport modeling was used to develop site-specific DAFs between the source and the receptor location. The modeling results estimated a DAF of 1.1 for the storm drain. As discussed in Appendix VI, the DAF for PAH constituents was estimated to be 11. Compound specific regulatory levels or risk-based screening criteria were used in conjunction with the site-specific DAFs identified for the potential migration of contamination from the site to determine the ACL for each compound. The ACL calculations are presented in Appendix VI. The ACLs associated with the drainage ditch were determined to be

- 78 µg/L for benzene (i.e. 1.1 × 71.28 µg/L),
- 0.34 µg/L for benzo(a)anthracene (i.e. 11 × 0.0311 µg/L),
- 0.34 µg/L for benzo(a)pyrene (i.e. 11 × 0.0311 µg/L),
- 0.34 µg/L for benzo(b)fluoranthene (i.e. 11 × 0.0311 µg/L),
- 0.34 µg/L for chrysene (i.e. 11 × 0.0311 µg/L), and
- 0.34 µg/L for indeno(1,2,3-cd)pyrene (i.e. 11 × 0.0311 µg/L).

Benzene was the only compound to exceed its respective ACL in the former Northern Fuel Battery. The benzene concentrations during the CAP-Part B investigation in 1997 exceeded the ACL in wells MW11, MW60, MW61, MW63, and MW64. No groundwater samples were collected from MW8, MW59, and MW62 during the 1997 investigation. Benzo(a)anthracene and chrysene exceeded their respective ACL in one well (i.e., MW56), which is located outside the pilot study area. MW56 is located over 300 feet southeast the underground storm drain. If fate and transport modeling were performed for this location, the DAF would increase due to the distance between MW56 and the storm drain, and as a result, the ACLs for the PAH constituents would increase. Thus, remediation of benzene will be the primary objective of the corrective action in the pilot study area and these two PAH compounds will not be addressed further.

III.B.4.e. Conclusions and Recommendations

The following conclusions and recommendations are based on fate and transport modeling of a continuous source of contamination at the site based on the maximum predicted groundwater concentration at the source of 3250 µg/L.

- Screening results show that BTEX concentrations in soil exceed their respective STLs.
- Benzene and total xylenes concentrations in soil exceeded their ATLs of 0.012 mg/kg and 20 mg/kg, respectively.
- Screening results show that benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene concentrations in groundwater exceed their respective IWQS.
- Benzene concentrations in groundwater exceeded the ACL of 78 µg/L.

Considering the site characteristics, active remediation of the soil and groundwater will provide the best corrective action for this site. The free product present at the site should be removed in conjunction with the soil and groundwater remediation.

III.C. DESIGN AND OPERATION OF CORRECTIVE ACTION SYSTEMS

III.C.1. System Effectiveness/Basis for Selection

Treatment technologies applicable for the remediation of hydrocarbons in soil and groundwater were evaluated in the CAP-Part B Report (Metcalf & Eddy 1997). The treatment systems originally proposed included air sparging wells at the leading edge of the groundwater plume, a soil vapor recovery system in the area of free product and soil contamination, and a total fluids recovery system to remove free product and contaminated groundwater.

During a site visit by GA EPD on September 15, 1998, Fort Stewart proposed to implement a pilot study consisting of oxygen injection across the entire groundwater plume to enhance the microbial biodegradation. During the oxygen injection, free product removal would continue in the product recovery wells. In correspondence dated October 7, 1998 (Perez 1998), Fort Stewart indicated that an addendum to the CAP-Part B Report would be prepared documenting the revised corrective action and the results of the pilot study.

In correspondence dated September 30, 1999 (Perez 1999), Fort Stewart submitted pilot study data collected between May 1999 and August 1999. However, the effectiveness of the system could not be evaluated in that short of a time period and submitted in an addendum to the CAP-Part B Report. After a year of injecting oxygen at the Former Building 728 site, the pilot study indicates that bioremediation of the contaminant plume is taking place. Therefore, the revisions to the proposed corrective action at the Former Building 728 site are discussed in the following sections.

III.C.1.a. Theory and Feasibility

Based on the hydrocarbon concentrations near the former USTs and the proximity of the underground storm drain/man-made drainage ditch, oxygen injection was selected for the pilot study at Former Building 728. The oxygen injection system is based on the premise that fuel-type hydrocarbons are readily biodegraded in most environments and that the rate of biodegradation is generally limited by the amount of oxygen and nutrients available. Increasing the amount of oxygen and nutrients (if the site requires additional nutrients) in the subsurface will increase the biological activity. Biodegradation of BTEX has been documented for similar sites (e.g., shallow water table and permeable silty sand). In fact, the site conditions at the former Building 728 site are similar to other sites that are ideal for biodegradation (Abou-Rizk et al. 1995). Site groundwater flow and the geology are all conducive to aerobic biodegradation, which is known to produce the most rapid biodegradation rates for hydrocarbons. The primary source (i.e., the USTs) has been removed; therefore, subsurface conditions (dissolved oxygen, oxidation-reduction potential, background nutrient availability) will be improved with the addition of oxygen.

A secondary source (i.e., area of free product) remains in the vicinity of MW8. To increase the free product recovery, additional product recovery wells were installed and equipped with Ferret™ product recovery systems.

The Georgia IWQS for benzene of 71.28 µg/L and the benzene ACL of 78 µg/L were exceeded at five monitoring wells during the 1997 CAP-Part B investigation. The benzene concentrations ranged from 4.2 µg/L to 2400 µg/L. Prior to the pilot study, additional wells were installed in the area to delineate the area of free product and the dissolved groundwater plume. During the pre-pilot study baseline sampling event, the benzene concentrations ranged from 2.1J µg/L to 2600 µg/L and exceeded the benzene IWQS and ACL in 13 of the 15 wells sampled. No other compounds exceeded their respective IWQS in the vicinity of the former Northern Fuel Battery during any of the past sampling rounds.

III.C.1.b. Groundwater Treatment System

The groundwater treatment system consists of a pilot study where 98 percent pure oxygen is being injected into the groundwater via multiple injection points at low flow rates. The injection points are located so that the pilot study treats the dissolved groundwater plume that exceeds the benzene IWQS. The injection of pure oxygen into groundwater using oxygen generators is a patented remediation process developed by Matrix Environmental, Inc. Oxygen injection rapidly enhances the biodegradation of petroleum hydrocarbons, which are biodegradable under aerobic conditions. The purpose of the oxygen injection system is to increase groundwater dissolved oxygen levels from background to the solubility limit of approximately 40 mg/L.

III.C.1.b.1. Oxygen Injection System

The oxygen injection system involves the injection of 98 percent pure oxygen into groundwater via multiple injection points at low flow rates. The remediation system consists of an AirSep AS80 pressure-swing adsorption oxygen generator that produces oxygen at a rate of 80 standard cubic feet per hour (scfh). The oxygen is stored in a 120-gallon receiver tank and pulse-sparged simultaneously to 12 injection points at approximately 30 scfh per point. The oxygen injection is being performed in accordance with Underground Injection Control Permit #104 for the Former Building 728 site.

The Matrix Environmental Trailer-mounted Oxygen Injection System includes the following components:

- 6-foot by 10-foot cargo trailer;
- AirSep Model AS-80 oxygen generator with a 120-gallon surge tank and regulator;
- Atlas Copco GA-5 rotary screw air compressor with air dryer, vertical tank with auto drain, and low sound enclosure, rated for 25 ACFM @ 125 PSIG & 7.5 HP TEFC motor, three-phase/60 Hz/230 volts;
- static-phase converter to allow system to be used with single-phase/230 volt power;
- manifold for 12 injection points to include individual pressure gauge (PSI) and variable area flow meter (scfh);
- adjustable timers (per set of six points) and solenoid valve to control oxygen flow for pulse injection;
- main electrical panel with breakers for easy connection to power supply; and
- fully integrated remediation system with all plumbing, electrical, and mechanical components installed.

A total of 24 injection points were installed across 6 rows spaced 40 feet apart as shown in Figure 5. These points were installed on 20-foot centers along each row and completed with above-grade surface covers. The injection points are constructed of ¾-inch inside diameter polyvinyl chloride (PVC) and were installed to a depth of approximately 10 feet below the water table (i.e., 15 feet BGS) with a 1-foot section of 10-slot screen at the bottom. Header piping from each injection point to the location of the trailer was installed above grade and was constructed of ¾-inch polyethylene tubing. The area surrounding the injection points and Matrix trailer was fenced off to prevent unauthorized access.

The system was configured with two sets of six flow meters that are timer-controlled. Therefore, 12 of the 24 injection points are active at any given time. Initially, the two rows of injection points in the source area were placed into operation. The flow rate of oxygen to each injection point and the pulse interval was

determined in the field based on groundwater dissolved oxygen data. The initial settings were 30 scfh per point at a cycle interval of 10 minutes on and 50 minutes off. The 12 downgradient injection points were activated once hydrocarbon limited conditions are observed in the source area. The time to achieve this condition in the downgradient area will be shorter due to the lower levels of hydrocarbons in groundwater. Aerobic biodegradation continued in the source area when the points were switched due to the high levels of dissolved oxygen and the continued dissolution of oxygen from microbubbles trapped in the saturated zone. As the pilot study progressed, the injection points in operation were modified based on the results of groundwater analytical data.

As a result of the oxygen injection pilot study conducted at the Former Building 728 site, the oxygen injection system is now considered the remedial system for the site, in conjunction with the free product recovery measures.

III.D. IMPLEMENTATION

III.D.1. Milestone Schedule

A remedial system implementation schedule for the oxygen injection system was submitted to GA EPD on September 30, 1999. A revised Gantt chart showing milestone activities and anticipated duration is provided in Figure 3. The actual time required to achieve the site remedial levels (i.e., ACLs) may be greater, or less, than presented in Figure 3. Therefore, Fort Stewart will notify GA EPD USTMP of any significant changes to the proposed treatment time and will provide GA EPD USTMP an updated Gantt chart, as necessary. Currently, the project has been funded through January 2001.

III.D.2. Progress Reporting

Annual progress reports will be submitted to GA EPD that will summarize all the monitoring events for that period. This addendum to the CAP-Part B report also serves as the first annual progress report.

III.D.3. Certificate of Completion Report

Petition for permanent closure will be submitted with the final progress report. GA EPD will provide final approval for decommissioning the monitoring wells, which will be requested in the final progress report. Decommissioning of monitoring wells will be completed according to the U.S. Army Corps of Engineers design manual for monitoring wells. Decommissioning will comply with all applicable state and federal standards.

The following certification will be submitted to EPD within 30 days of submitting the final progress report:

> I hereby certify that the Corrective Action Plan-Part B, dated _____, 20___, for Hunter Army Airfield, Former Building 728 site, Facility ID 9-025049, including any and all certified amendments/addenda thereto, has been implemented in accordance with the schedules, specifications, sampling programs, and conditions contained therein, and that the plan's stated objectives have been met.
>
> _____
> Signature (Owner/Operator)

III.D.4. Inspection Schedule and Preventative Maintenance Program

Preventative maintenance for the oxygen injection system was performed in accordance with the manufacturer's recommendations. Initial startup tests and system calibrations were conducted upon installation of the system. Site visits were conducted biweekly for the first month of operation and reduced to monthly thereafter. Selected personnel from Fort Stewart and the U.S. Army Corps of Engineers-Savannah District were trained on operation of the system and adjustment procedures so that more frequent visits were conducted when required.

The system was operated in accordance with manufacture's specifications. System adjustments/servicing include the following:

- adjusting the oxygen flow rate to maximize dissolved oxygen concentrations in groundwater,
- checking system voltages for proper operation, and
- inspecting all piping for evidence of any leaks.

All future maintenance and repairs, if necessary, will be conducted in accordance with the manufacturer's recommendations.

Also, during each sampling event, wells were visually inspected for changes or damage. Any notable observations were recorded and provided in the subsequent progress report.

III.D.5. Periodic Monitoring

Groundwater samples from MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21 were collected monthly for the first six months and bimonthly thereafter. Benzene is the primary target compound for remediation at this site; thus, the groundwater samples were analyzed for BTEX only. Monitoring will continue at the site until two consecutive bimonthly sampling events at the site indicate that benzene concentrations at all site wells are below the ACL of 78 µg/L. As the pilot study progresses, the wells in the monitoring program may be modified to provide adequate coverage of the remaining groundwater plume.

During each sampling event, product and water levels will be measured in all monitoring points installed or monitored as part of the corrective action. Specific conductivity, pH, temperature, dissolved oxygen (DO), and oxygen reduction potential (ORP) analysis will be completed on each sample from the monitoring locations where analytical samples are collected. The samples will be shipped to an approved laboratory for BTEX analysis only using EPA Method 8021B/8260B.

III.D.6. Effectiveness of Corrective Action

The remediation system will no longer be needed once the objectives of the corrective action have been achieved, that is to reduce the benzene concentrations in groundwater to below the ACL of 78 µg/L and to reduce the free product thickness to less than an eighth of an inch.

III.D.7. Confirmatory Soil Sampling Plan

Following completion of remediation of the groundwater plume, 15 soil borings will be installed adjacent to the pre-pilot product delineation boreholes. Soil with the highest headspace in each boring will be collected from these post-test borings and sent to the laboratory for BTEX and total petroleum hydrocarbon (TPH) analyses, and selected samples will also be sent for total organic carbon (TOC) analysis.

III.D.8. Stockpiled Bulk Soil Sampling

No stockpiled soil will be generated with this corrective action; therefore, no soil sampling will be conducted.

III.D.9. Termination Conditions

Concentrations of benzene in soil and groundwater must be at or below the ATL and ACL, respectively, prior to terminating the operation of the remedial system. However, if successive monthly rounds of data indicate that groundwater concentrations are approaching an asymptotic limit, an alternate remedial goal may be proposed to GA EPD. Once the ACL or alternate remediation goal is achieved, the corrective action will be terminated regardless of the site ranking score.

III.D.10. Post-Completion Site Restoration Activities

After termination has been granted, equipment and debris related to the remediation activities and/or monitoring program will be removed from the site.

III.E. PUBLIC NOTIFICATION

Former Building 728 is located entirely within the confines of HAAF, a federal facility. The U.S. Government owns all of the property contiguous to the site. The Fort Stewart Directorate of Public Works has complied with the public notice requirements defined by GA EPD guidance by publishing an announcement in conjunction with the submittal of the CAP-Part B Report in 1997.

IV. CLAIM FOR REIMBURSEMENT

Fort Stewart is a federally owned facility and has funded the investigation and remediation for the Former Building 728 site, Facility ID #9-025049 using Department of Defense Environmental Restoration Funds. Application for GUST Trust Fund reimbursement is not being pursued at this time.

V. FIRST ANNUAL PILOT STUDY PROGRESS REPORT

V.A. PRE-PILOT STUDY ACTIVITIES

V.A.1. Observation Point Installation

On May 7 – 8, 1999, five observation points (P1 through P5) were installed as shown in Figure 4. The observation points were soil borings completed as ¾-inch PVC piezometers with 10 feet of 10-slot screen and temporary surface completions (i.e., 6-inch PVC pipe with slip caps). Boring logs are provided in Appendix IV. Well construction details are presented in Table 1 and Appendix VII. One soil and one groundwater sample were collected from each observation point based on field volatile organic compound (VOC) headspace measurements. The soil samples were analyzed for BTEX and TPH and the groundwater samples were analyzed for BTEX, TPH, nitrate, sulfate, sulfide, ferrous iron (total and dissolved), methane, and CO_2 analyses. Alkalinity, ferric iron, and pH of the groundwater were measured in the field.

V.A.2. Injection Point Installation

On May 4 – 8, 1999, 24 injection points (J1 through J24) were installed along 6 rows spaced 40 feet apart, upgradient and downgradient of the source of contamination (Figure 5). These points were placed on 20-foot centers in each row and completed as ¾-inch PVC piezometers with 1 foot of 10-slot screen set at 14 feet BGS and temporary surface completions (i.e., 8-inch PVC pipe with slip caps). Boring logs are provided in Appendix IV. Well construction details are presented in Table 1 and Appendix VII. No soil or groundwater analytical samples were collected from the injection points. Header piping from each injection point to the remediation trailer was installed above the ground surface.

V.A.3. Product Delineation Points

To determine the extent of free product in the vicinity of MW8, 24 product delineation points (D1 through D24) were installed (Figure 6) at the site on May 6 – 9, 1999. These product delineation points were soil borings completed as ¾-inch PVC piezometers with 10 feet of 10-slot screen and temporary surface completions (i.e., 6-inch PVC pipe with slip caps). The piezometers were installed to bracket the water table to determine the presence of free product, the water table elevation, gradient, and flow direction over time. Boring logs are provided in Appendix IV. Well construction details are presented in Table 1 and Appendix VII. One soil sample was collected from each boring for pre-pilot study screening. Ten of these soil samples were analyzed for BTEX and TPH. The 10 samples selected for analysis were based on VOC headspace readings, field conditions, and amount of free product in the piezometer.

V.A.4. Vadose Zone Pilot Tests

On May 17 and 18, 1999, a soil vapor extraction (SVE) test, short-term air injection test, and an in situ microbial respiration test were conducted in the vicinity of MW56 located approximately 25 feet south of the former Building 728 location. The purpose of these tests was to provide remediation design parameters for SVE and air or oxygen injection (i.e., bioventing) technologies.

V.A.4.a. Soil Vapor Extraction Test

On May 6 – 8, 1999, a 2-inch monitoring well (VW-1) and two ¾-inch piezometers (V1 and V2) were installed in the vicinity of MW56, which is located approximately south of former Building 728 (Figure 7). Piezometers V1 and V2 were located 5.0 feet and 19.0 feet, respectively, from well VW-1. The monitoring well and piezometers were screened at approximately 2.0 to 12.0 feet BGS. The depth to groundwater in the area was approximately 5.5 feet BGS. Boring logs are provided in Appendix IV. Well construction details are presented in Table 1 and Appendix VII. One soil sample was collected for each boring and analyzed for VOCs, semivolatile organic compounds (SVOCs), TPH-DRO, and TPH-GRO. One groundwater sample was collected from each well/piezometer and analyzed for VOCs and SVOCs.

On May 17, 1999, prior to conducting the actual SVE step test, incremental rates of vacuum were applied to VW-1 and the depth to groundwater was measured in the well at each corresponding vacuum rate. The results of the pretest data are provided in Attachment B and indicated that subsurface soil had very low permeability or the test wells VW-1 and MW56 were inadequate for testing due to a very limited flow (i.e., less than 0.5 scfm) with no radius of influence. To investigate the reason for the extremely low flow rates from the soil, one new test well (VEW-1) and two monitoring points (P-1 and P-2) were installed as shown in Figure 7. The boreholes were drilled with a hand auger to approximately 6.0 feet BGS, which is approximately 0.5 feet below the water table. Each of the wells were constructed with ¾-inch PVC and screened from 2.0 to 6.0 feet BGS. Piezometers P-1 and P-2 were located 3.0 feet and 5.75 feet, respectively, from well VEW-1. Initial testing of VEW-1 indicated that an extraction flow rate of up to

4.4 scfm could be achieved with an applied vacuum of 60 inches of water column and a measurable vacuum was recorded in the nearest piezometer P-1.

A four-hour SVE step test was conducted in well VEW-1. The methodology and results are presented in Attachment B. Four different rates of vacuum (i.e., 18, 35, 52, and 70 inches of water column) were applied to the wellhead, each for a period of one hour. At the beginning and end of each step, the applied vacuum, the extraction flow rate, the VOC concentration in the extracted gas and the treated discharge, and the concentration of oxygen, carbon dioxide, and methane were measured and recorded. In addition, the induced subsurface vacuum at P-1 and P-2 were recorded at 15-minute intervals during each one-hour step. At the conclusion of the first and fourth step, an extracted soil gas sample was collected for laboratory analysis for VOCs and TPH.

For the four different vacuum rates utilized, the extraction flow rates ranged from 2.2 to 4.4 scfm, which are considered to be low. However, there was a linear increase in the extraction flow rate with each incremental increase in the applied vacuum. The oxygen content in the soil gas remained very low throughout the duration of the four-hour step test and concentrations of carbon dioxide and methane remained elevated. These data strongly suggest that oxygen was being consumed during the aerobic biodegradation of the hydrocarbons in the soil at a rate that was grater than the diffusion of oxygen back into the subsurface soil, thus creating oxygen limiting conditions.

V.A.4.b. Short Term Air Injection Test

Based on the field evaluation of the SVE step test results, a short-term air injection test was completed on May 18, 1999. The apparent low permeability of the soil and shallow depth to groundwater may preclude the efficient operation of an air extraction system. The relatively high vacuum values that would be needed to generate air flow from the subsurface and an adequate radius of influence would likely create groundwater upwelling conditions that would interfere with the efficient operation of an extraction system. Therefore, the short-term air injection test was conducted.

Five different rates of pressure were applied to VEW-1, each for approximately 5 minutes. The methodology and results are presented in Attachment B. During each pressure step, the applied pressure, the injection flow rate, and the subsurface pressure values at P-1 and P-2 were recorded. The injection flow rates ranged from 1.6 scfm at an applied pressure of 18 inches of water column to 4.9 scfm at an applied pressure of 80 inches of water column. A radius of influence of approximately 6 to 7 feet could be obtained at applied pressures of 70 and 80 inches of water column and is based on maintaining a subsurface pressure of 0.1 inches of water column.

V.A.4.c. In-Situ Microbial Respiration Tests

At the conclusion of the short-term air injection test, atmospheric air injection into the soil continued for approximately two hours on May 18, 1999. At the conclusion of the two-hour injection event, the concentrations of oxygen, carbon dioxide, and methane were measured at 15-minute or 30-minute intervals with a land fill gas monitor for a period of 6 hours. The methodology and results are presented in Attachment B. Throughout the six-hour test, the concentration of oxygen declined, while the concentrations of carbon dioxide and methane increased. The consumption of oxygen during the test is attributed to the aerobic biodegradation of the hydrocarbons in the soil by the indigenous microorganisms. As the oxygen was consumed during the aerobic beodegradation of hydrocarbons, carbon dioxide was generated. In addition, the production of methane indicated that anerobic biodegradation was occurring in the heterogeneous soil. The aerobic biodegradation rate was estimated to be 36 mg/kg/day, which indicates that microbial activity and TPH biodegradation were enhanced as the subsurface was aerated. However,

with the continuous operation of a bioventing (i.e., air or oxygen injection) system this estimated rate would likely decline due to decreasing substrate availability and possible nutrient limiting conditions.

V.A.4.d. Remediation Design Considerations

The SVE step test and the air injection tests yielded similar flow rates and radii of influence. Microbial respiration tests indicated that aerating the subsurface would increase the biodegradation of hydrocarbon contaminants. The relatively shallow depth to groundwater may interfere with the effective operation of a SVE system. In addition, the equipment requirements for an extraction system in comparison to an air/oxygen system are more intensive. Based on the biodegradable nature of the contaminants and the very low contaminant recovery rates in the vapor phase during the extraction test, an air/oxygen injection system would likely be the most efficient technology to remediate the site.

V.A.5. Baseline Sampling – May 1999

V.A.5.a. Soil Sampling

Baseline soil sampling was conducted in May 1999 during the installation of the observation points and the product delineation points. One soil sample was collected from each of the five observation points and analyzed for BTEX and TPH. One soil sample was collected from each of the 24 product delineation points; however, only 10 samples were analyzed for BTEX and TPH and 8 samples were analyzed for TPH. The samples from the product delineation points that were submitted to the analytical laboratory were from the borings in the vicinity of MW8 and the free product plume identified during the CAP-Part B investigation. The baseline analytical results for soil are presented in Table 2 and Figure 8. Soil samples for geotechnical analysis were collected from selected borings for use in fate and transport modeling. The geotechnical results are provided in Appendix V.

V.A.5.b. Groundwater Sampling

The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21. Baseline groundwater sampling from these locations for BTEX was conducted on May 7–10, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 9. The results of the May 1999 sampling event are summarized below:

- Benzene was detected in 15 of 15 samples at concentrations ranging from 2.1J µg/L to 2600 µg/L. Thirteen of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.
- Toluene was detected in 13 of 15 samples at concentrations ranging from 8.3J µg/L to 4250 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.
- Ethylbenzene was detected in 14 of 15 samples at concentrations ranging from 32.1 µg/L to 784 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.
- Total Xylenes were detected in 14 of 15 samples at concentrations ranging from 197 µg/L to 3360 µg/L. A Georgia IWQS does not exist for xylenes, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 22,700 ft^2 as shown in Figure 9. Of the 15 wells sampled in May 1999, 13 wells exceed the IWQS for benzene. Within the plume, there are seven wells

(i.e., MW60, MW63, P1, P2, P3, D1, and D3) where the benzene concentrations exceed 1000 µg/L. This area of highest benzene contamination is located immediately downgradient of the free product.

V.A.5.c. Water Level and Product Thickness Measurements

Groundwater elevations were measured in the monitoring wells on May 9, 1999, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 10. In May 1999, the groundwater flow direction was toward the northwest and the groundwater average gradient was approximately 0.0105 ft/ft.

Depth to free product and free product thickness are also presented in Table 4. In May 1999, free product exceeding 1/8-inch (i.e., 0.01 ft) was observed in seven product delineation points (i.e., D7, D8, D10, D11, D12, D16, and D17). As shown in Figure 9, the area of free product is located north of MW59 and extends toward MW8 and MW62 and covers an area of approximately 1,850 ft^2.

V.B. PILOT STUDY ACTIVITIES

V.B.1. Initial Free Product Removal

Following the determination of the extent of free product at the site in May 1999, the belt skimmer was removed from MW8 in order to install a Ferret™ product recovery system. However, the well casing was bowed and the system could not be installed. Ferret™ product recovery systems were installed in MW59 and MW62. The systems were connected to aboveground storage tank (AST) with overfill shutoffs and containment. Piping from the recovery system to the AST was aboveground. The Ferret™ systems are passive recovery systems manufactured by QED Environmental Systems, Inc., and consist of a product-only pump, tubing, and an air compressor and are equipped with an automatic shutoff. A float with an inlet located in the product layer actively draws the product into a bladder within the pump. When the bladder is full, the compressed air enters the pump, which compresses the bladder and pushes the product to the surface. When the bladder empties, the air valve is shut off, allowing the bladder to begin the next fill cycle.

To optimize the free product removal, three additional product recovery wells (PR-1, PR-2, and MW-8A) were installed at the site in June 1999 (Figure 11). After the recovery wells were installed, the product recovery system was removed from MW62 and Ferret™ product recovery systems were installed in MW-8A, MW59, and PR-2 in June 1999. Well MW62 did not have a significant amount of free product, so the product recovery system was moved to PR-1. Recovery well PR-1 did not have a significant amount of free product, thus the product recovery system was left in MW59.

Because the majority of the free product appeared to be located in the vicinity of D6 and D10, three additional free product recovery wells (PR-3, PR-4, and PR-5) were installed in the vicinity of these points along the downgradient edge of the free product plume (Figure 11) in October 1999. After the recovery wells were installed, Ferret™ product recovery systems were installed in PR-3, PR-4, and PR-5 in October 1999.

Free product was collected in an AST equipped with an automatic shutoff, overfill alarm, and dual containment. The removed free product will be transported to the Ft. Stewart energy plant for energy production.

V.B.2. Enhanced Product Recovery System

A vacuum extraction and air injection treatment system was constructed at the Former Building 728 site in February 2000. The purpose of the system was to enhance the recovery of the free product floating on the groundwater. The air extraction and air injection wells are configured in a manner that induces a pressure gradient in the subsurface towards the existing recovery wells to enhance the migration of the product towards the recovery wells.

V.B.2.a. Vacuum Extraction System

The vacuum extraction system consists of vacuum extraction equipment and the extraction well field. A 6-HP regenerative blower unit is used to apply a vacuum to the wellheads of the six recovery wells (MW8A, MW59, PR-2, PR-3, PR-4, and PR-5) that contained the Ferret™ product recovery systems and also PR-1 which does not have a product recovery system installed. The blower unit was equipped with a moisture separator tank and automatic discharge pumps to remove condensate water. The water was discharged from the steel condensate tank to a 300-gallon polyethylene tank on site that was used for storage of the water. The discharge of the blower unit was equipped with a 300-pound granular activated carbon unit to treat the off-gas prior to discharge to the atmosphere. The blower unit was equipped with an inline flow meter and a vacuum gauge on the intake.

Two-inch diameter Schedule 40 PVC pipe is used to connect the blower intake to the six existing product recovery wells. Each well head is equipped with a flow adjust valve and a vacuum gauge.

V.B.2.b. Air Injection System

The air injection system consists of an air compressor manifolded to 12 air injection wells. The air compressor is a 5-HP rotary vane compressor capable of generating up to 50 standard cubic feet of compressed air per minute at an injection pressure of 15 pounds per square inch. The discharge of the compressor is equipped with a pressure gauge, a flow adjust valve, and a pressure bleed valve. The discharge is further separated into two manifold lines. Each manifold line is constructed of 1-inch diameter aluminum conduit piping. The injection wells are identified as A-1 through A-6 and B-1 through B-6 (Figure 11). Wells A-1 through A-6 are connected to one manifold line while B-1 through B-6 are connected to the second manifold line. The six wells on the A manifold are generally located through the central axis of the delineated free product area. The wells on the B manifold are generally located on the hydraulically upgradient side of the delineated free product area.

The twelve injection well boreholes were completed each to a depth of 8.5 feet below grade using a 3-inch diameter manually operated bucket auger. Within each borehole a 1-inch diameter injection well with a 2-foot section of screen at the base of the well was completed. The purpose of the placement of the screen from 6.5 to 8.5 feet below grade is to maximize the injection pressure at the groundwater surface. The 8.5 foot depth selection was based on the historical groundwater seasonal low through February 2000. The screen consists of 0.02 slot screen with a Morie #2 sand pack. The sand extends to 6 inches above the top of the screen. The remainder of the borehole was sealed with bentonite. Each wellhead is equipped with a flow adjust valve and a pressure gauge. The location of the injection and extraction wells and the treatment equipment is presented on Figure 11.

V.B.3. Oxygen Injection System

The oxygen injection system described in Section III.C.1.b.1 was operational on May 19, 1999 with oxygen being injected into two rows of injectors. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free

product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The oxygen was being injected in accordance with the Underground Injection Control Permit #104 for the Former Building 728 site.

V.B.4. System Monitoring and Sampling

V.B.4.a. First Sampling Event – June 1999

The oxygen injection system had been in operation for one month when the first sampling event was conducted with oxygen being injected into two rows of injectors as shown in Figure 12. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on June 15, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 12. The results of the June 1999 sampling event are summarized below:

- Benzene was detected in 15 of 15 samples at concentrations ranging from 3J µg/L to 3370 µg/L. Nine of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.
- Toluene was detected in 12 of 15 samples at concentrations ranging from 0.56J µg/L to 6720 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.
- Ethylbenzene was detected in 15 of 15 samples at concentrations ranging from 0.73J µg/L to 1150 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.
- Total xylenes were detected in 15 of 15 samples at concentrations ranging from 1.9J µg/L to 4490 µg/L. A Georgia IWQS does not exist for xylenes, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 18,600 ft^2 as shown in Figure 12 and Table 5. Of the fifteen wells sampled in June 1999, nine wells exceeded the IWQS for benzene. Within the plume, there are seven wells (i.e., MW60, MW63, P1, P2, P3, P4, and D3) where the benzene concentrations exceed 1000 µg/L. This area of highest benzene contamination is located immediately downgradient of the free product.

Groundwater elevations were measured in the monitoring wells on June 15, 1999, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 13. In June 1999, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0103 ft/ft, and the average groundwater elevation was 12.56 ft above mean sea level (AMSL) [i.e., 6.92 ft below top of casing (BTOC)].

Depth to free product and free product thickness are presented in Table 4. In June 1999, free product exceeding 1/8-inch (i.e. >0.01 ft) was observed in five product delineation points (i.e., D6, D7, D10, D11, and D16). As shown in Figure 12 and Table 5, the area of free product is located north of MW59 and extends toward MW8 and MW62 and covers an area of approximately 1,800 ft^2. Free product recovery in June 1999 consisted of Ferret product recovery systems in MW8A, MW59, and PR-2.

There were no changes to the oxygen injection locations or the monitoring locations for the next sampling event in July 1999. Additional product recovery wells were installed on June 2, 1999 and the Ferret™ product recovery systems were installed in wells MW8A, MW59, and PR-2.

V.B.4.b. Second Sampling Event – July 1999

The oxygen injection system had been in operation for two months when the second sampling event was conducted with oxygen being injected into two rows of injectors as shown in Figure 14. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on July 8, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 14. The results of the July 1999 sampling event are summarized below:

- Benzene was detected in 13 of 15 samples at concentrations ranging from 0.82J µg/L to 3430 µg/L. Nine of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 13 of 15 samples at concentrations ranging from 0.56J µg/L to 8020 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 13 of 15 samples at concentrations ranging from 0.87J µg/L to 1250 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 13 of 15 samples at concentrations ranging from 1.3J µg/L to 5090 µg/L. A Georgia IWQS does not exist for xylenes, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 17,050 ft^2 as shown in Figure 14 and Table 5. Of the fifteen wells sampled in July 1999, nine wells exceeded the IWQS for benzene, which is the same as the previous sampling event. Within the plume, there are six wells (i.e., MW60, P1, P2, P3, P4, and D3) where the benzene concentrations exceed 1000 µg/L. This area of highest benzene contamination is located immediately downgradient of the free product. The concentration of benzene in MW11, located at the leading edge of the plume was 0.82J µg/L as compared to 114 µg/L during the previous sampling event.

Groundwater elevations were measured in the monitoring wells on July 6, 1999, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 15. In July 1999, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0142 ft/ft, and the average groundwater elevation was 14.19 ft AMSL (i.e., 5.92 ft BTOC). Prior to the July 1999 sampling event, a 100-year rain event occurred during the first week of July.

Depth to free product and free product thickness are presented in Table 4. In July 1999, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in seven product delineation points (i.e., D6, D8, D10, D11, D15, D16, and D17). As shown in Figure 14 and Table 5, the area of free product is located near MW59 and extends toward MW8 and MW62 and was separated into two areas of approximately 2,375 ft^2 and 500 ft^2. Free product recovery in July 1999 consisted of Ferret™ product recovery systems in MW8A, MW59, and PR-2.

Neither the oxygen injection locations nor the monitoring locations were changed for the next sampling event.

V.B.4.c. Third Sampling Event – August 1999

The oxygen injection system had been in operation for three months when the third sampling event was conducted with oxygen being injected into two rows of injectors as shown in Figure 16. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on August 24 and 25, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 16. The results of the August 1999 sampling event are summarized below:

- Benzene was detected in 12 of 15 samples at concentrations ranging from 13.7 µg/L to 3460 µg/L. Eight of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 8 of 15 samples at concentrations ranging from 0.56J µg/L to 3890 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 14 of 15 samples at concentrations ranging from 0.62J µg/L to 1530 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 14 of 15 samples at concentrations ranging from 0.86J µg/L to 4550 µg/L. A Georgia IWQS for xylenes does not exist, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 18,000 ft^2 as shown in Figure 16 and Table 5. Of the fifteen wells sampled in August 1999, eight wells exceeded the IWQS for benzene as compared to nine the previous sampling event. Within the plume, there are four wells (i.e., P1, P2, P3, and D3) where the benzene concentrations exceed 1000 µg/L. This area of highest benzene contamination is located immediately downgradient of the free product. The concentration of benzene in MW11, located at the leading edge of the plume, remained below the IWQS. The concentration of benzene in P4 and MW60, located downgradient of the free product, decreased from 1990 µg/L and 3260 µg/L, respectively, in July 1999 to 516 µg/L and 257 µg/L, respectively, in August 1999. This indicates that the row of oxygen injectors immediately downgradient of the free product is preventing the continued migration of benzene from the free product area.

Groundwater elevations were measured in the monitoring wells on August 23, 1999, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 17. In August 1999, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0111 ft/ft, and the average groundwater elevation was 12.97 ft AMSL (i.e., 6.51 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In August 1999, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in five product delineation points (i.e., D6, D9, D10, D11, D16). As shown in Figure 16 and Table 5, the area of free product is located near MW59 and

extends toward MW8 and covers an area of approximately 1,950 ft^2. Free product recovery in August 1999 consisted of Ferret™ product recovery systems in MW8A, MW59, and PR-2.

Upon completion of sampling activities in August 1999, the oxygen injection locations were modified. Oxygen injection was discontinued in the row of injectors located upgradient of the free product. Oxygen injection was initiated in the two rows at the leading downgradient edge of the plume. Thus, the first row of injectors was J2, J3, and J4; the second row of injectors was J5, J6, J7, and J8; and the third row of injectors was J9, J10, J11, J12, and J13. There were no changes to the monitoring locations for the next sampling event.

V.B.4.d. Fourth Sampling Event – September 1999

The oxygen injection system had been in operation for four months when the fourth sampling event was conducted. The location of the oxygen injectors in operation was modified to three rows of injectors in August 1999 as shown in Figure 18. The first row of injectors was J2, J3, and J4; the second row of injectors was J5, J6, J7, and J8; and the third row of injectors was J9, J10, J11, J12, and J13. The third row of injectors was located immediately downgradient of the free product. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on September 29, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 18. The results of the September 1999 sampling event are summarized below:

- Benzene was detected in 12 of 15 samples at concentrations ranging from 2.4 µg/L to 3710 µg/L. Seven of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 7 of 15 samples at concentrations ranging from 1.4J µg/L to 5680 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.
- Ethylbenzene was detected in 13 of 15 samples at concentrations ranging from 0.6J µg/L to 1910 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 13 of 15 samples at concentrations ranging from 0.79J µg/L to 4940 µg/L. A Georgia IWQS for xylenes does not exist, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 14,875 ft^2 as shown in Figure 18 and Table 5. Of the fifteen wells sampled in September 1999, seven wells exceeded the IWQS for benzene as compared to eight the previous sampling event. Within the plume, there are five wells (i.e., P1, P2, P3, D3, and D4) where the benzene concentrations exceeded 1000 µg/L. This area of highest benzene contamination is located downgradient of the free product. The concentration of benzene in MW11, located at the leading edge of the plume, remained below the IWQS. The concentrations of benzene in P4 and MW60, located downgradient of the free product, were similar to the concentrations observed during the previous sampling event. This indicates that the row of oxygen injectors immediately downgradient of the free product is preventing the continued migration of benzene from the free product area.

Groundwater elevations were measured in the monitoring wells on September 29, 1999 to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 19. In September 1999, the groundwater flow direction was toward the northwest, the groundwater

gradient was approximately 0.0103 ft/ft, and the average groundwater elevation was 13.93 ft AMSL (i.e., 5.55 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In September 1999, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in six product delineation points (i.e., D6, D7, D10, D11, D16, and D17). As shown in Figure 18 and Table 5, the area of free product is located near MW59 and extends toward MW8 and covers an area of approximately 2,225 ft^2. Free product recovery in September 1999 consisted of Ferret™ product recovery systems in MW8A, MW59, and PR-2.

Neither the oxygen injection locations nor the monitoring locations were changed for the next sampling event.

V.B.4.e. Fifth Sampling Event – October 1999

The oxygen injection system had been in operation for five months when the fifth sampling event was conducted. The location of the oxygen injectors in operation was modified to three rows of injectors in August 1999 as shown in Figure 20. The first row of injectors was J2, J3, and J4; the second row of injectors was J5, J6, J7, and J8; and the third row of injectors was J9, J10, J11, J12, and J13. The third row of injectors was located immediately downgradient of the free product. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on October 27, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 20. The results of the October 1999 sampling event are summarized below:

- Benzene was detected in 14 of 15 samples at concentrations ranging from 0.78J µg/L to 3760 µg/L. Six of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 7 of 15 samples at concentrations ranging from 1.6J µg/L to 3180 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 14 of 15 samples at concentrations ranging from 0.55J µg/L to 2070 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 15 of 15 samples at concentrations ranging from 0.53J µg/L to 6020 µg/L. A Georgia IWQS for xylenes does not exist, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 15,475 ft^2 as shown in Figure 20 and Table 5. Of the fifteen wells sampled in October 1999, six wells exceed the IWQS for benzene as compared to seven the previous sampling event. Within the plume, there are four wells (i.e., P3, D1, D3, and D4) where the benzene concentrations exceed 1000 µg/L. This area of highest benzene contamination is located downgradient of the free product. The concentrations of benzene in MW11 and P1, located at the leading edge of the plume, were below the IWQS. The concentrations of benzene in P4 and MW60, located downgradient of the free product, were below the IWQS. This indicates that the row of oxygen injectors immediately downgradient of the free product is preventing the continued migration of benzene from the free product area.

Groundwater elevations were measured in the monitoring wells on October 27, 1999, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 21. In October 1999, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0125 ft/ft, and the average groundwater elevation was 13.27 ft AMSL (i.e., 6.21 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In October 1999, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in eight product delineation points (i.e., D6, D7, D8, D10, D11, D15, D16, and D17). As shown in Figure 20 and Table 5, the area of free product is located near MW59 and extends toward MW8 and MW62 and covers an area of approximately 2,850 ft^2. Free product recovery in October 1999 consisted of Ferret™ product recovery systems in MW8A, MW59, and PR-2. Prior to the fifth sampling event, three additional free product recovery wells (PR-3, PR-4, and PR-5) were installed at the site in October 1999 and equipped with Ferret™ product recovery systems.

Upon completion of sampling activities in October 1999, the oxygen injection locations were modified. Oxygen injection was discontinued in the two rows of injectors located at the leading edge of the plume and modified back to the original configuration of injection rows on either side of the free product. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The monitoring locations were not changed for the next sampling event.

V.B.4.f. Sixth Sampling Event – December 1999

The oxygen injection system had been in operation for seven months when the sixth sampling event was conducted. The location of the oxygen injectors in operation was modified back to the original two rows of injectors in October 1999 as shown in Figure 22. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on December 1, 1999. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 22. The results of the December 1999 sampling event are summarized below:

- Benzene was detected in 15 of 15 samples at concentrations ranging from 1J µg/L to 3700 µg/L. Seven of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 8 of 15 samples at concentrations ranging from 0.59J µg/L to 2950 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 13 of 15 samples at concentrations ranging from 0.74J µg/L to 1770 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 15 of 15 samples at concentrations ranging from 0.52J µg/L to 5710 µg/L. A Georgia IWQS for xylenes does not exist, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 8,575 ft^2 as shown in Figure 22 and Table 5. Of the fifteen wells sampled in December 1999, seven wells exceeded the IWQS for benzene as compared to six the previous sampling event. Within the plume, there was one well (i.e., D3) where the benzene concentration exceeded 1000 µg/L. This area of highest benzene contamination is located north of MW8. The concentration of benzene in MW11, located at the leading edge of the plume, was below the IWQS. The concentrations of benzene in MW60, P4, and D1, located downgradient of the free product, were below the IWQS. It appears that the row of oxygen injectors immediately downgradient of the free product has divided the groundwater into two plumes. A long, thin plume runs parallel to the underground storm drain and another plume is located in the area of the free product. However, the monitoring program in December 1999 was insufficient to determine the concentrations within the plume in the area of free product.

Groundwater elevations were measured in the monitoring wells on December 1, 1999, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 23. In December 1999, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0106 ft/ft, and the average groundwater elevation was 12.18 ft AMSL (i.e., 7.30 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In December 1999, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in seven product delineation points (i.e., D6, D9, D10, D11, D15, D16, and D17). As shown in Figure 22 and Table 5, the area of free product has separated into two areas. The largest area is located near MW59 and extends toward MW8 and covers an area of approximately 1500 ft^2. The smaller area covers an area of approximately 340 ft^2. Free product recovery in December 1999 consisted of Ferret product recovery systems in MW8A, MW59, PR-2, PR-3, PR-4, and PR-5.

Neither the oxygen injection locations nor the monitoring locations were changed for the next sampling event.

V.B.4.g. Seventh Sampling Event – January 2000

The oxygen injection system had been in operation for eight months when the seventh sampling event was conducted. The location of the oxygen injectors in operation was modified back to the original two rows of injectors in October 1999 as shown in Figure 24. One row was located downgradient of the free product and consisted of injectors J9, J10, J11, J12, and J13. The other row was located upgradient of the free product plume and consisted of injectors J14, J15, J16, J17, J18, J19, and J20. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, MW64, P1, P2, P3, P4, P5, D1, D3, D4, and D21.

Fifteen monitoring locations were sampled for BTEX on January 4, 2000. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 24. The results of the January 2000 sampling event are summarized below:

- Benzene was detected in 15 of 15 samples at concentrations ranging from 0.2J µg/L to 2210J µg/L. Seven of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 3 of 15 samples at concentrations ranging from 27.3 µg/L to 1150J µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 15 of 15 samples at concentrations ranging from 0.37J µg/L to 1010 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 14 of 15 samples at concentrations ranging from 1J µg/L to 3180 µg/L. A Georgia IWQS for xylenes does not exist, and none of the concentrations exceeded the MCL of 10,000 µg/L.

The area of groundwater contamination covers approximately 10,650 ft^2 as shown in Figure 24 and Table 5. Of the fifteen wells sampled in January 1999, seven wells exceeded the IWQS for benzene as compared to seven the previous sampling event. Within the plume, there were two wells (i.e., MW61 and D3) where the benzene concentration exceeded 1000 µg/L. This area of highest benzene contamination is located north of MW8. The concentration of benzene in MW11, located at the leading edge of the plume, was below the IWQS. The concentrations of benzene in MW60, P4, and D1, located downgradient of the free product, were below the IWQS. It appears that the row of oxygen injectors immediately downgradient of the free product has continued to divide the groundwater into two plumes. However, the monitoring program in January 1999 was insufficient to determine the concentrations within the plume in the area of free product.

Groundwater elevations were measured in the monitoring wells on January 4, 2000, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 25. In January 2000, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0111 ft/ft, and the average groundwater elevation was 12.38 ft AMSL (i.e., 7.14 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In January 2000, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in six product delineation points (i.e., D6, D8, D10, D11, D16, and D17). As shown in Figure 24 and Table 5, the area of free product has separated into two areas. The largest area is located near MW59 and extends toward MW8 and covers an area of approximately 1770 ft^2. The second smaller area covers an area of approximately 100 ft^2 and is located near MW62. Free product recovery in January 2000 consisted of Ferret product recovery systems in MW8A, MW59, PR-2, PR-3, PR-4, and PR-5.

Upon completion of sampling activities in January 2000, the oxygen injection locations were modified. Oxygen injection was discontinued in the row of injectors located upgradient of the area of free product. The row of oxygen injectors (J9, J10, J11, J12, and J13) downgradient of the free product remained in operation. The oxygen injection locations (J2, J3, J4, J7, J18, J19, and J20) were put into operation and were located throughout the long, thin plume running parallel to the storm drain. In addition the monitoring locations would be modified during the next sampling event. The benzene concentrations in monitoring locations MW64, P5, and D21 had been less than 5 µg/L or not detected since September 1999, thus these locations were dropped from the monitoring program in order to include D6, D10, and D17 in the monitoring program. The new wells would allow for monitoring of the small benzene plume in the vicinity of the remaining free product.

V.B.4.h. Eight Sampling Event – March 2000

The oxygen injection system had been in operation for ten months when the eighth sampling event was conducted. The location of the oxygen injectors in operation was modified in January 2000 as shown in Figure 26. The row of oxygen injectors (J9, J10, J11, J12, and J13) downgradient of the free product remained in operation. The oxygen injection locations (J2, J3, J4, J7, J18, J19, and J20) were spread

throughout the long, thin plume running parallel to the storm drain. Monitoring locations MW64, P5, and D21 were dropped from the monitoring program in lieu of D6, D10, and D17. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, P1, P2, P3, P4, D1, D3, D4, D6, D10, and D17.

Fifteen monitoring locations were sampled for BTEX on March 28, 2000. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 26. The results of the March 2000 sampling event are summarized below:

- Benzene was detected in 12 of 15 samples at concentrations ranging from 2.4 µg/L to 1820 µg/L. Nine of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 6 of 15 samples at concentrations ranging from 9.4 µg/L to 9350 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 7 of 15 samples at concentrations ranging from 12.8 µg/L to 2510 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total xylenes were detected in 7 of 15 samples at concentrations ranging from 191 µg/L to 16,700 µg/L. A Georgia IWQS for xylenes does not exist; one of the concentrations exceeded the MCL of 10,000 µg/L.

As shown in Figure 26, the area of groundwater contamination separated into two plumes, one is long and thin running parallel to the storm drain and the other is in the vicinity of the free product. The areas of contamination are approximately 6,450 ft^2 and 3,000 ft^2 as indicated in Table 5. Of the fifteen wells sampled in January 1999, nine wells exceeded the IWQS for benzene as compared to seven the previous sampling event. However, the sampling program was modified during this event to better understand the plume associated with free product. Within the long, thin plume, there were two wells (i.e., MW61 and D3) where the benzene concentration exceeded 1000 µg/L. This area of highest benzene contamination is located north of MW8. None of the concentrations within the area of free product exceeded 1000 µg/L. The concentration of benzene in MW11, located at the leading edge of the plume, was below the IWQS. The concentrations of benzene in MW60, P4, and D1, located downgradient of the free product, were below the IWQS. It appears that the row of oxygen injectors immediately downgradient of the free product continues to divide the groundwater into two plumes.

Groundwater elevations were measured in the monitoring wells on March 27, 2000, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 27. In March 2000, the groundwater flow direction was toward the north and northwest, the groundwater gradient was approximately 0.0227 ft/ft, and the average groundwater elevation was 13.05 ft AMSL (i.e., 6.46 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In March 2000, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in four product delineation points (i.e., D6, D10, D11, and D24). As shown in Figure 26 and Table 5, the area of free product has separated into two areas. The largest area is located near MW59 and extends toward MW8 and covers an area of approximately 580 ft^2. The second smaller area covers an area of approximately 213 ft^2 and is located near D24. Free product recovery in March 2000 consisted of Ferret product recovery systems in MW8A, MW59, PR-2, PR-3, PR-4, and PR-5 in conjunction with the enhanced product removal system implemented in February 2000.

Neither the oxygen injection locations nor the monitoring locations were changed for the next sampling event.

V.B.4.i. Ninth Sampling Event – May 2000

The oxygen injection system had been in operation for 12 months (i.e., 1 year) when the ninth sampling event was conducted. The location of the oxygen injectors in operation was last modified in January 2000 as shown in Figure 28. The row of oxygen injectors (J9, J10, J11, J12, and J13) downgradient of the free product remained in operation. The oxygen injection locations (J2, J3, J4, J7, J18, J19, and J20) were spread throughout the long, thin plume running parallel to the storm drain. The monitoring locations to determine the effectiveness of the pilot study were MW6, MW11, MW60, MW61, MW63, P1, P2, P3, P4, D1, D3, D4, D6, D10, and D17.

Fifteen monitoring locations were sampled for BTEX on May 23, 2000. Analytical results for groundwater sampling are summarized in Table 3 and presented in Figure 28. The results of the March 2000 sampling event are summarized below:

- Benzene was detected in 13 of 15 samples at concentrations ranging from 5.2 µg/L to 2010J µg/L. Nine of the concentrations exceeded the IWQS of 71.28 µg/L and the benzene ACL of 78 µg/L.

- Toluene was detected in 9 of 15 samples at concentrations ranging from 0.31J µg/L to 2160 µg/L. None of the concentrations exceeded the toluene IWQS of 200,000 µg/L.

- Ethylbenzene was detected in 14 of 15 samples at concentrations ranging from 0.22J µg/L to 584 µg/L. None of the concentrations exceeded the ethylbenzene IWQS of 28,718 µg/L.

- Total Xylenes were detected in 15 of 15 samples at concentrations ranging from 0.23J µg/L to 4300J µg/L. A Georgia IWQS for xylenes does not exist, and none of the concentrations exceeded the MCL of 10,000 µg/L.

As shown in Figure 28, the area of groundwater contamination separated into two plumes, one is long and thin running parallel to the storm drain and the other is in the vicinity of the free product. The areas of contamination are approximately 6,550 ft^2 and 2,665 ft^2 as indicated in Table 5. Of the fifteen wells sampled in May 2000, eight wells exceeded the IWQS for benzene as compared to nine the previous sampling event. Within the long, thin plume, there was one well (i.e., MW61) where the benzene concentration exceeded 1000 µg/L. This area of highest benzene contamination is located north of MW8. Within the area of free product plume, there was one well (i.e., D6) where the benzene concentration exceeded 1000 µg/L. The concentration of benzene in MW11, located at the leading edge of the plume, was below the IWQS. The concentrations of benzene in MW60, P4, and D1, located downgradient of the free product, were below the IWQS. The row of oxygen injectors immediately downgradient of the free product continues to divide the groundwater into two plumes.

Groundwater elevations were measured in the monitoring wells on May 22, 2000, to determine the groundwater flow direction. A list of the wells and corresponding water level elevations is presented in Table 4. The potentiometric surface map generated from the water level measurements is presented in Figure 29. In May 2000, the groundwater flow direction was toward the northwest, the groundwater gradient was approximately 0.0095 ft/ft, and the average groundwater elevation was 12.54 ft AMSL (i.e., 7.02 ft BTOC).

Depth to free product and free product thickness are presented in Table 4. In May 2000, free product exceeding 1/8-inch (i.e., >0.01 ft) was observed in two product delineation points (i.e., D10 and D18). As shown in Figure 28 and Table 5, the area of free product has separated into two areas. One area is located near D10 and covers an area of approximately 188 ft^2. The second area covers an area of approximately 271 ft^2 and is located near MW59 and D18. Free product recovery in May 2000 consisted of Ferret product recovery systems in MW8A, MW59, PR-2, PR-3, PR-4, and PR-5 in conjunction with the enhanced product removal system implemented in February 2000.

Neither the oxygen injection locations nor the monitoring locations were changed for the next sampling event in July 2000.

V.C. ANALYSIS OF TRENDS

V.C.1. Area of Plume and Free Product

As shown in the groundwater quality maps, the area of benzene contamination in groundwater steadily decreased during the first year of oxygen injection. The initial area of the groundwater plume was 22,700 ft^2 in May 1999 and was 8,815 ft^2 in May 2000, which resulted in a 61% reduction in the size of the dissolved groundwater plume. In the majority of the observation wells located within the plume, the benzene concentrations were reduced by 68% to 100% during the first year of the oxygen injection; however, three of the wells showed an increase in benzene concentrations of 47% to 70%.

During the pilot study activities in 1999, the area of free product ranged in size from approximately 1850 ft^2 to 2875 ft^2, with limited recovery of free product. The area of free product did not show a significant decrease in area until additional free product recovery measures were implemented in February 2000. As a result of the enhanced product recovery system consisting of vacuum extraction and air injection that was installed in February 2000, the area of free product has been reduced by 84% to approximately 459 ft^2 in May 2000.

V.C.2. Benzene Concentrations in Groundwater

Wells P1, P3, MW11, and MW63 are located on the west side or downgradient edge of the dissolved groundwater plume. As shown in Figure 30a, the benzene concentrations steadily decreased during the first year of the oxygen injection pilot study and showed a 95% to 100% reduction in the benzene concentrations. As of May 2000, benzene was not detected in MW11, the most downgradient well. The concentrations of benzene in P1, P3, and MW63 are approaching an asymptotic level near the ACL of 78 µg/L and the IWQS of 71.28 µg/L.

Wells P2, P4, D1, MW60, and MW61 are located within the middle of the plume, but outside the area of free product. As shown in Figure 30b, the benzene concentrations have fluctuated depending on which oxygen injectors were operating, but the overall trend has been a 97% to 100% reduction in the benzene concentrations, except for MW61 that showed a 70% increase in benzene concentrations. In July 2000, it was noted that the closest oxygen injection location, J13, was clogged and as a result, the lack of oxygen being injected in the area may be the cause of the increase. MW61 is the only well in this area where the benzene concentrations exceed the ACL of 78 µg/L and the IWQS of 71.28 µg/L.

Wells D3, D4, D6, D10, and D17 are located within the middle of the plume and near or inside the area of free product. D3 and D4 have been in the monitoring plan since May 1999 and D6, D10, and D17 were added to the monitoring plan after it was observed that the plume was breaking into two separate plumes. As shown in Figure 30c, the benzene concentrations in D3 were reduced by 74% and increased by 47% in

D4. During September 1999 and October 1999, they oxygen injectors located in the immediate vicinity of D4 were not in operation and the lack of oxygen injection in this area was probably the cause of the peak concentration in October 1999. However, the concentrations in D4 have been on a general decline since peaking in October 1999. Since adding D6, D10, and D17 to the monitoring plan in March 2000, the benzene concentrations in D10 and D17 have seen a reduction of 14% and 34% during the two months of sampling. The benzene concentration in D6 has increased by 27% during the two months of sampling. The five wells in this area have benzene concentrations that exceed the ACL of 78 µg/L and the IWQS of 71.28 µg/L.

Wells MW6, P5, and D17 are located on the east side or upgradient edge of the groundwater plume. As shown in Figure 30d, the benzene concentrations have remained below the ACL of 78 µg/L and the IWQS of 71.28 µg/L since the first sampling event after the injection of oxygen began. As a result P5 and D21 were dropped from the monitoring program after the January 2000 sampling event in lieu of other wells located in the free product area. MW6 contains low concentrations of benzene, probably because it is located between the two rows of former USTs that were located in the Northern Fuel Battery.

V.C.3. Biodegradation Parameters

In addition to the analytical samples collected during the pilot study sampling events, the groundwater was analyzed in the field for pH, DO, ORP, conductivity, and temperature. Microbial activity tends to be reduced outside a pH range of 5 to 9 and many of the anaerobic bacteria are particularly sensitive to pH extremes. DO is the highest energy yielding electron acceptor for biodegradation of organic constituents and aerobic conditions typically exist when the DO is greater than 1 to 2 mg/L. ORP is a measure of the type of microbial environment, which ranges from +500 millivolts (mV) for aerobic conditions to -300 mV for methanogenic conditions. Temperature affects the rates of microbial metabolism and slower biodegradation rates occur at lower temperatures.

As shown in Figure 31a, the average DO concentration at the site prior to initiating oxygen injection was 2 mg/L with an elevated area near D1 indicating that site conditions were favorable for aerobic hydrocarbon degradation. DO concentration maps for selected sampling events are presented in Figures 31a and 31b. As expected, the DO concentration maps show that the oxygen injection is increasing the DO in the vicinity of the operating injector locations. As the location of the injectors in operation changes, the DO concentrations across the site increase in the newly injected areas and decrease where oxygen is no longer being injected. Following the injection of oxygen into the groundwater at the site, the average DO concentrations at the site ranged from 3 mg/L to 20 mg/L.

As shown in Figure 32a, the average ORP concentration at the site prior to initiating oxygen injection was 95 mV with an elevated area near D1 indicating that site conditions were somewhat favorable for aerobic hydrocarbon degradation. ORP concentration maps for selected sampling events are presented in Figures 32a and 32b. As expected, the ORP concentration maps show that the oxygen injection is increasing the ORP in the vicinity of the operating injector locations. As the location of the injectors in operation changes, the ORP concentrations across the site increase in the newly injected areas and decrease where oxygen is no longer being injected. Following the injection of oxygen into the groundwater at the site, the average ORP concentrations at the site ranged from 110 mV to 250 mV.

V.C.4. Conclusions and Recommendations

The oxygen injection pilot study has produced positive results by reducing the area of the dissolved hydrocarbon plume so that it no longer impacts the underground storm drain at concentrations above the IWQS. The next objective of the remediation is to reduce the benzene concentrations to below the ACL.

Thus, oxygen injection should be continued at the site until benzene concentration levels are below the ACL of 78 µg/L. After 12 months of oxygen injection, the site ranking score is 51,000 (Appendix X). The oxygen injection system operating at the site is the selected remedial action for the Former Building 728 site, Facility ID#9-025049 in lieu of all alternatives proposed in the CAP-Part B Report dated December 1997. Bimonthly (ie. every other month) groundwater sampling of wells MW6, MW11, MW60, MW61, MW63, P1, P2, P3, P4, D1, D3, D4, D6, D10, and D17 for BTEX should continue until the benzene ACL is achieved. The wells sampled as part of the monitoring program may be changed based on the analytical results to better track the changes in the groundwater plume. Once the benzene ACL is achieved confirmatory soil and groundwater sampling will be conducted.

The enhanced free product recovery system that was implemented in February 2000 appears to have removed the majority of the recoverable free product; however, pockets of free product may be tied up in the vadose zone. The combination of air injection and vacuum extraction should remain in operation in conjunction with the oxygen injection. The product recovery system will be monitored on a monthly basis. Fort Stewart/HAAF will evaluate the results and may consider soil excavation and disposal in the areas where free product continues to exceed an eighth of an inch in thickness.

Wells MW61, D3, and D4 are the three wells that were sampled during all ten sampling events that have had the lowest percent decrease in benzene concentrations or an increase in benzene concentrations. The change in benzene concentrations in D4 has been due to rebound when the closest oxygen injectors were not operating; thus, injectors J19 and J20 should remain in operation until the benzene concentrations in D4 approach the IWQS. Additional oxygen injectors are required around MW61 and D3 to promote increased aerobic conditions as shown in Figure 33. One injector should be located north of MW61, one injector should be located north of D3, and one injector should be located south of D3.

VI. REFERENCES

Abou-Rizk, J.A., M.E. Leavitt, and D.A. Graves 1995. "In Situ Aquifer Bioremediation of Organics Including Cyanide and Carbon Disulfide" in R. Hinchee, ed., *In Situ and On-Site Bioreclaimation*. Battelle Press, Columus, Ohio.

ASTM (American Society for Testing and Materials) 1995. *Standard Guide for Risk-based Corrective Action Applied at Petroleum Release Sites*, ASTM E 1739-95, approved September 10, 1995.

Coughlin, Michael F., 1998. Letter to John Spears (Fort Stewart Directorate of Public Works, Environmental Branch) September 4.

Metcalf & Eddy 1996. *Final Corrective Action Plan - Part A Phase I Site Investigation of the Airport Hydrant System (Building 728) Facility ID: 9-025035 and 9-025049, Hunter Army Airfield, Georgia*, August.

Metcalf & Eddy 1997. *Final Corrective Action Plan - Part B Report for Former Building 728, EPD Facility ID: 9-025035 and 9-025049, Hunter Army Airfield, Georgia*, December.

Mills, W. B., Porcella, D. B., Ungs, M. J., Gherini, S. A., Summers, K. V., Rupp, G. L., and Bowie, G. L. 1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants: Parts 1, 2, and 3*, EPA/600/6-85/002, EPA Environmental Research Laboratory, Office of Research and Development, Athens, Georgia.

Perez, Ovidio 1998. Letter to Michael Coughlin (Georgia Environmental Protection Department, Underground Storage Tank Management Program) October 7, 1998.

Perez, Ovidio 1999. Letter to William Logan (Georgia Environmental Protection Department, Underground Storage Tank Management Program) September 30, 1999.

APPENDIX I

FIGURES

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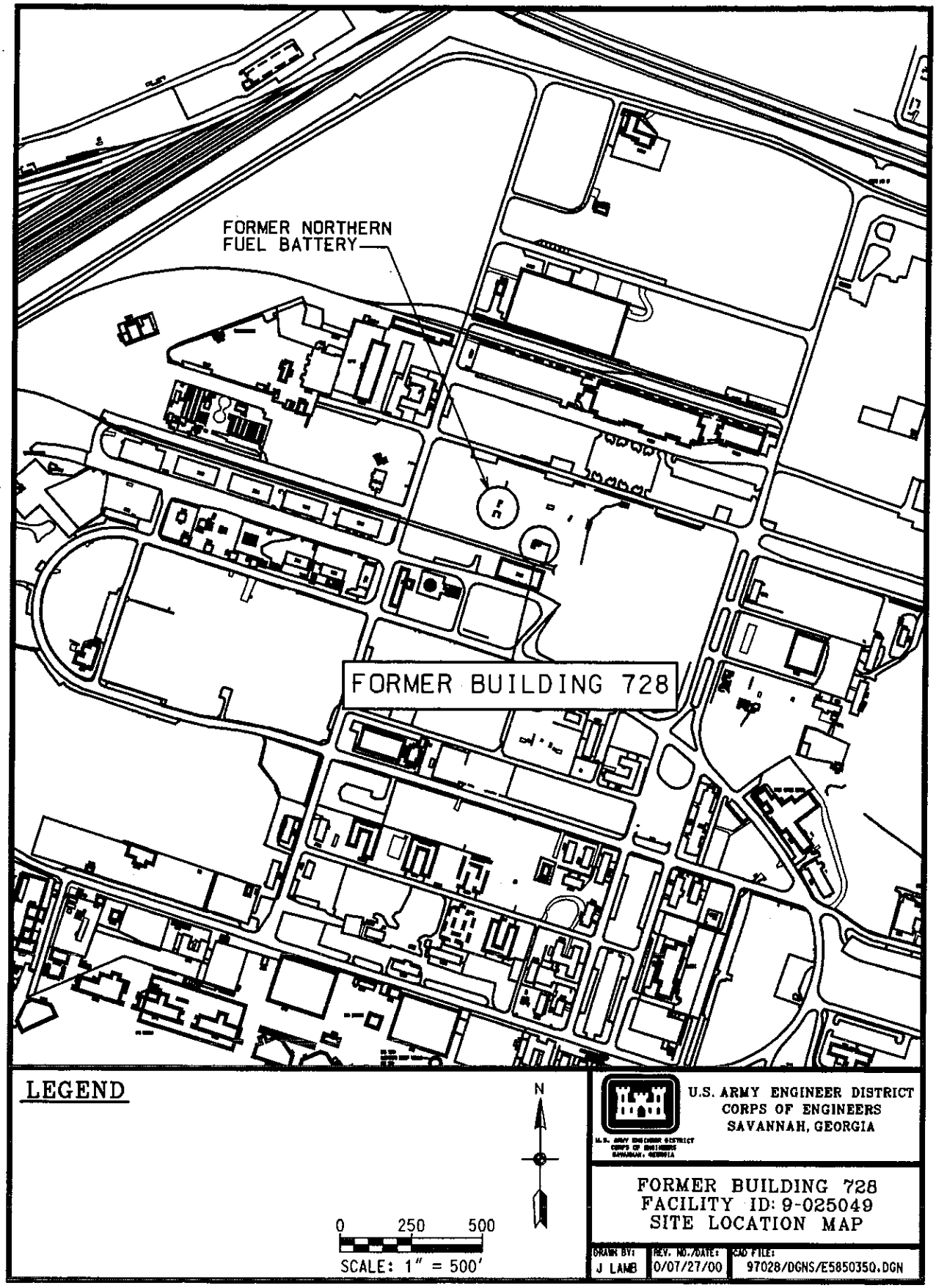

Figure 1. Location Map for the Former Building 728 Site, Facility ID #9-025049

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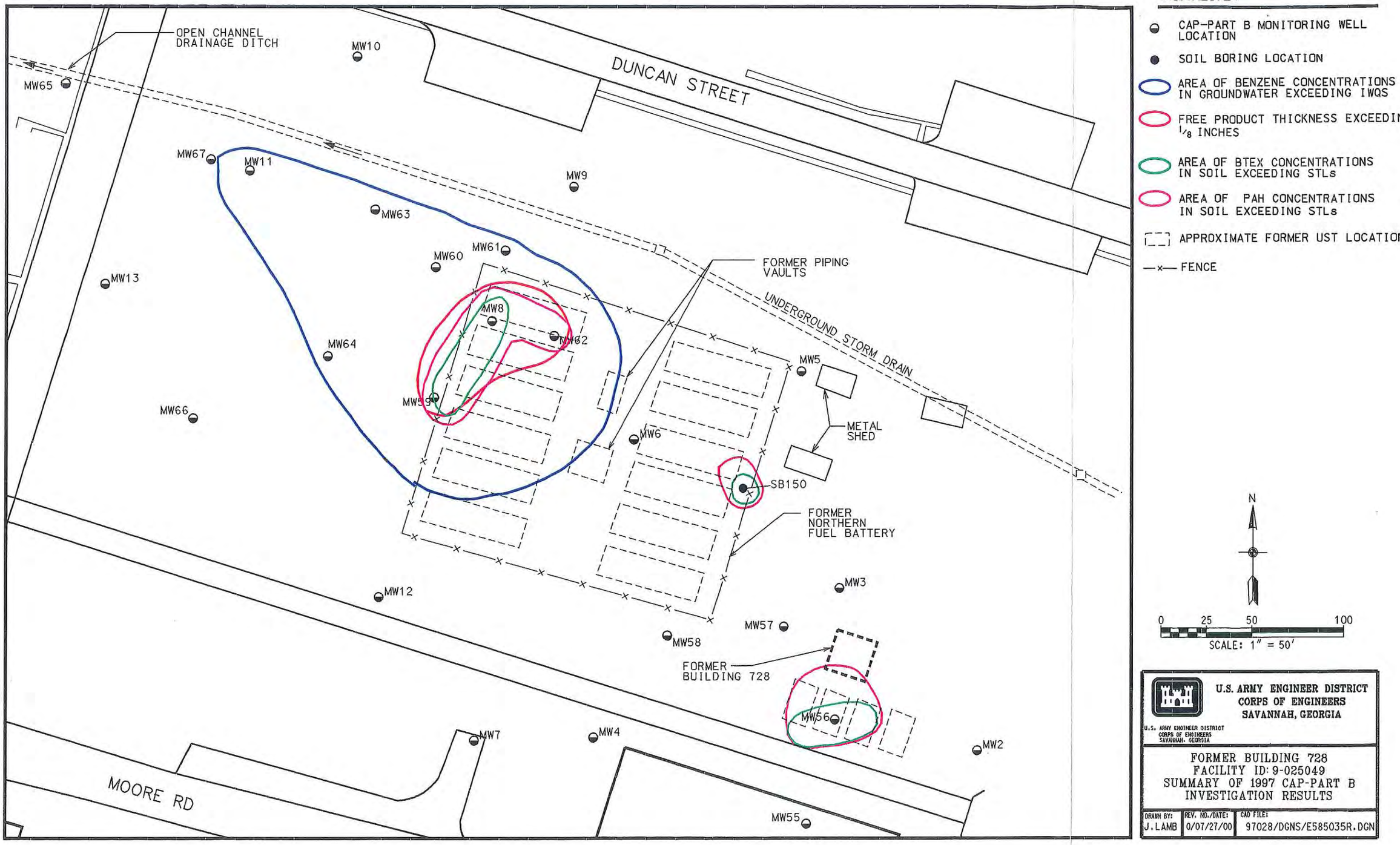

LEGEND.

- CAP-PART B MONITORING WELL LOCATION
- SOIL BORING LOCATION
- AREA OF BENZENE CONCENTRATIONS IN GROUNDWATER EXCEEDING IWQS
- FREE PRODUCT THICKNESS EXCEEDING 1/8 INCHES
- AREA OF BTEX CONCENTRATIONS IN SOIL EXCEEDING STLs
- AREA OF PAH CONCENTRATIONS IN SOIL EXCEEDING STLs
- APPROXIMATE FORMER UST LOCATION
- —x— FENCE

N

0 25 50 100
SCALE: 1" = 50'

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FORMER BUILDING 728
FACILITY ID: 9-025049
SUMMARY OF 1997 CAP-PART B
INVESTIGATION RESULTS

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J.LAMB	0/07/27/00	97028/DGNS/E585035R.DGN

Figure 2. Summary of 1997 CAP-Part B Investigation Results for the Former Building 728 Site, Facility ID #9-025049

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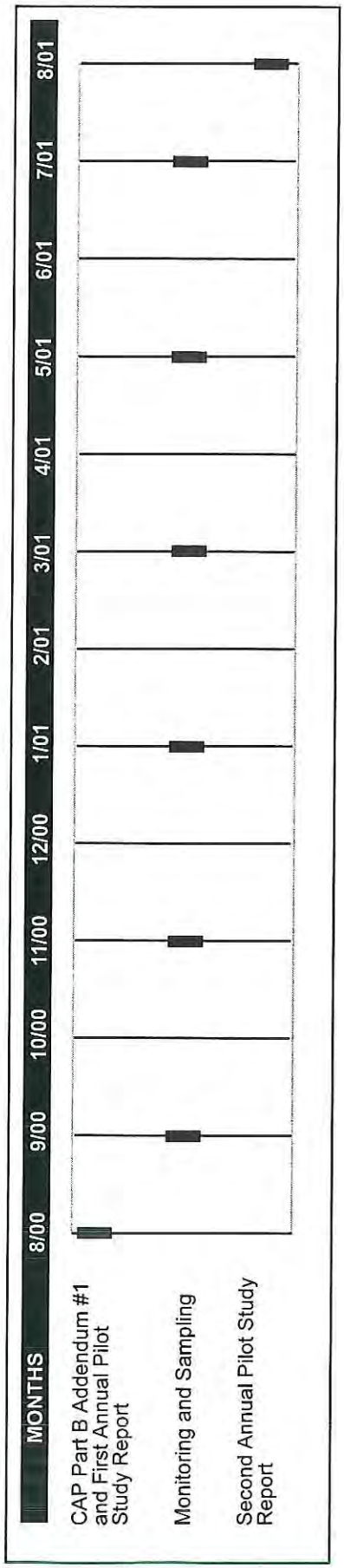

Figure 3. Milestone Schedule for the Remedial Action at the Former Building 728 Site, Facility ID #9-025049

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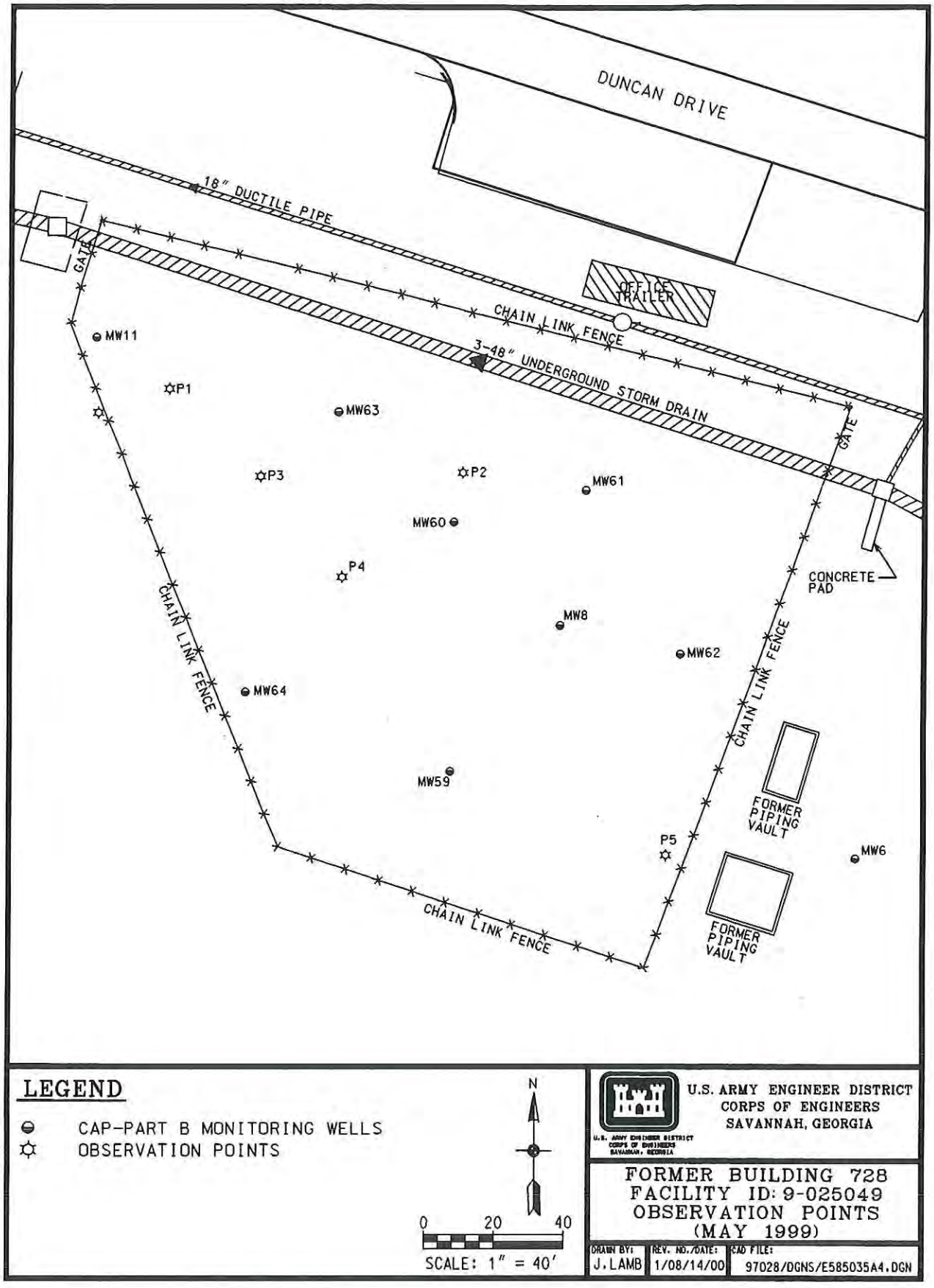

Figure 4. Observation Point Locations at the Former Building 728 Site, Facility ID #9-025049

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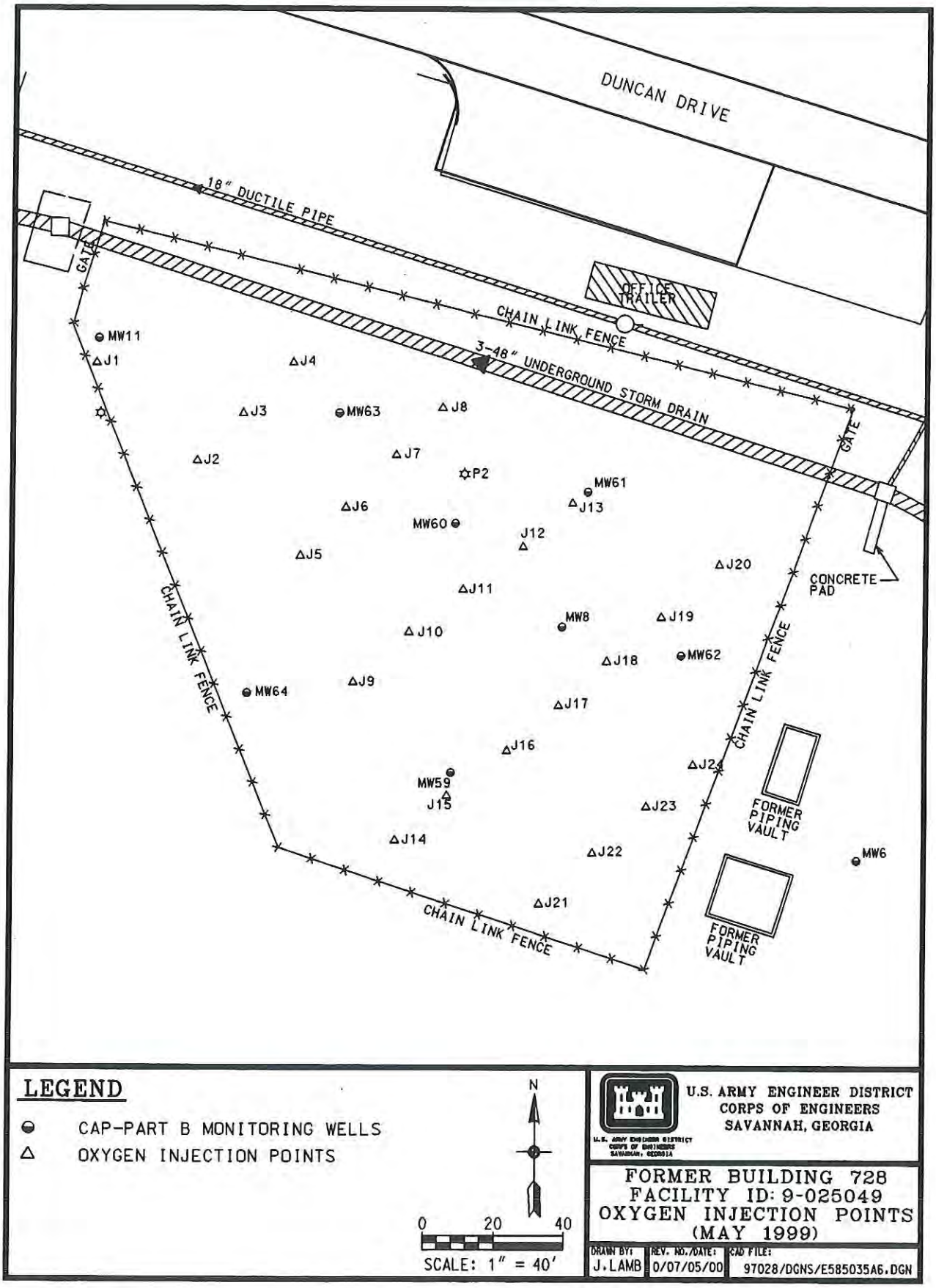

Figure 5. Oxygen Injection Locations at the Former Building 728 Site, Facility ID #9-025049

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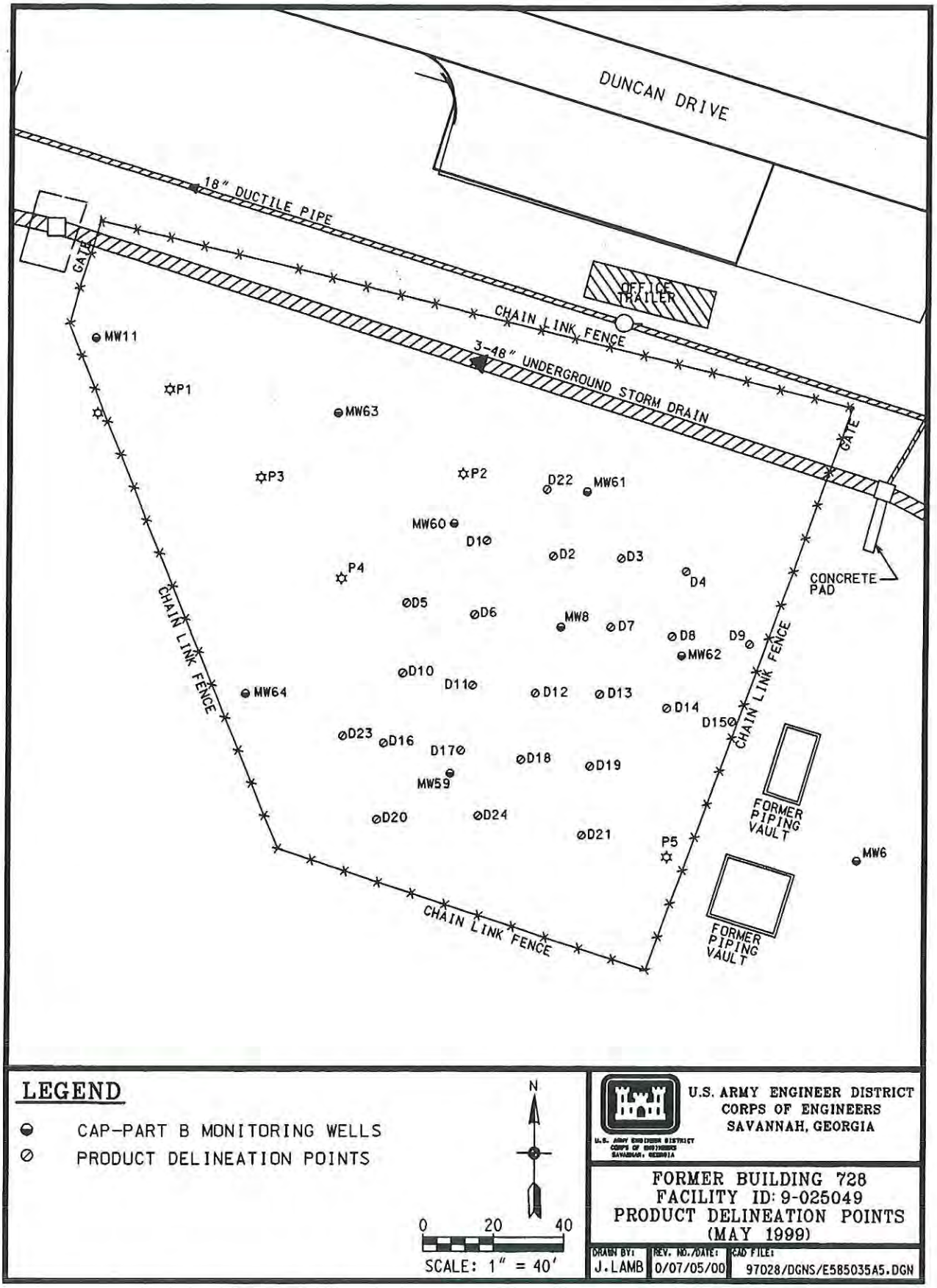

Figure 6. Product Delineation Point Locations at the Former Building 728 Site, Facility ID #9-025049

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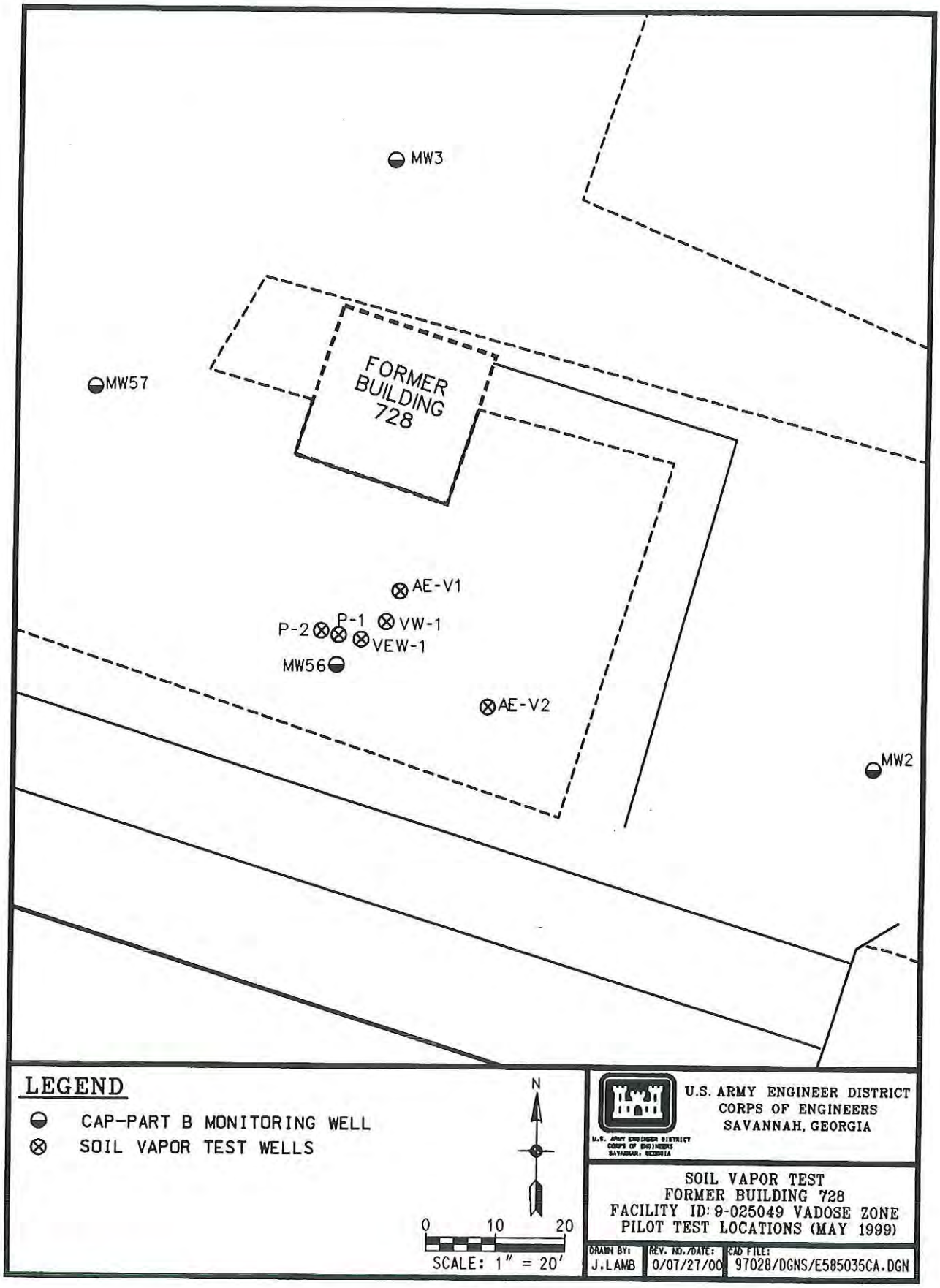

Figure 7. Vadose Zone Pilot Test Locations at the Former Building 728 Site, Facility ID #9-025049

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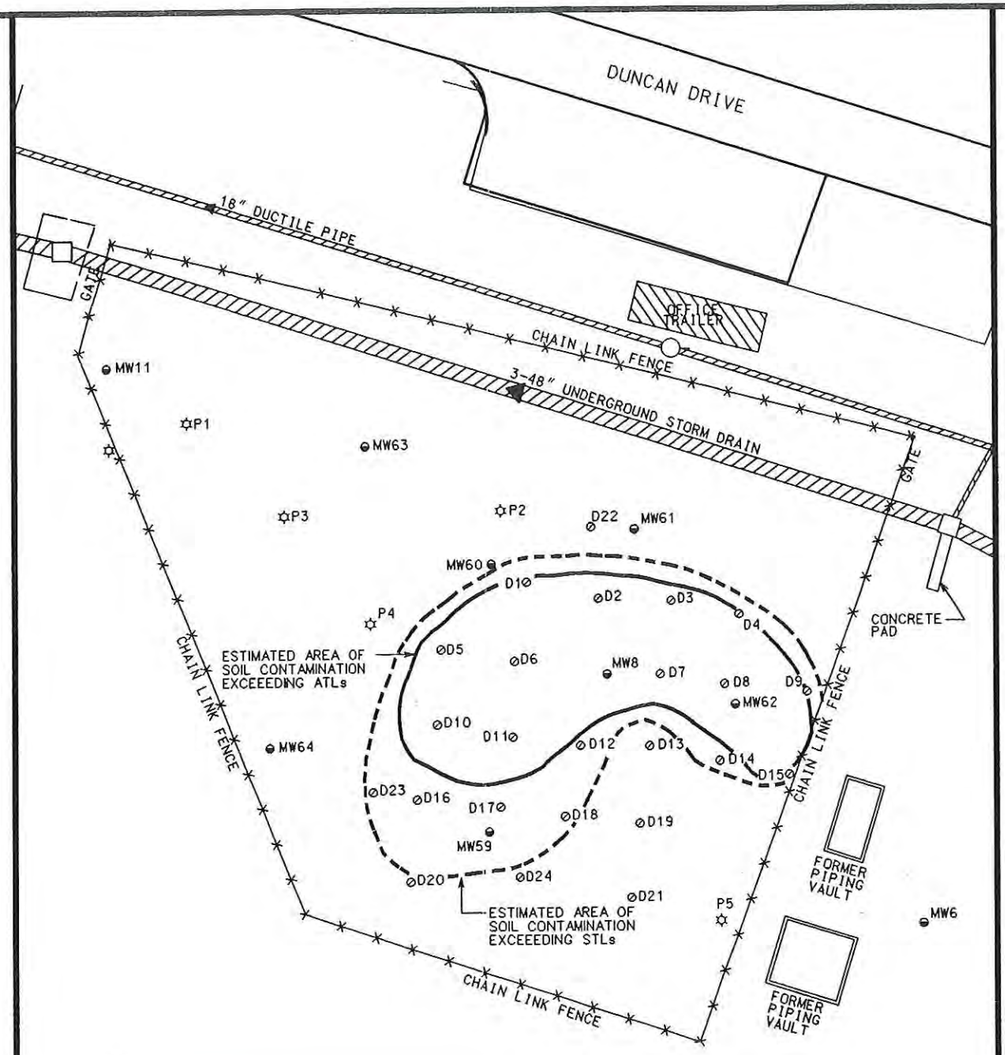
AE-D1
AED111 7.2-8.2 FT
B 0.206 J T 0.181 J E 0.297 J X 0.952
AE-D2
SOIL SAMPLE NOT ANALYZED
AE-D3
AED311 7.0-8.0 FT
B 0.111 J T 0.078 E 0.651 X 2.58
AE-D4
AED411 8.0-9.1 FT
B 0.0718 J T 0.128 J E 0.281J X 0.512 J TPH 13.5 J
AE-D5
AED511 6.9-8.9 FT
B 0.161 J T 0.518 E 0.0791 X 0.38 TPH 48.4 J
AE-D6
AED611 7.1-8.1 FT
TPH 469
AE-D7
AED711 8.0-9.0 FT
TPH 2000
AE-D8
AED811 8.0-9.0 FT
TPH 769
AE-D9
AED911 4.5-6.5 FT
TPH 405
AE-D10
AEDA11 7.0-8.0 FT
B 0.625 T 9.76 E 4.52 X 23.2 TPH 25.7
AE-D11
AEDB11 6.5-7.5 FT
TPH 621
AE-D12
AEDC11 7.8-8.8 FT
TPH 127

AE-D13
AEDD11 8.0-8.8 FT
TPH 68.6
AE-D14
AEDE11 8.0-8.6 FT
TPH 92.2
AE-D15
AEDF11 8.0-8.8 FT
B 0.0144 J T 0.0057 J E 0.643 J X 0.283 J TPH 701
AE-D16
AEDG11 6.2-7.2 FT
TPH 578
AE-D17
AEDK11 7.0-8.0 FT
B 0.0098 E 0.0045 TPH 12.8 J
AE-D18
AEDL11 10.0-10.7 FT
B 0.0016 J T 0.0086 E 0.0104 X 0.0466
AE-D19
SOIL SAMPLE NOT ANALYZED
AE-D20
SOIL SAMPLE NOT ANALYZED
AE-D21
AEDM11 8.0-8.5 FT
TPH 22.8
AE-D22
SOIL SAMPLE NOT ANALYZED
AE-D23
SOIL SAMPLE NOT ANALYZED
AE-D24
SOIL SAMPLE NOT ANALYZED



AE-P1
AEP111 4.0-6.0 FT
TPH 119
AE-P2
AEP211 4.0-6.0 FT
TPH 59.5
AE-P3
AEP311 5.0-6.0 FT
NO DETECTS
AE-P4
AEP411 5.4-6.4 FT
TPH 66.1
AE-P5
AEP511 4.0-6.0 FT
X 0.0012J TPH 105

LEGEND

- ◒ CAP-PART B MONITORING WELLS
- ⊘ PRODUCT DELINEATION POINTS
- ☼ OBSERVATION POINTS

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes, Total
TPH= Total Petroleum Hydrocarbons

NOTES:
AE-D6, AE-D7, AE-D8, AE-D9, AE-D11, AE-D12, AND AE-D14 WERE ONLY ANALYZED FOR TPH

CONCENTRATIONS ARE IN mg/kg

	STLs	ATLs
B	0.005	0.012
T	0.37	58.5
E	0.4	11.1
X	20	20

N
0 20 40
SCALE: 1" = 40'

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FORMER BUILDING 728
FACILITY ID: 9-025049
BASELINE SOIL SAMPLING
ANALYTICAL RESULTS (MAY 1999)

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Figure 8. Pilot Study Baseline Soil Analytical Results (May 1999) at the Former Building 728 Site, Facility ID #9-025049

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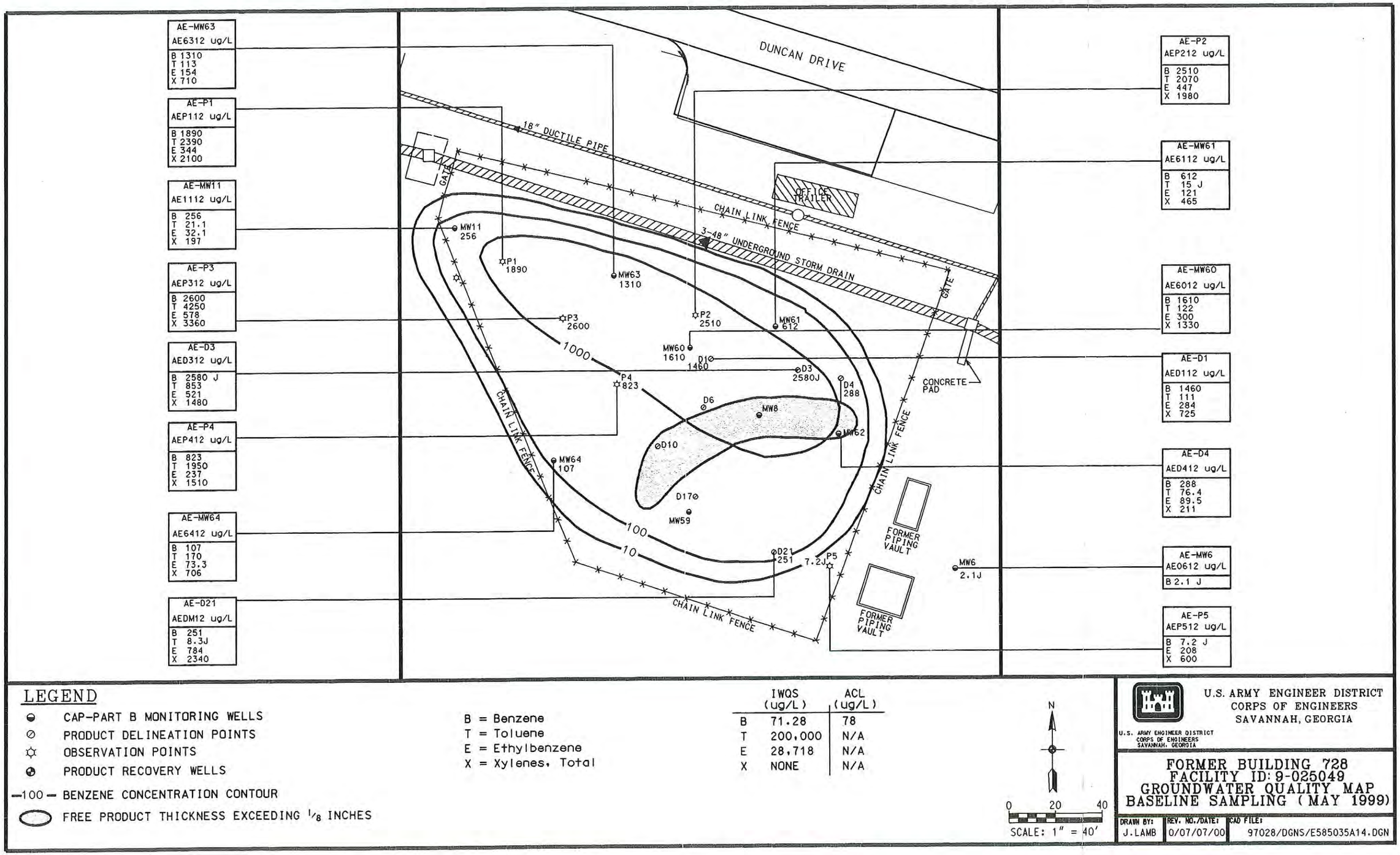

Figure 9. Pilot Study Baseline Groundwater Analytical Results (May 1999) at the Former Building 728 Site, Facility ID #9-025049

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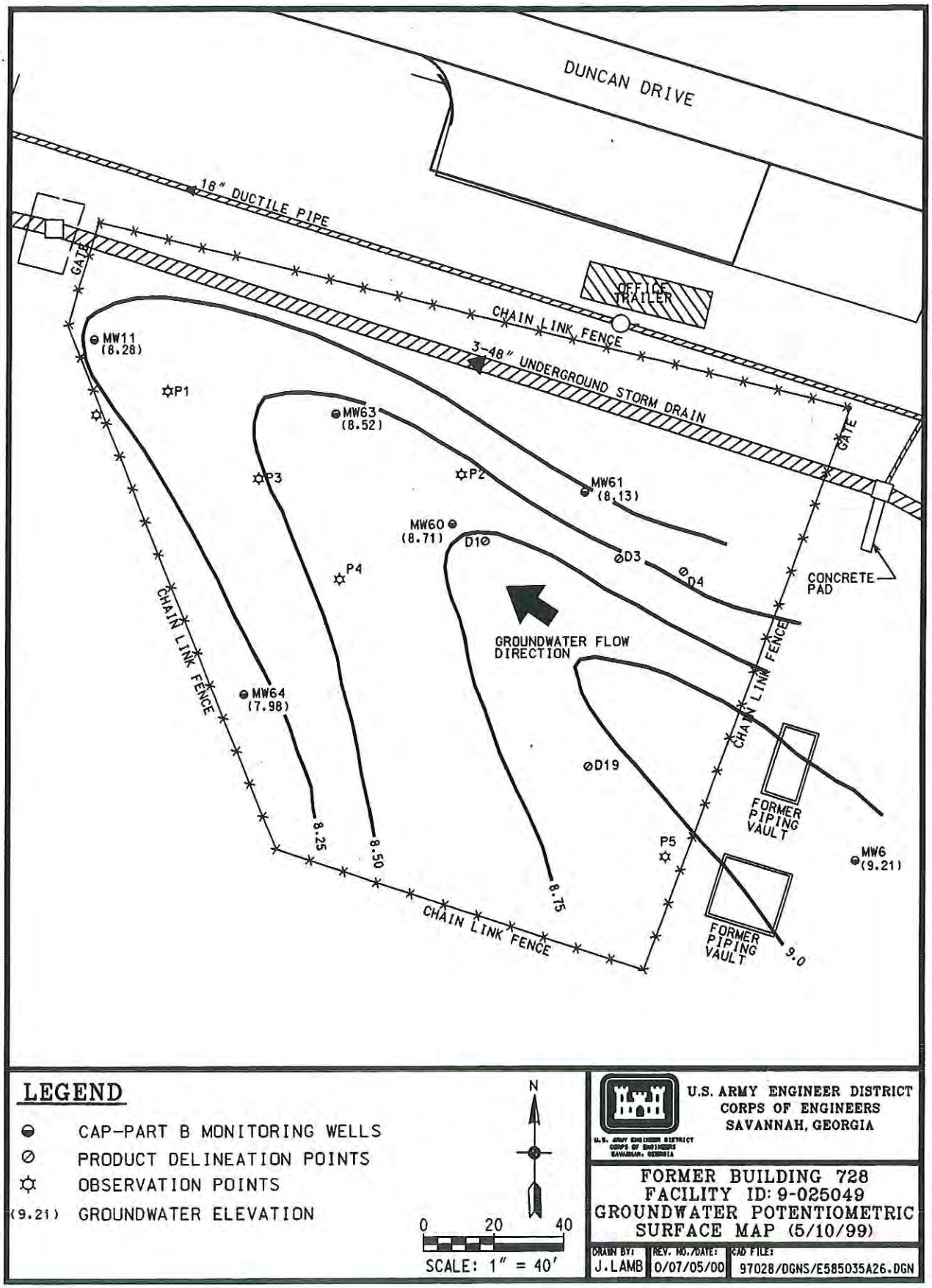

Figure 10. Pilot Study Baseline Groundwater Potentiometric Surface Map (May 1999) at the Former Building 728 Site, Facility ID #9-025049

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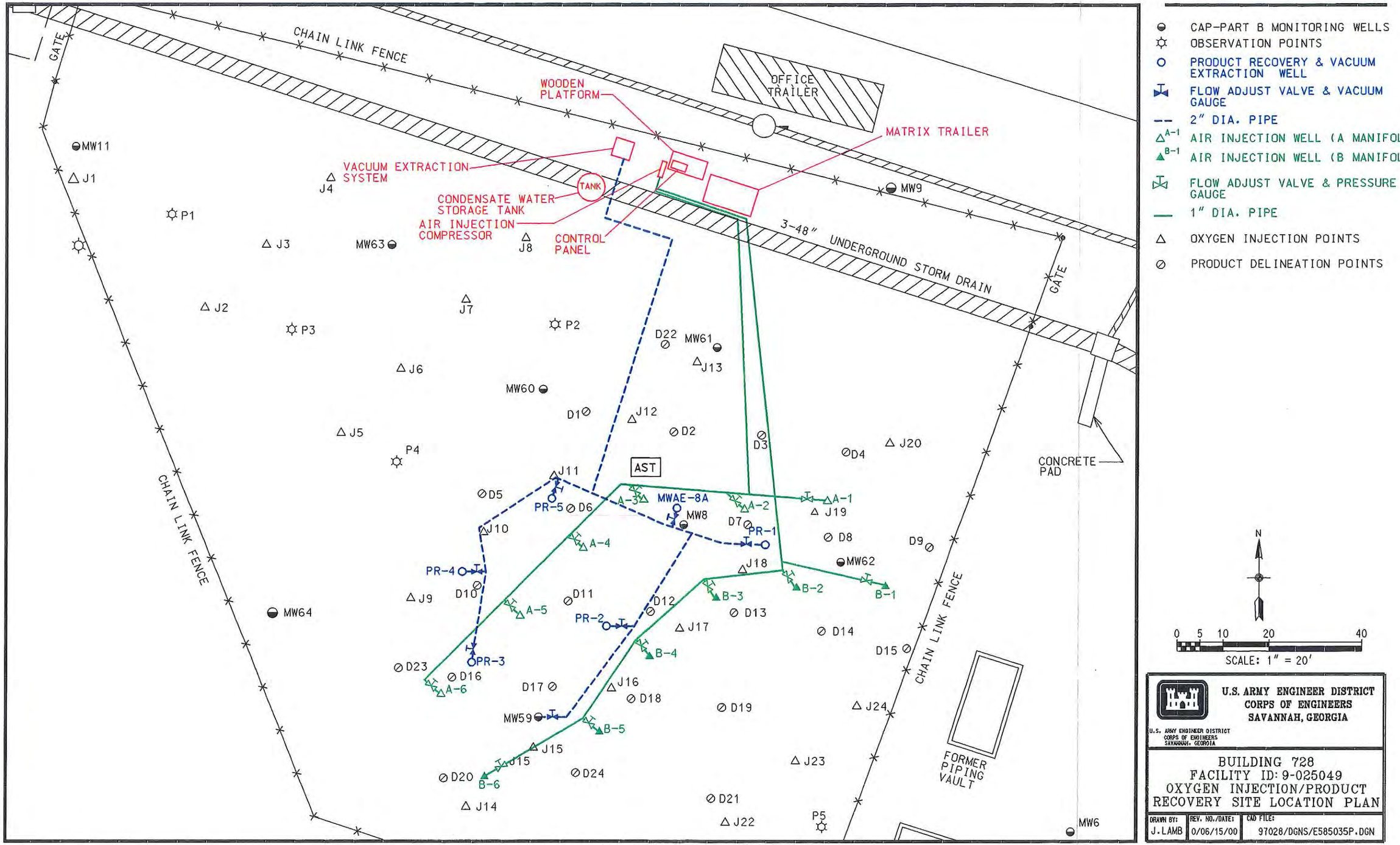

Figure 11. Product Recovery Locations and System at the Former Building 728 Site, Facility ID #9-025049

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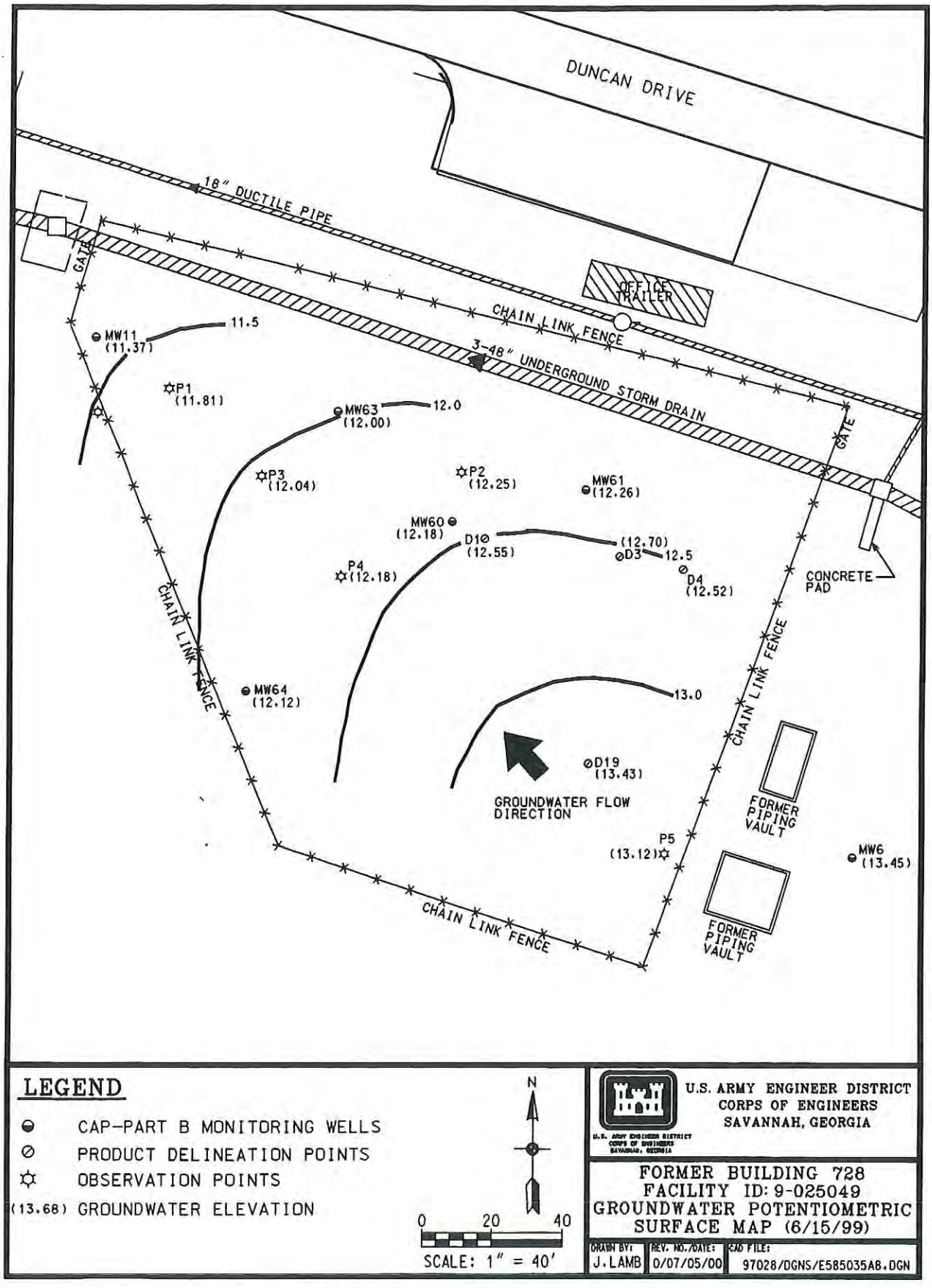

Figure 13. Pilot Study Groundwater Potentiometric Surface Map (June 1999) at the Former Building 728 Site, Facility ID #9-025049

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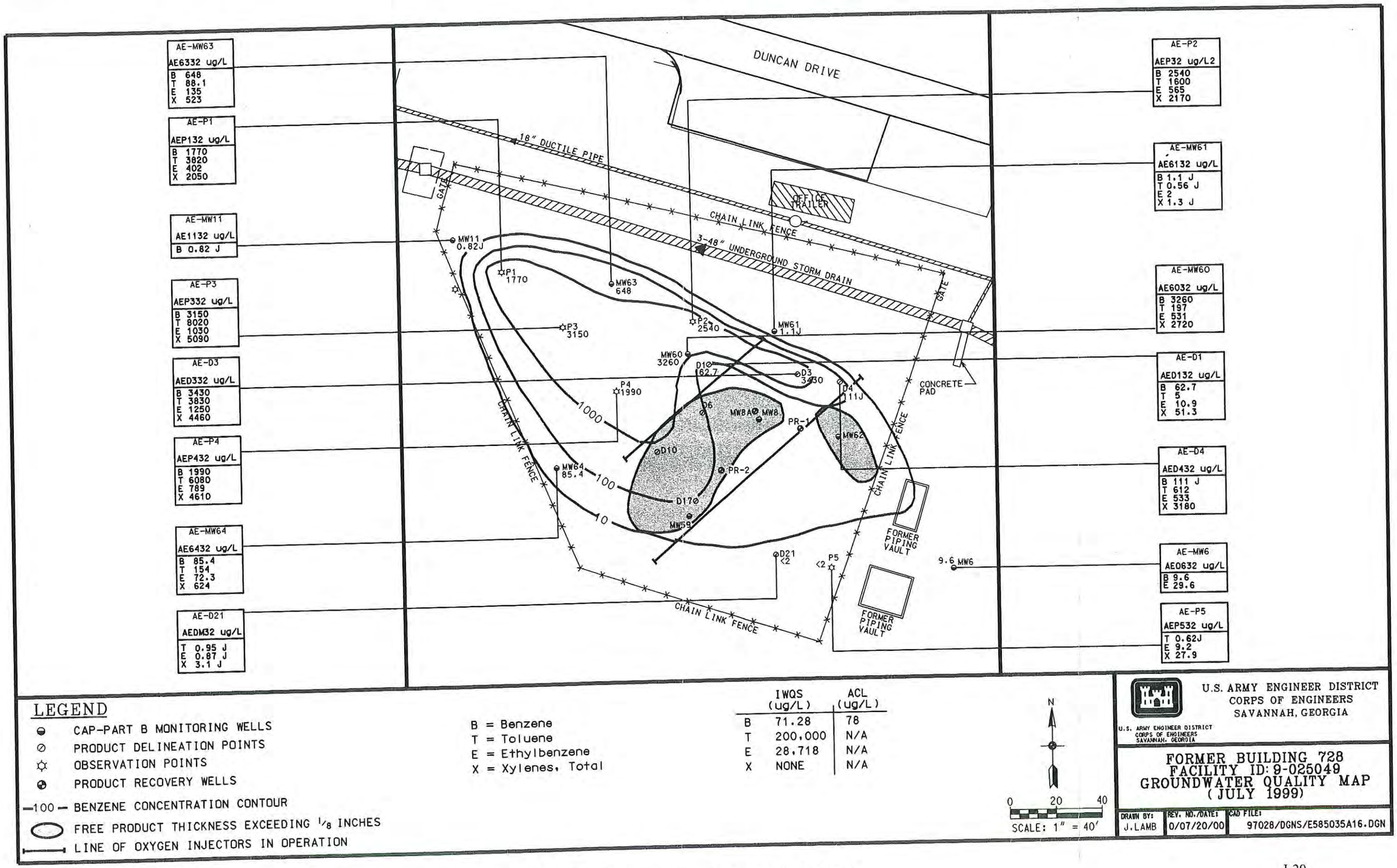

LEGEND

- CAP-PART B MONITORING WELLS
- PRODUCT DELINEATION POINTS
- OBSERVATION POINTS
- PRODUCT RECOVERY WELLS
- —100— BENZENE CONCENTRATION CONTOUR
- FREE PRODUCT THICKNESS EXCEEDING 1/8 INCHES
- LINE OF OXYGEN INJECTORS IN OPERATION

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes, Total

	IWQS (ug/L)	ACL (ug/L)
B	71.28	78
T	200,000	N/A
E	28,718	N/A
X	NONE	N/A

N

0 20 40
SCALE: 1" = 40'

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FORMER BUILDING 728
FACILITY ID: 9-025049
GROUNDWATER QUALITY MAP
(JULY 1999)

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Figure 14. Pilot Study Groundwater Analytical Results (July 1999) at the Former Building 728 Site, Facility ID #9-025049

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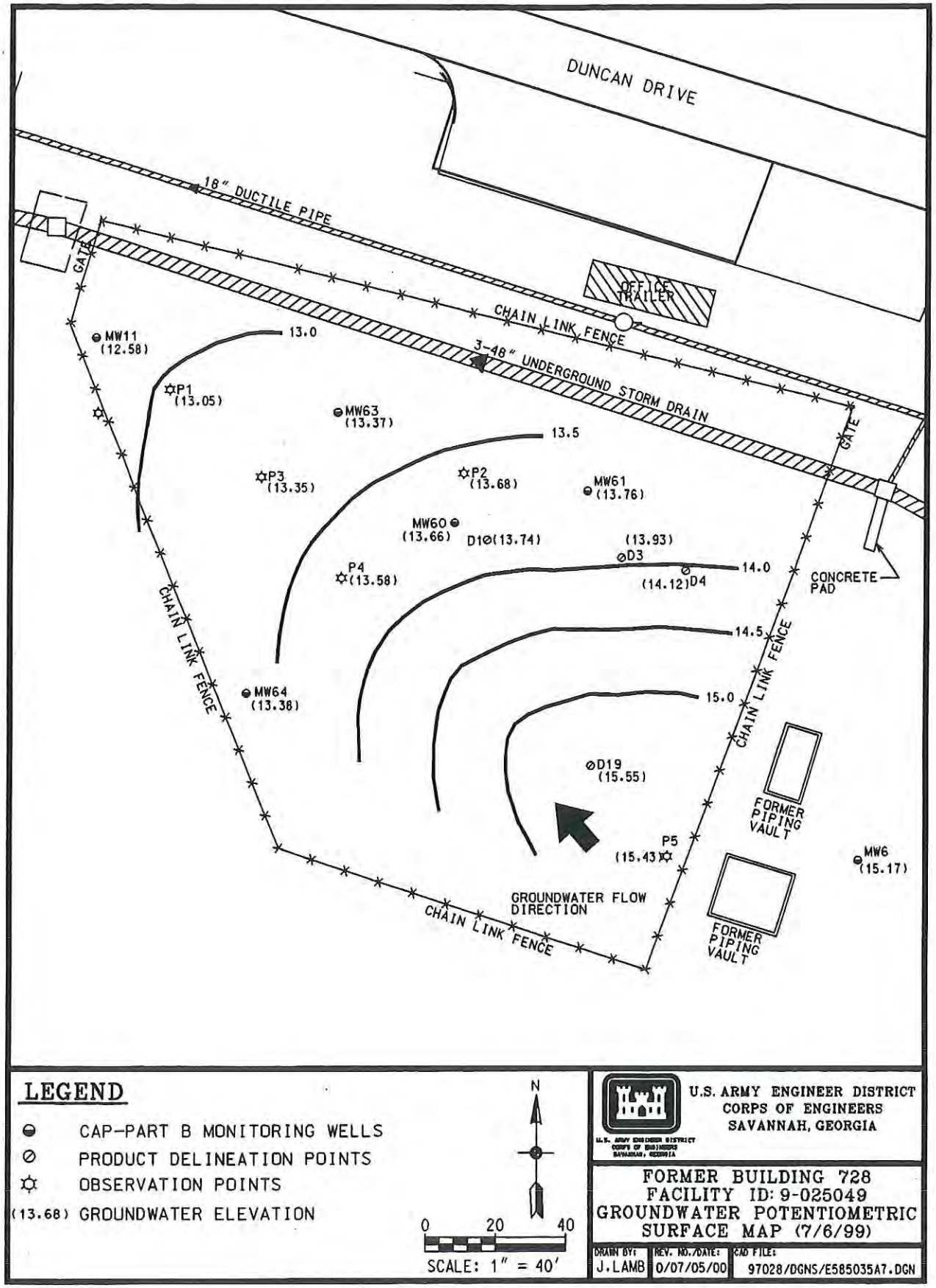

Figure 15. Pilot Study Groundwater Potentiometric Surface Map (July 1999) at the Former Building 728 Site, Facility ID #9-025049

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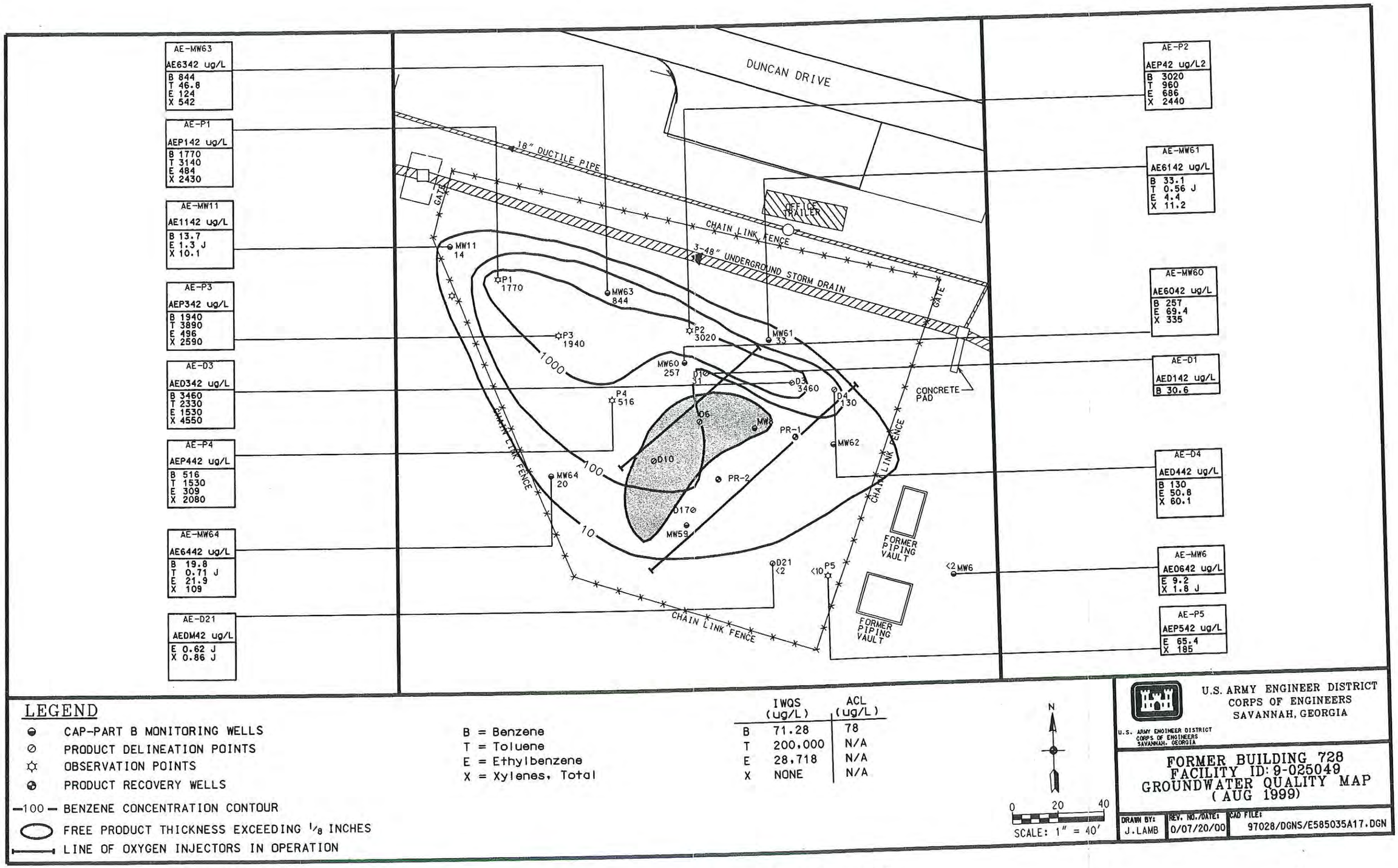

Figure 16. Pilot Study Groundwater Analytical Results (August 1999) at the Former Building 728 Site, Facility ID #9-025049

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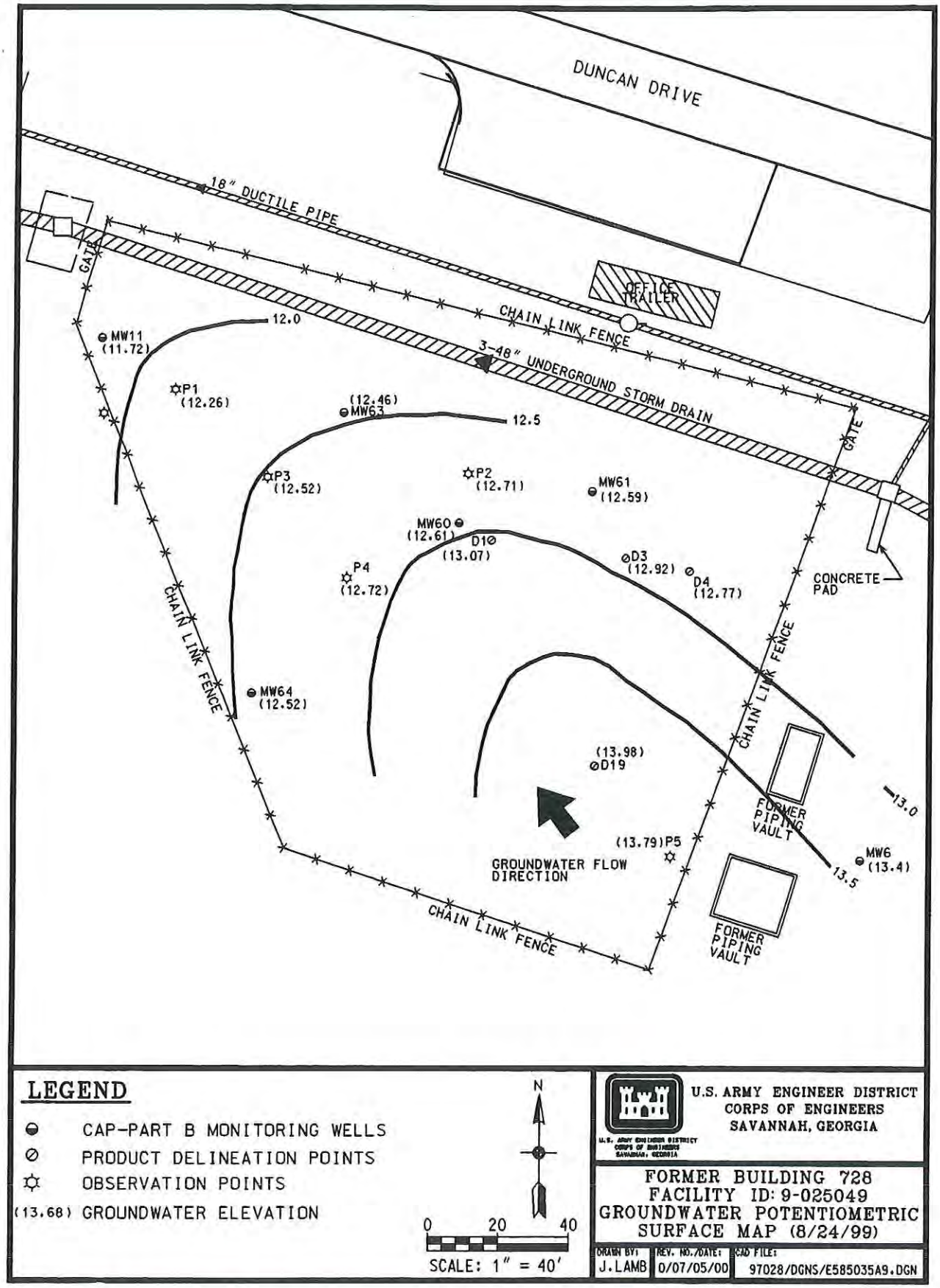

Figure 17. Pilot Study Groundwater Potentiometric Surface Map (August 1999) at the Former Building 728 Site, Facility ID #9-025049

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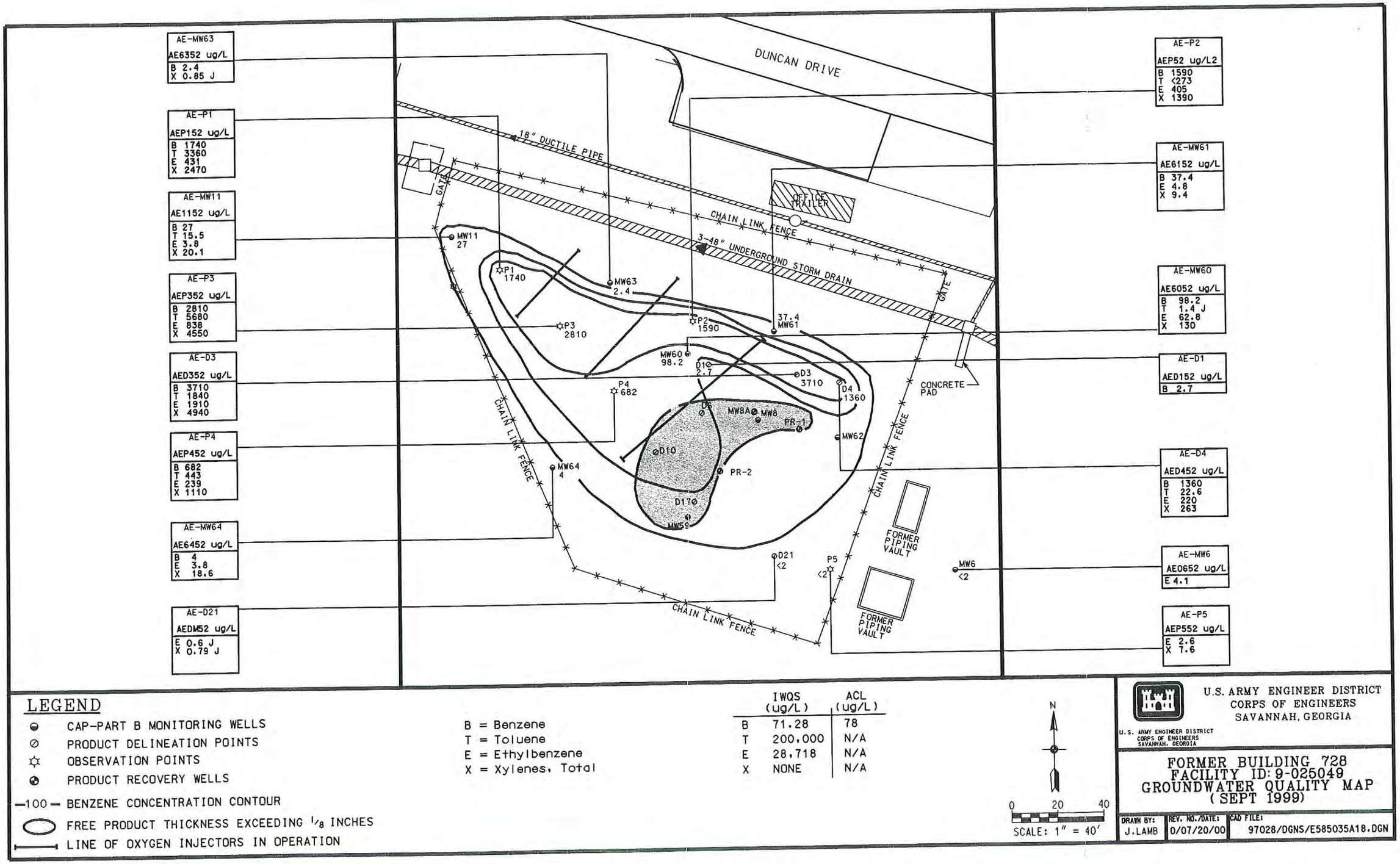

Figure 18. Pilot Study Groundwater Analytical Results (September 1999) at the Former Building 728 Site, Facility ID #9-025049

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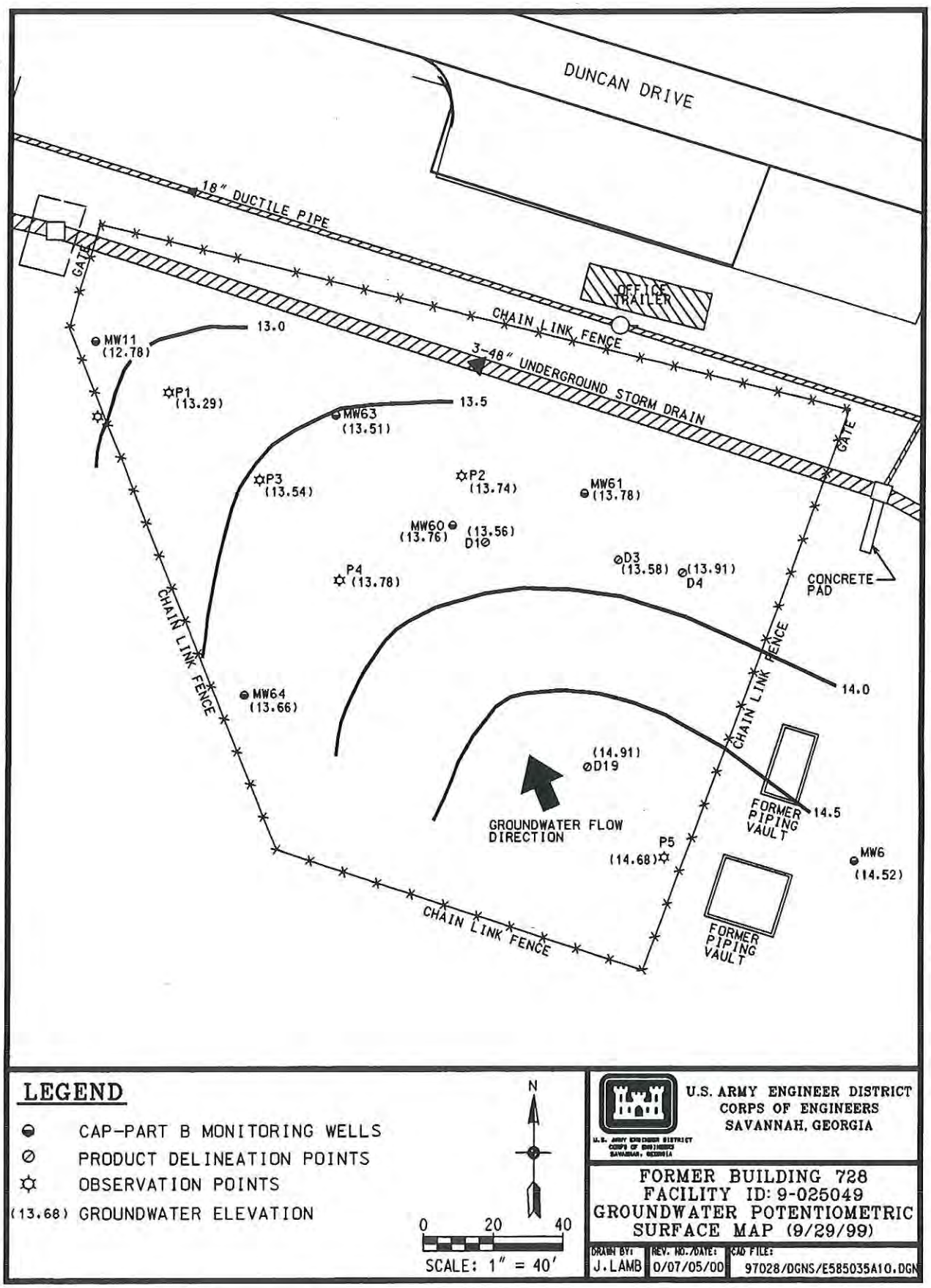

Figure 19. Pilot Study Groundwater Potentiometric Surface Map (September 1999) at the Former Building 728 Site, Facility ID #9-025049

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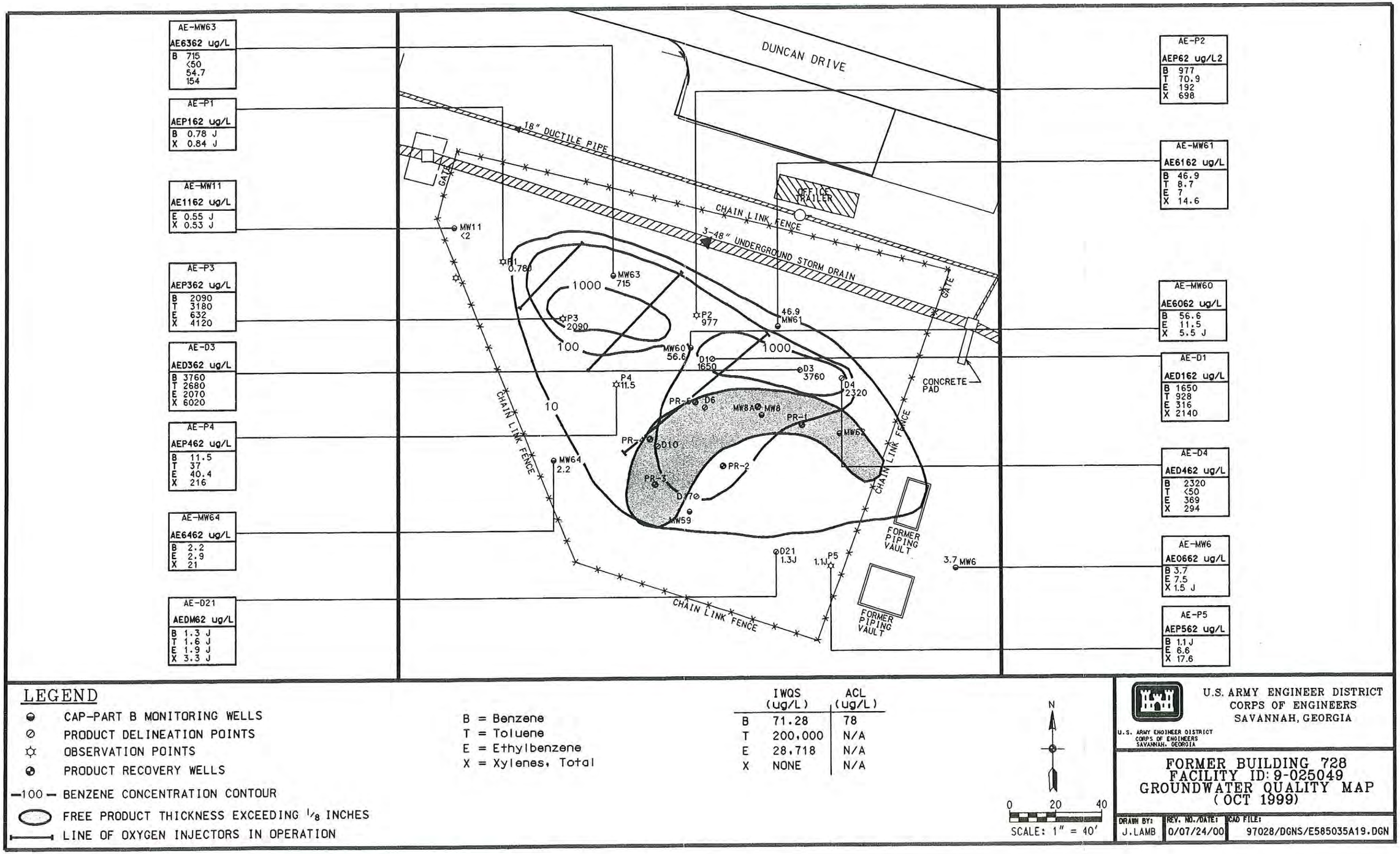

LEGEND

- CAP-PART B MONITORING WELLS
- PRODUCT DELINEATION POINTS
- OBSERVATION POINTS
- PRODUCT RECOVERY WELLS
- —100— BENZENE CONCENTRATION CONTOUR
- FREE PRODUCT THICKNESS EXCEEDING 1/8 INCHES
- LINE OF OXYGEN INJECTORS IN OPERATION

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes, Total

	IWQS (ug/L)	ACL (ug/L)
B	71.28	78
T	200,000	N/A
E	28,718	N/A
X	NONE	N/A

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FORMER BUILDING 728
FACILITY ID: 9-025049
GROUNDWATER QUALITY MAP
(OCT 1999)

DRAWN BY:	REV. NO./DATE:	CAD FILE:
J.LAMB	0/07/24/00	97028/DGNS/E585035A19.DGN

Figure 20. Pilot Study Groundwater Analytical Results (October 1999) at the Former Building 728 Site, Facility ID #9-025049

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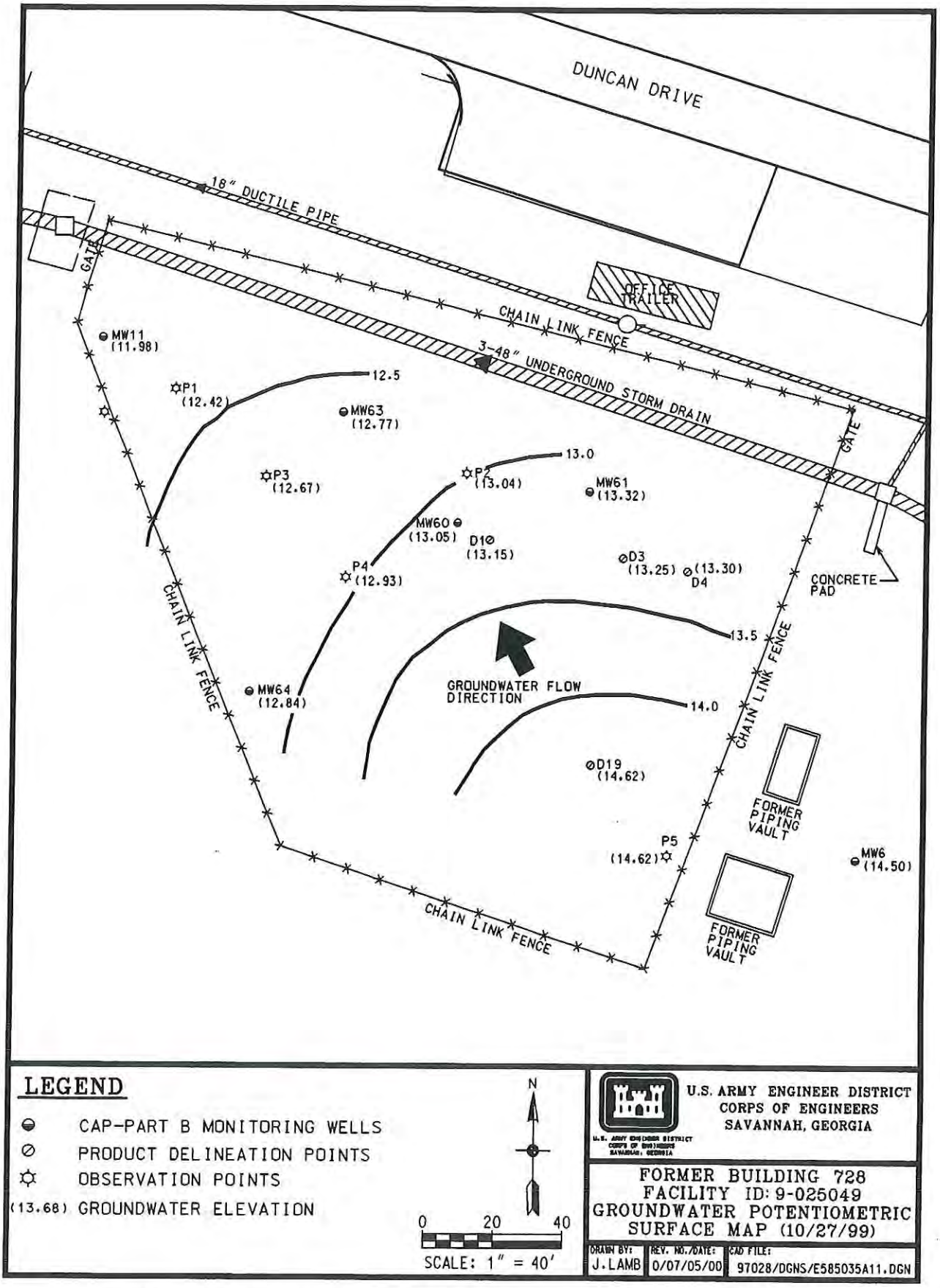

Figure 21. Pilot Study Groundwater Potentiometric Surface Map (October 1999) at the Former Building 728 Site, Facility ID #9-025049

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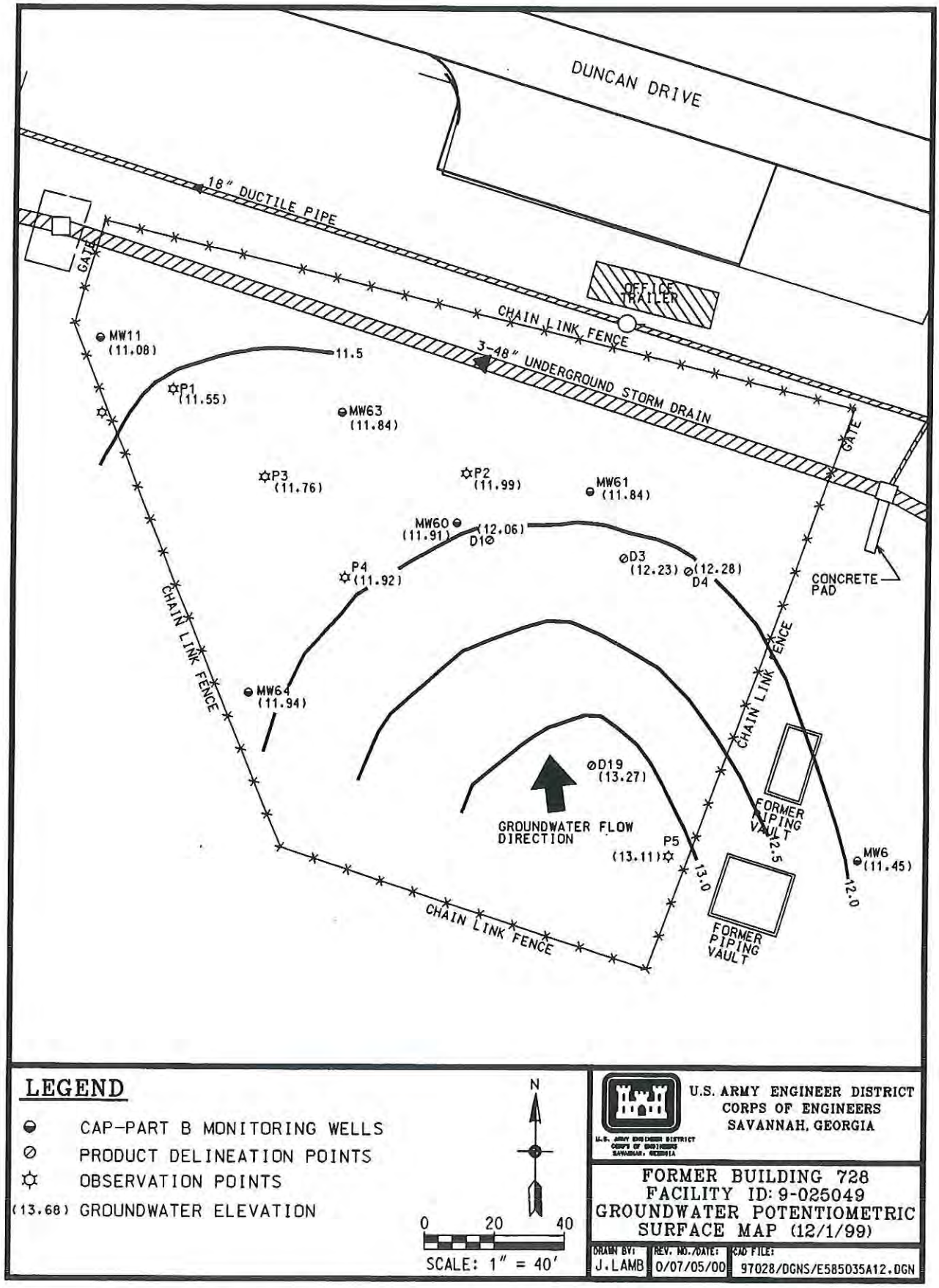

Figure 23. Pilot Study Groundwater Potentiometric Surface Map (December 1999) at the Former Building 728 Site, Facility ID #9-025049

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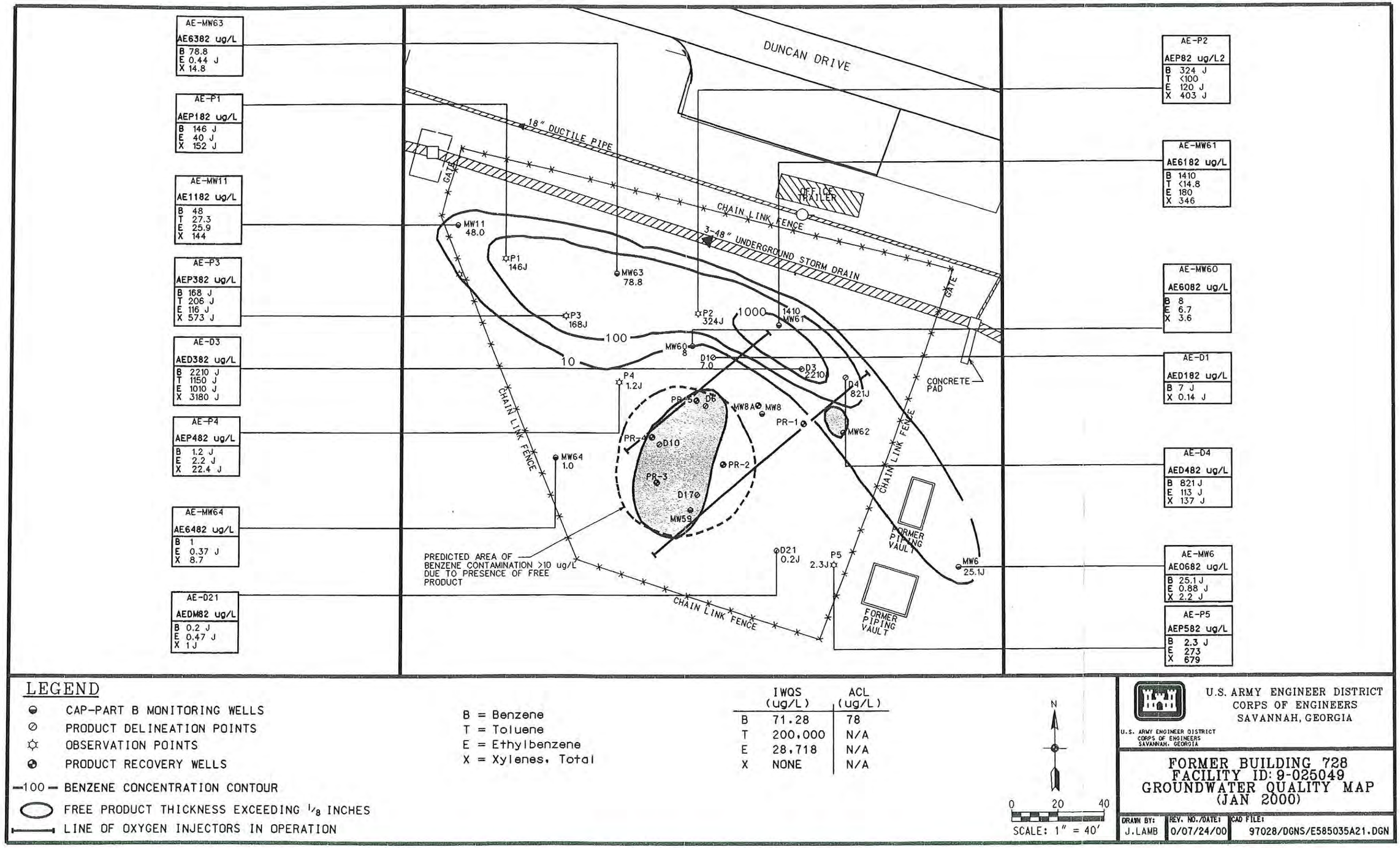

Figure 24. Pilot Study Groundwater Analytical Results (January 2000) at the Former Building 728 Site, Facility ID #9-025049

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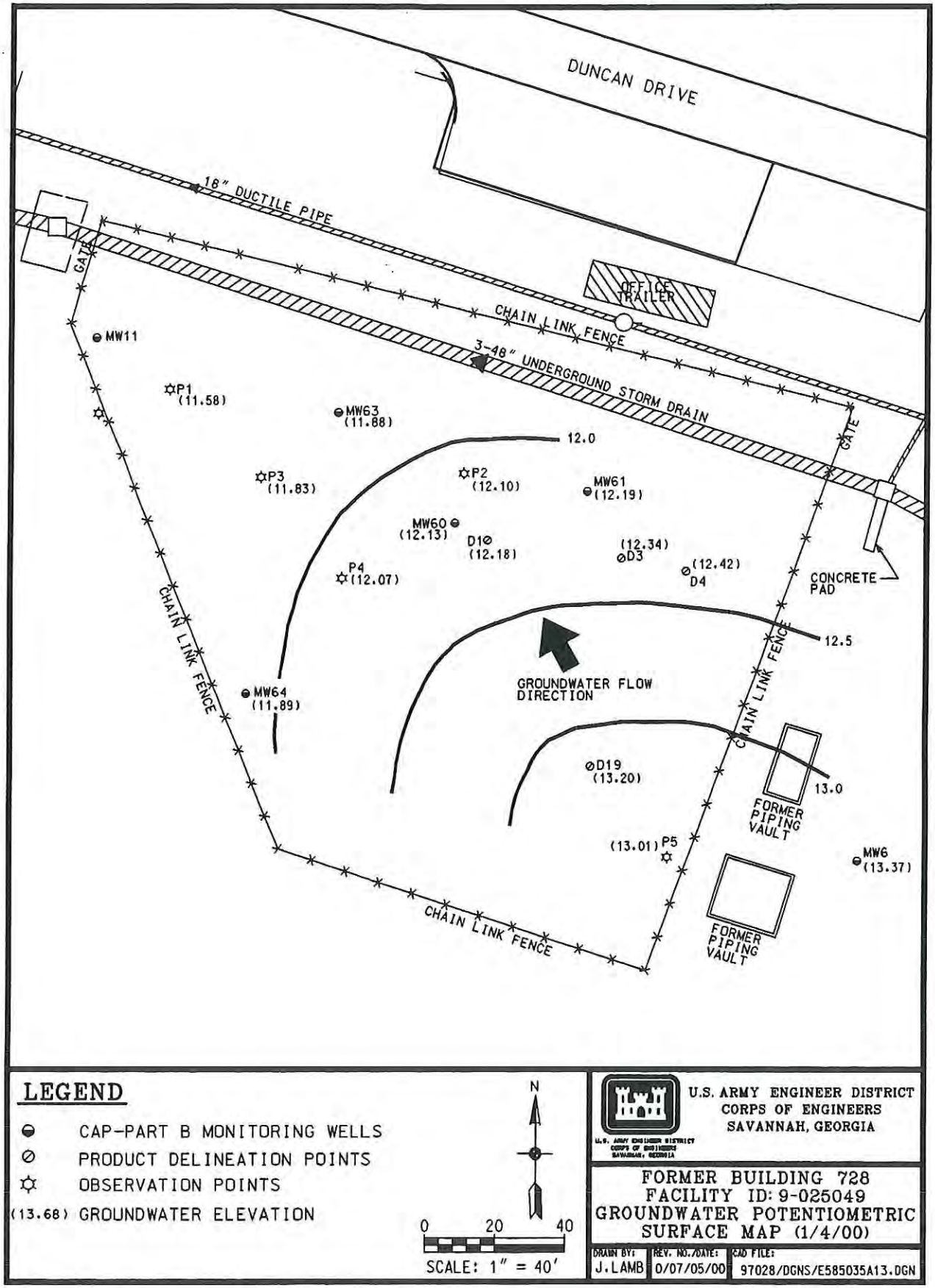

Figure 25. Pilot Study Groundwater Potentiometric Surface Map (January 2000) at the Former Building 728 Site, Facility ID #9-025049

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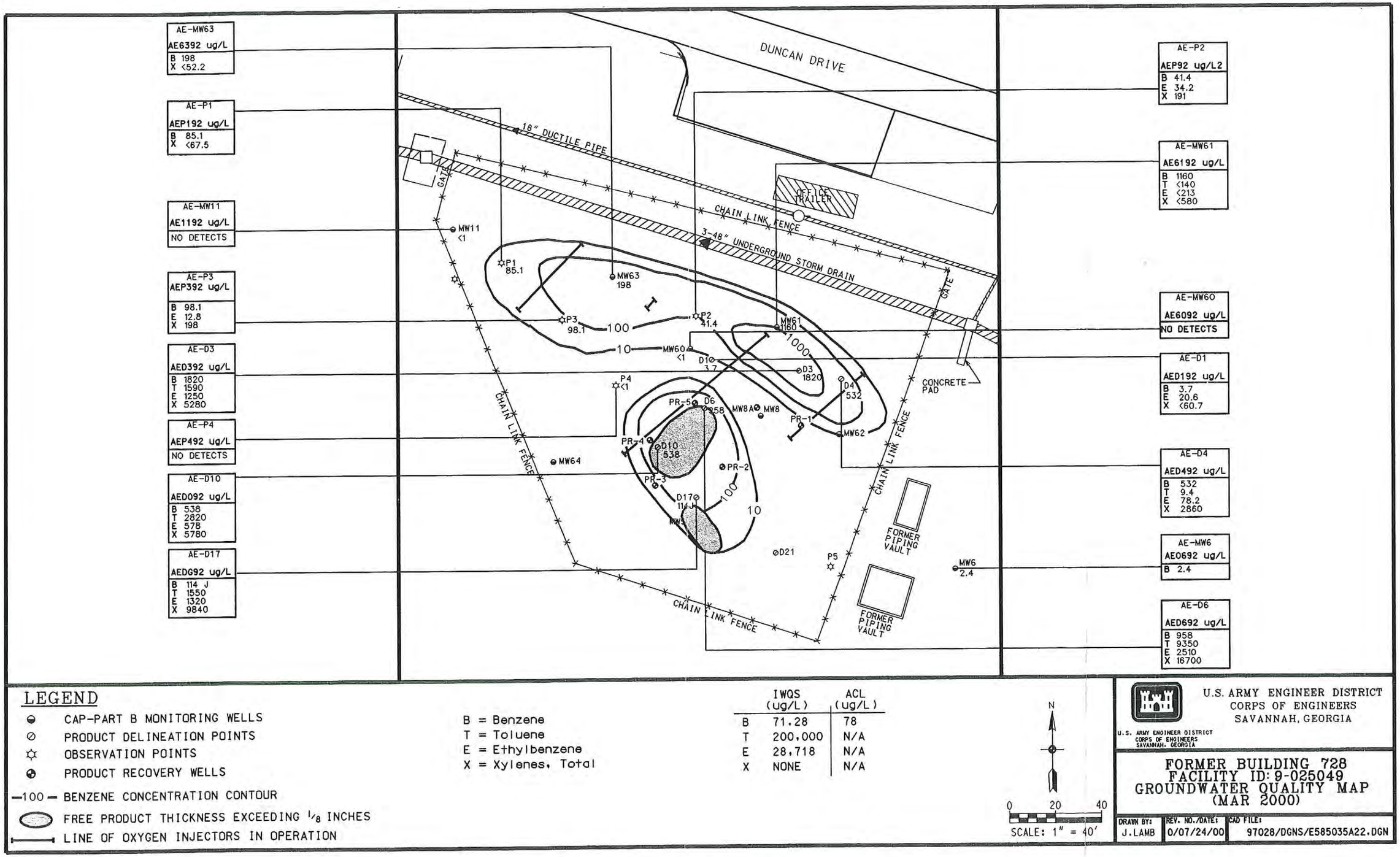

LEGEND

- CAP-PART B MONITORING WELLS
- PRODUCT DELINEATION POINTS
- OBSERVATION POINTS
- PRODUCT RECOVERY WELLS
- —100— BENZENE CONCENTRATION CONTOUR
- FREE PRODUCT THICKNESS EXCEEDING 1/8 INCHES
- LINE OF OXYGEN INJECTORS IN OPERATION

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes, Total

	IWQS (ug/L)	ACL (ug/L)
B	71.28	78
T	200.000	N/A
E	28.718	N/A
X	NONE	N/A

N

0 20 40
SCALE: 1" = 40'

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FORMER BUILDING 728
FACILITY ID: 9-025049
GROUNDWATER QUALITY MAP
(MAR 2000)

DRAWN BY:	REV. NO./DATE:	CAD FILE:
J.LAMB	0/07/24/00	97028/DGNS/E585035A22.DGN

Figure 26. Pilot Study Groundwater Analytical Results (March 2000) at the Former Building 728 Site, Facility ID #9-025049

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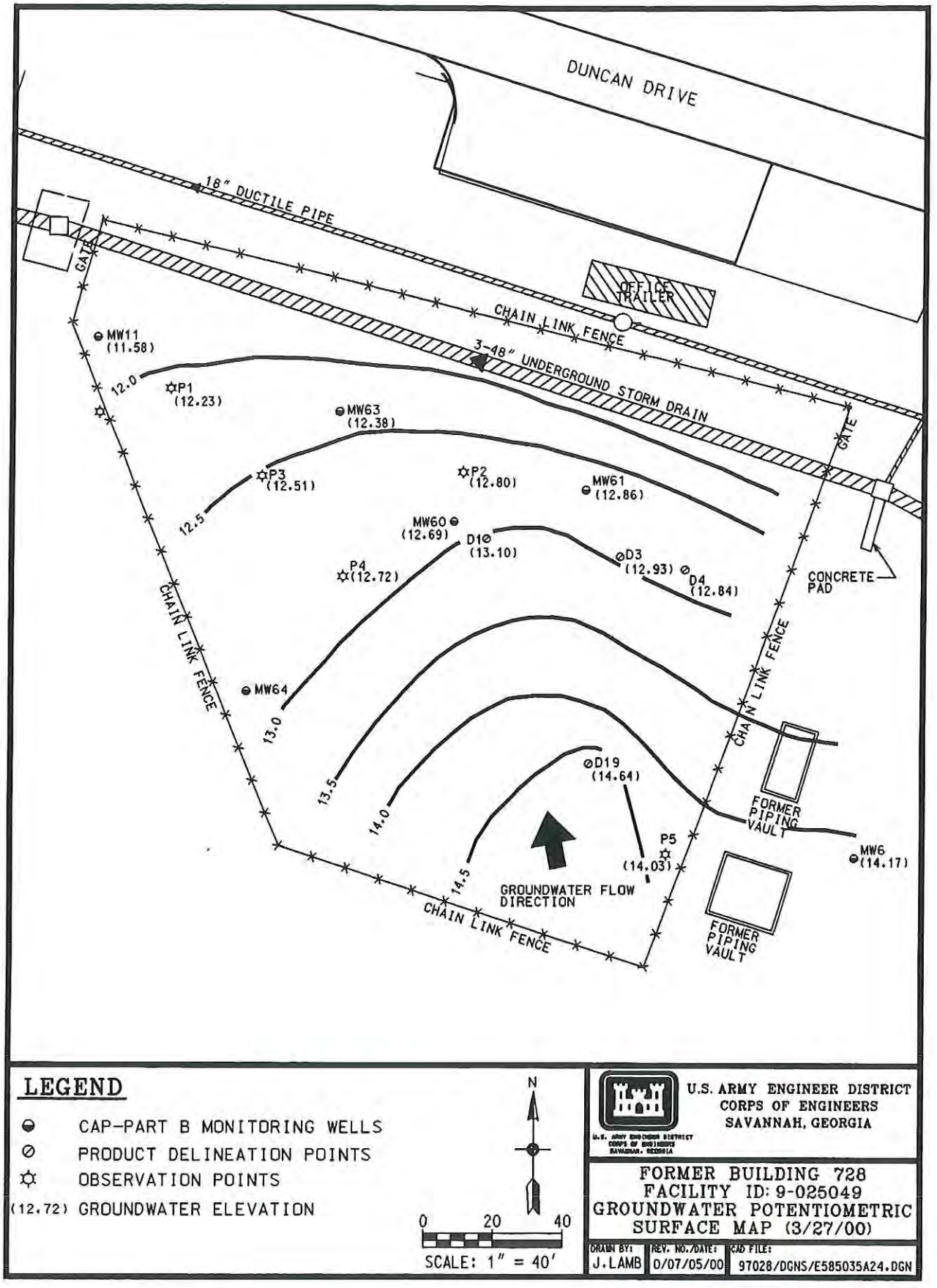

Figure 27. Pilot Study Groundwater Potentiometric Surface Map (March 2000) at the Former Building 728 Site, Facility ID #9-025049

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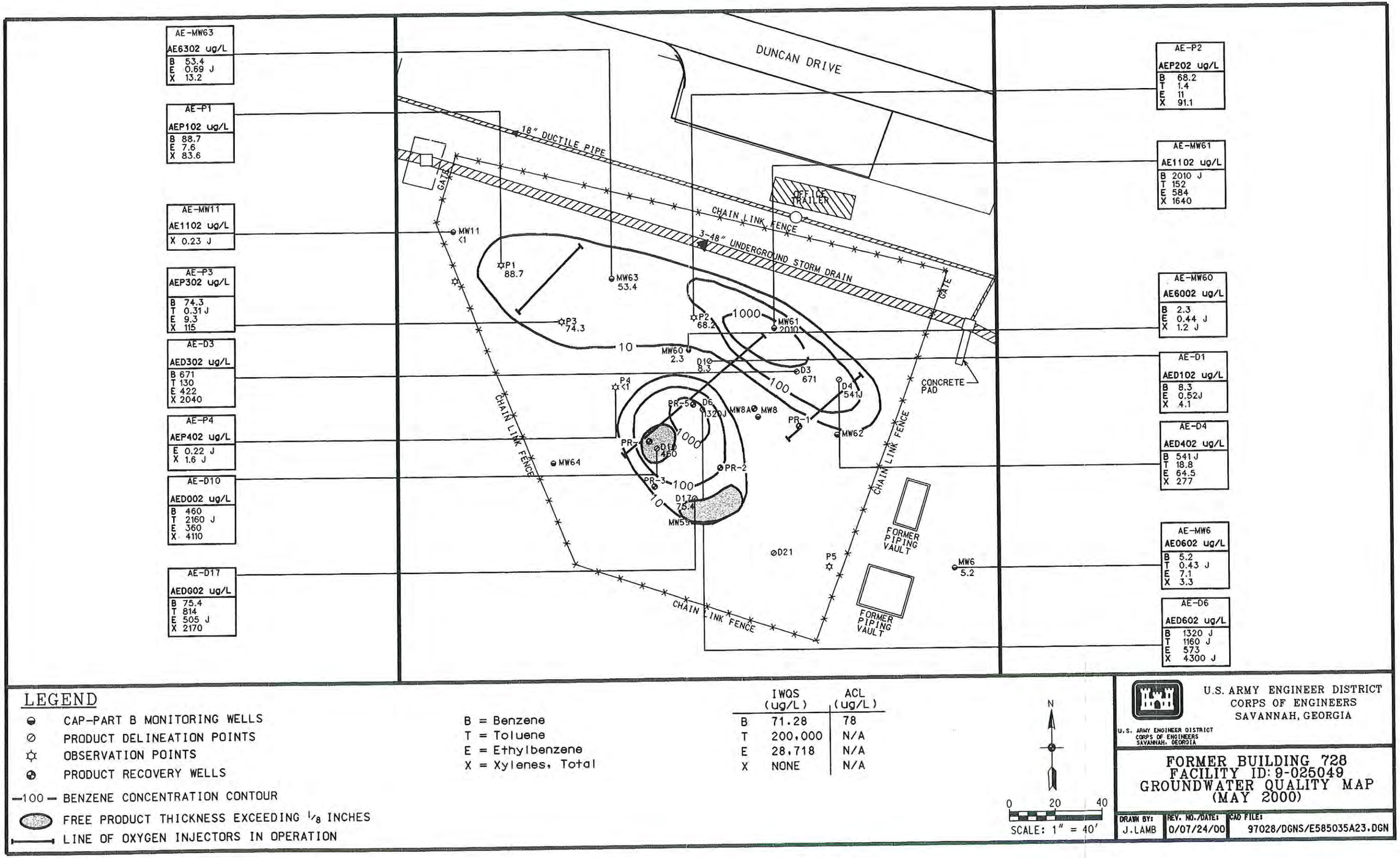

LEGEND

- CAP-PART B MONITORING WELLS
- PRODUCT DELINEATION POINTS
- OBSERVATION POINTS
- PRODUCT RECOVERY WELLS
- —100— BENZENE CONCENTRATION CONTOUR
- FREE PRODUCT THICKNESS EXCEEDING 1/8 INCHES
- LINE OF OXYGEN INJECTORS IN OPERATION

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes, Total

	IWQS (ug/L)	ACL (ug/L)
B	71.28	78
T	200,000	N/A
E	28,718	N/A
X	NONE	N/A

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FORMER BUILDING 728
FACILITY ID: 9-025049
GROUNDWATER QUALITY MAP
(MAY 2000)

DRAWN BY:	REV. NO./DATE:	CAD FILE:
J.LAMB	0/07/24/00	97028/DGNS/E585035A23.DGN

Figure 28. Pilot Study Groundwater Analytical Results (May 2000)
at the Former Building 728 Site, Facility ID #9-025049

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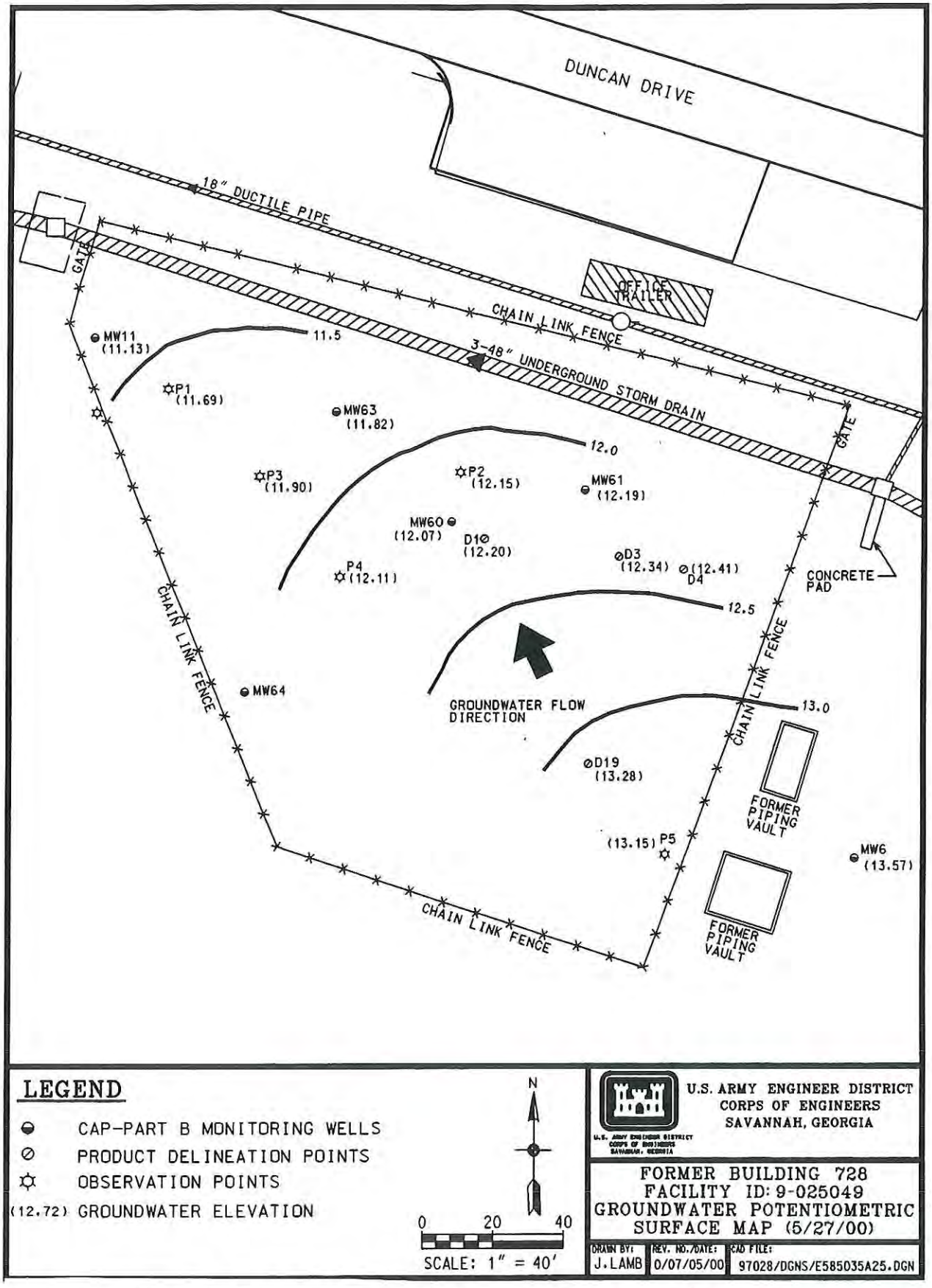

Figure 29. Pilot Study Groundwater Potentiometric Surface Map (May 2000) at the Former Building 728 Site, Facility ID #9-025049

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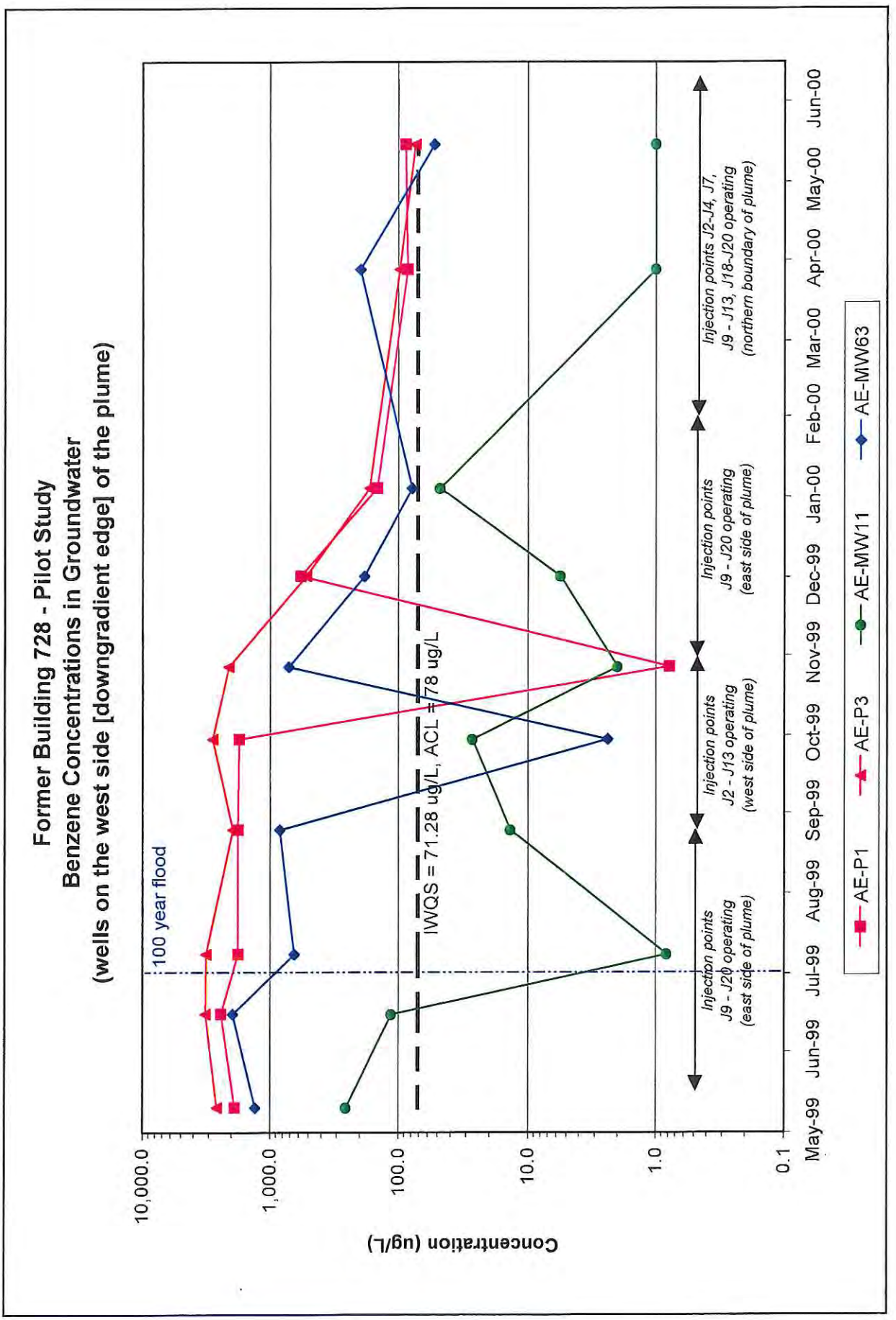

Figure 30a. Pilot Study Trend of Benzene Concentrations in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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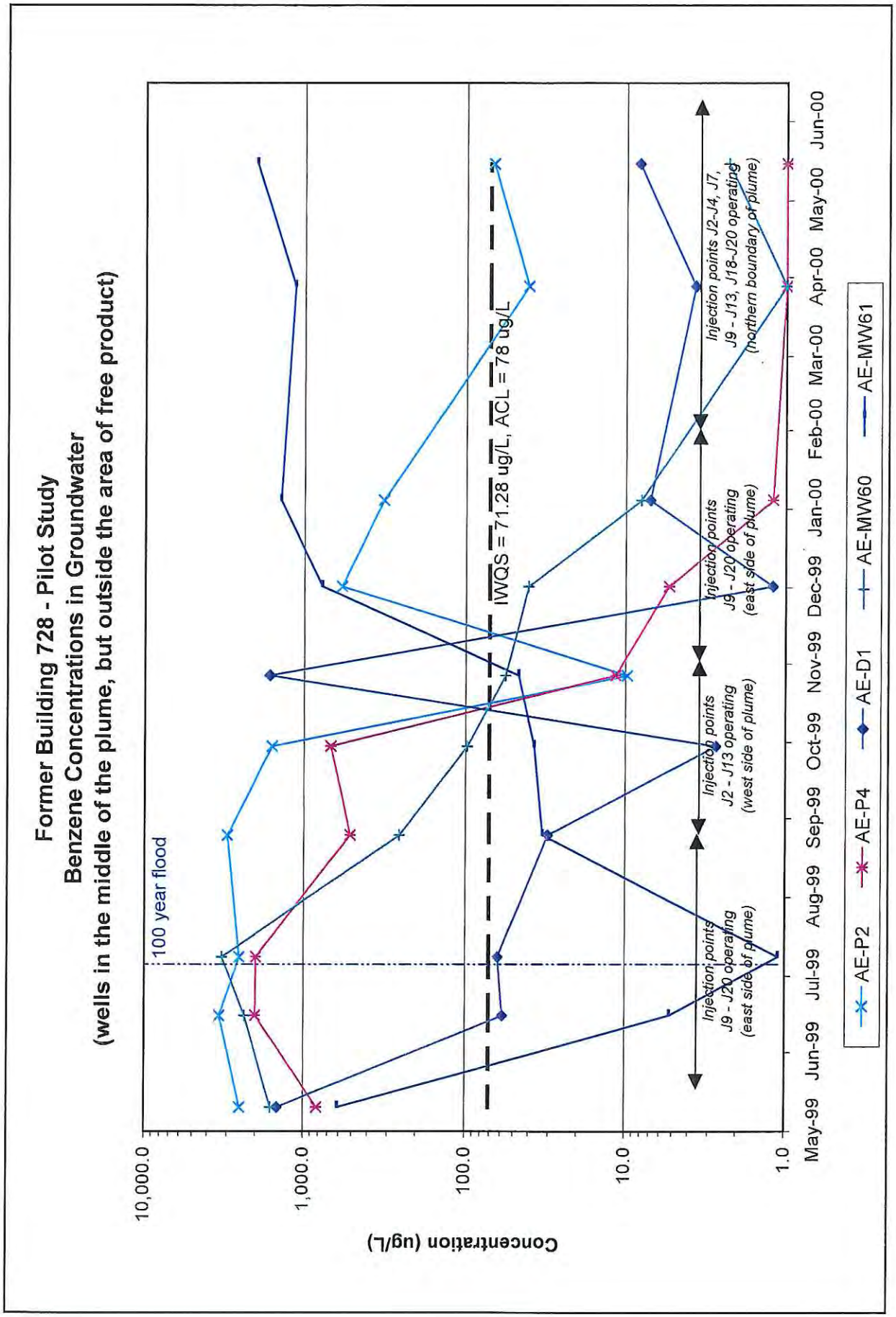

Figure 30b. Pilot Study Trend of Benzene Concentrations in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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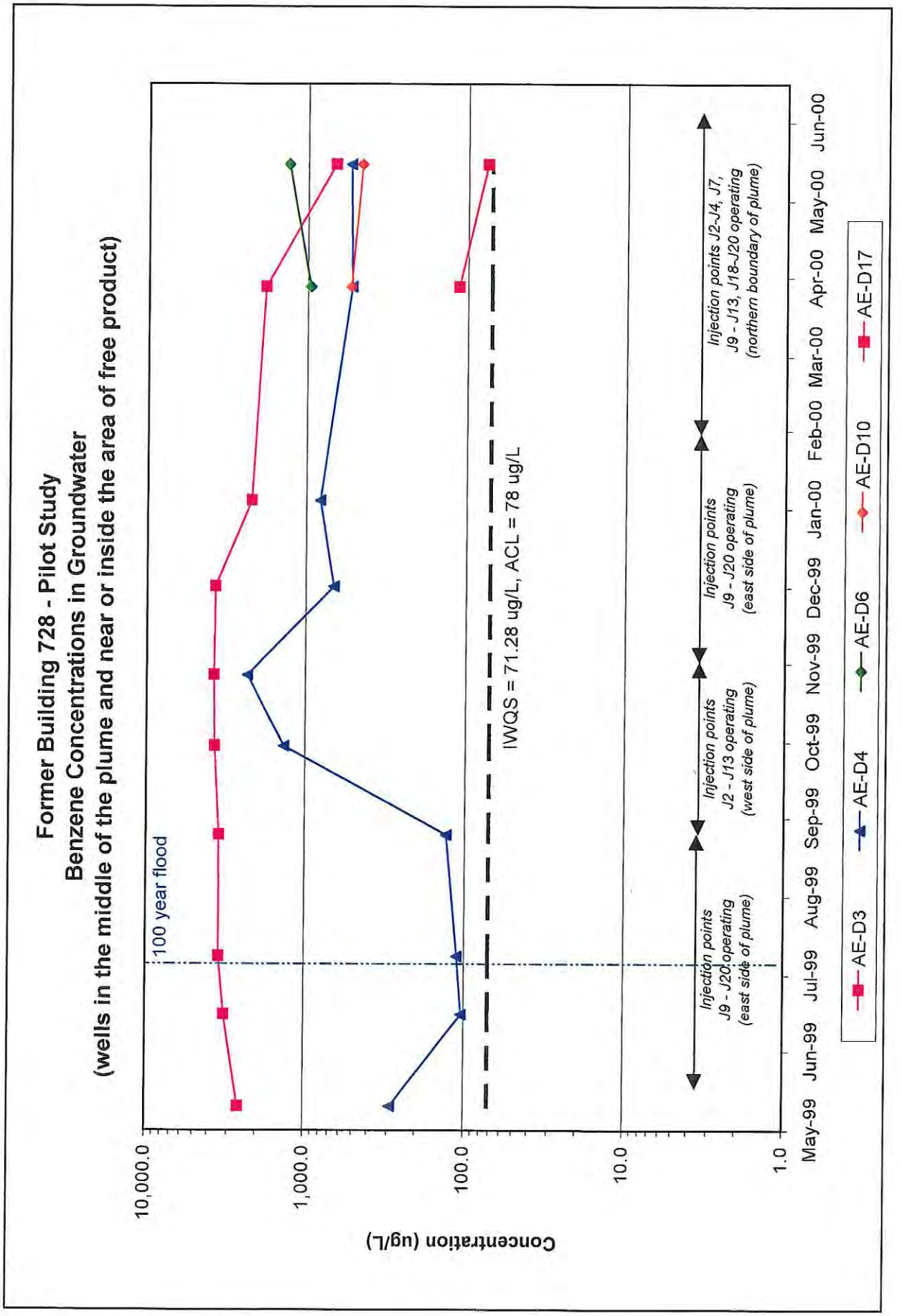

Figure 30c. Pilot Study Trend of Benzene Concentrations in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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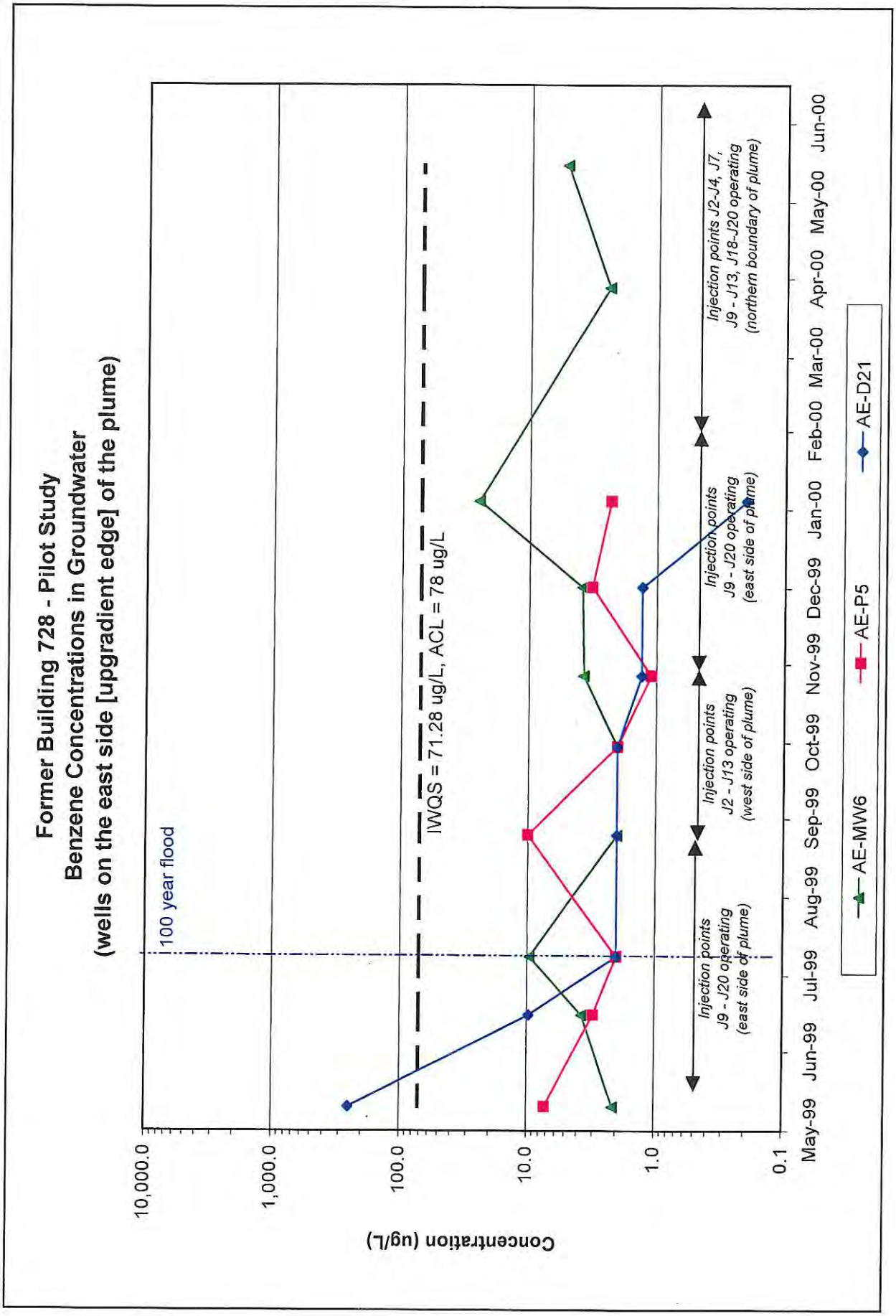

Figure 30d. Pilot Study Trend of Benzene Concentrations in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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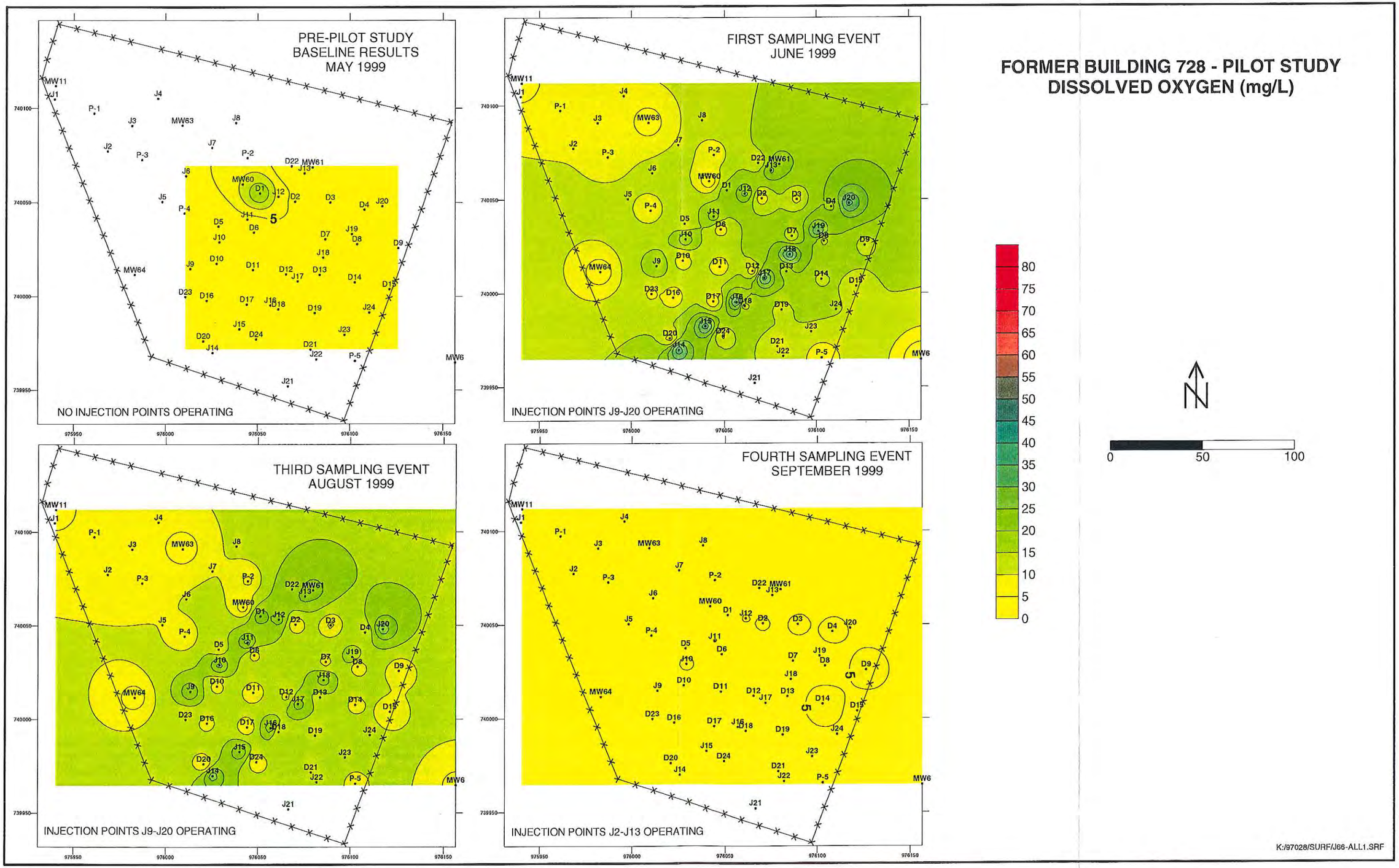

Figure 31a. Pilot Study Dissolved Oxygen in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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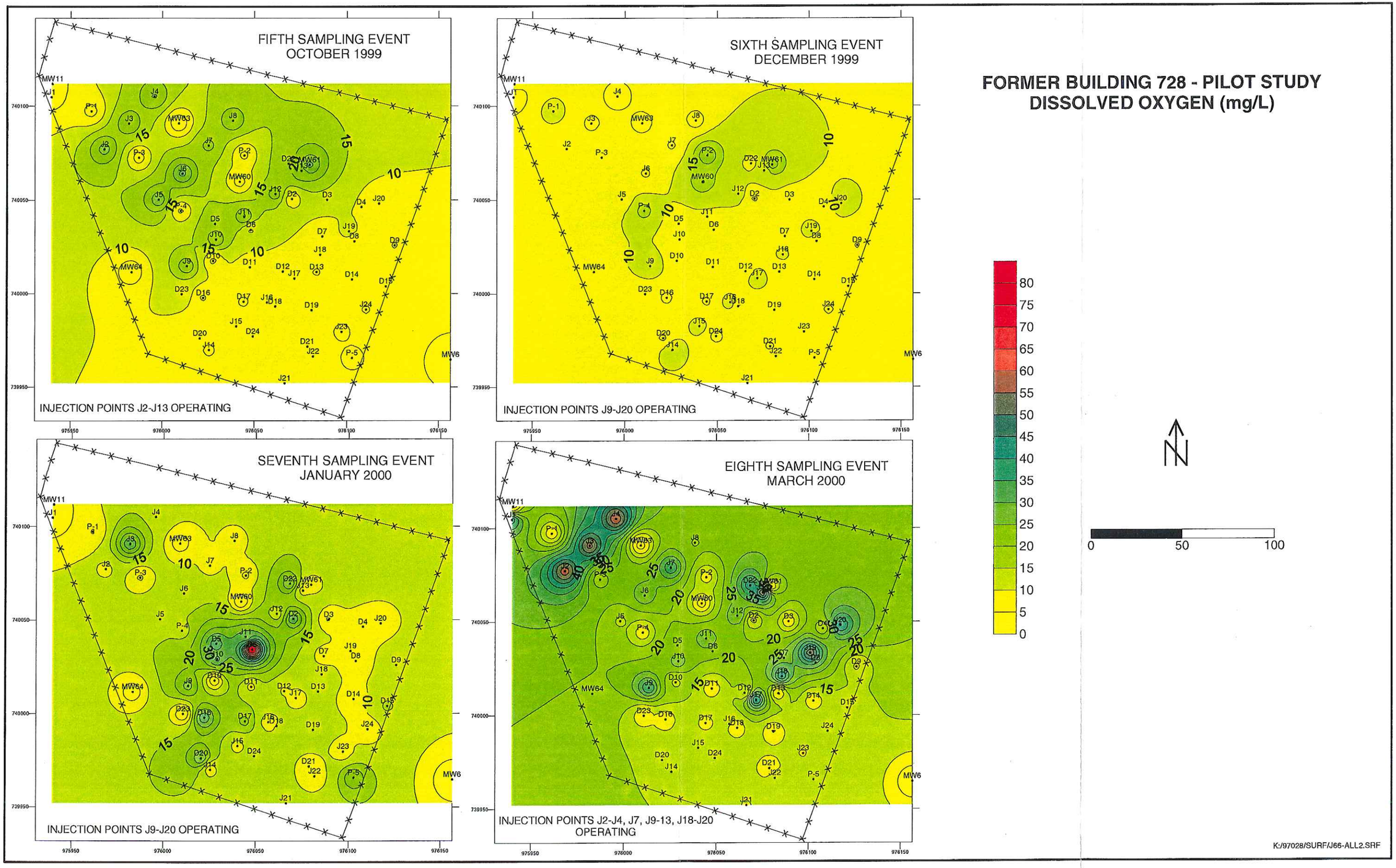

Figure 31b. Pilot Study Dissolved Oxygen in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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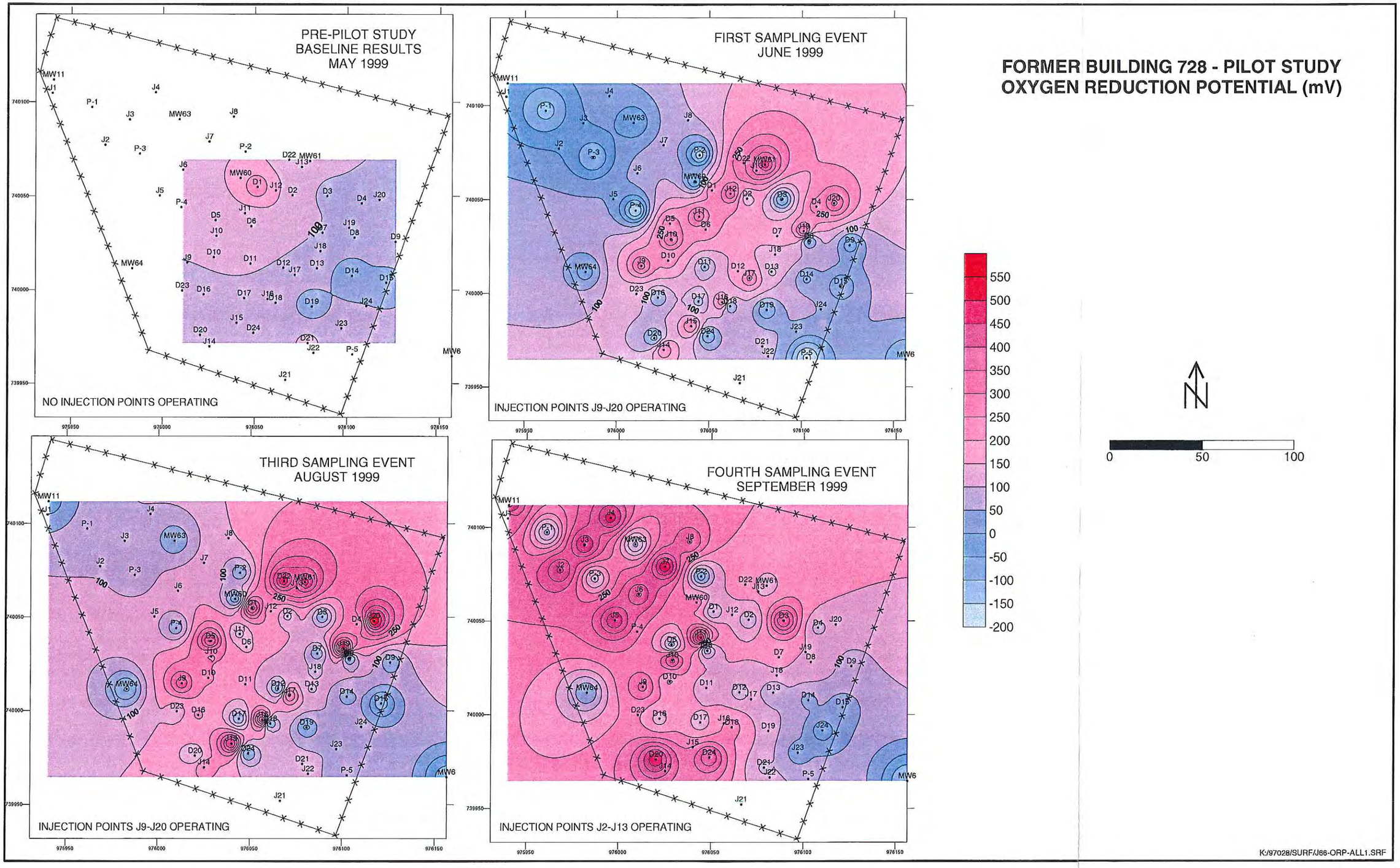

Figure 32a. Pilot Study Oxygen Reduction Potential in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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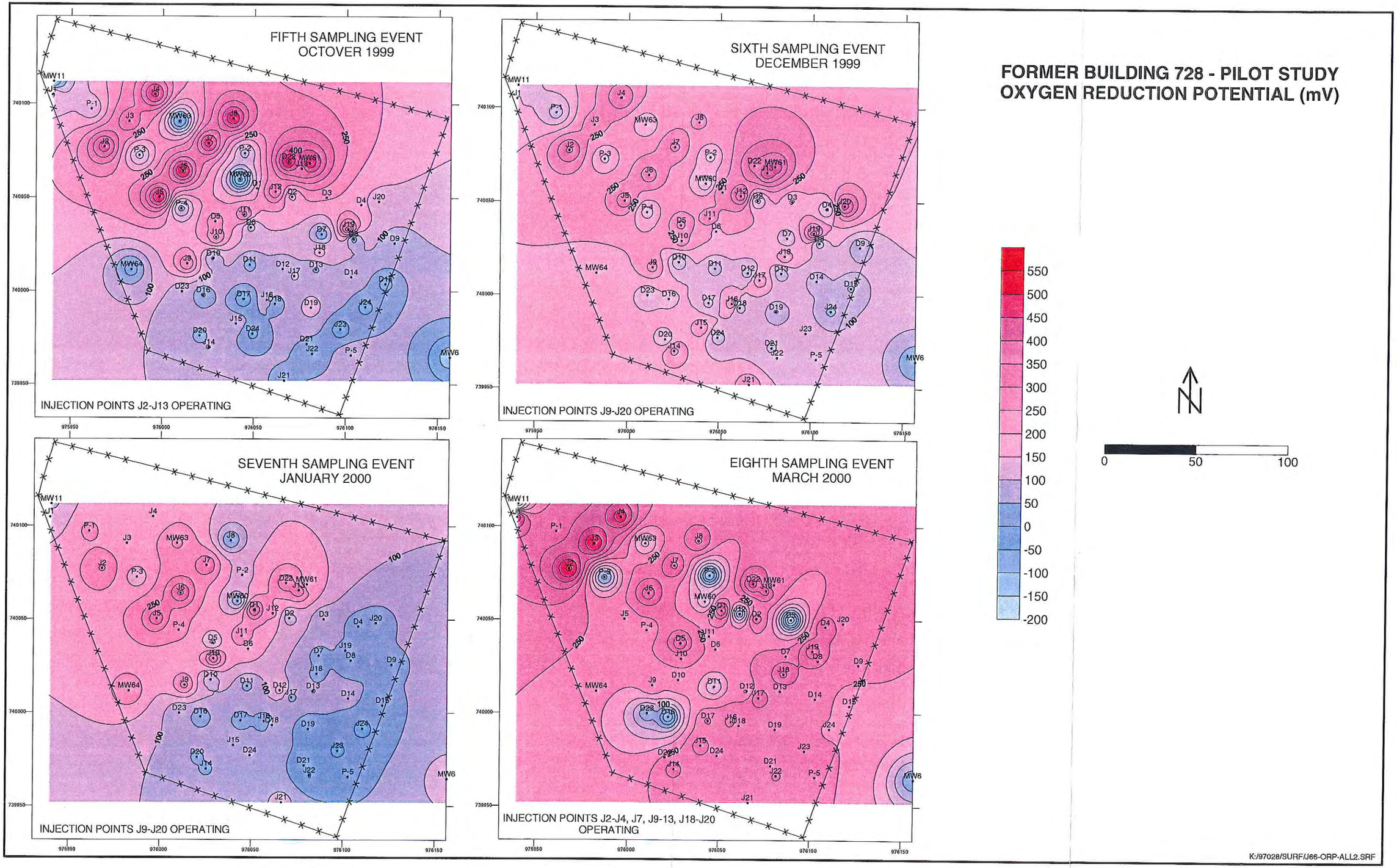

Figure 32b. Pilot Study Oxygen Reduction Potential in Groundwater at the Former Building 728 Site, Facility ID #9-025049

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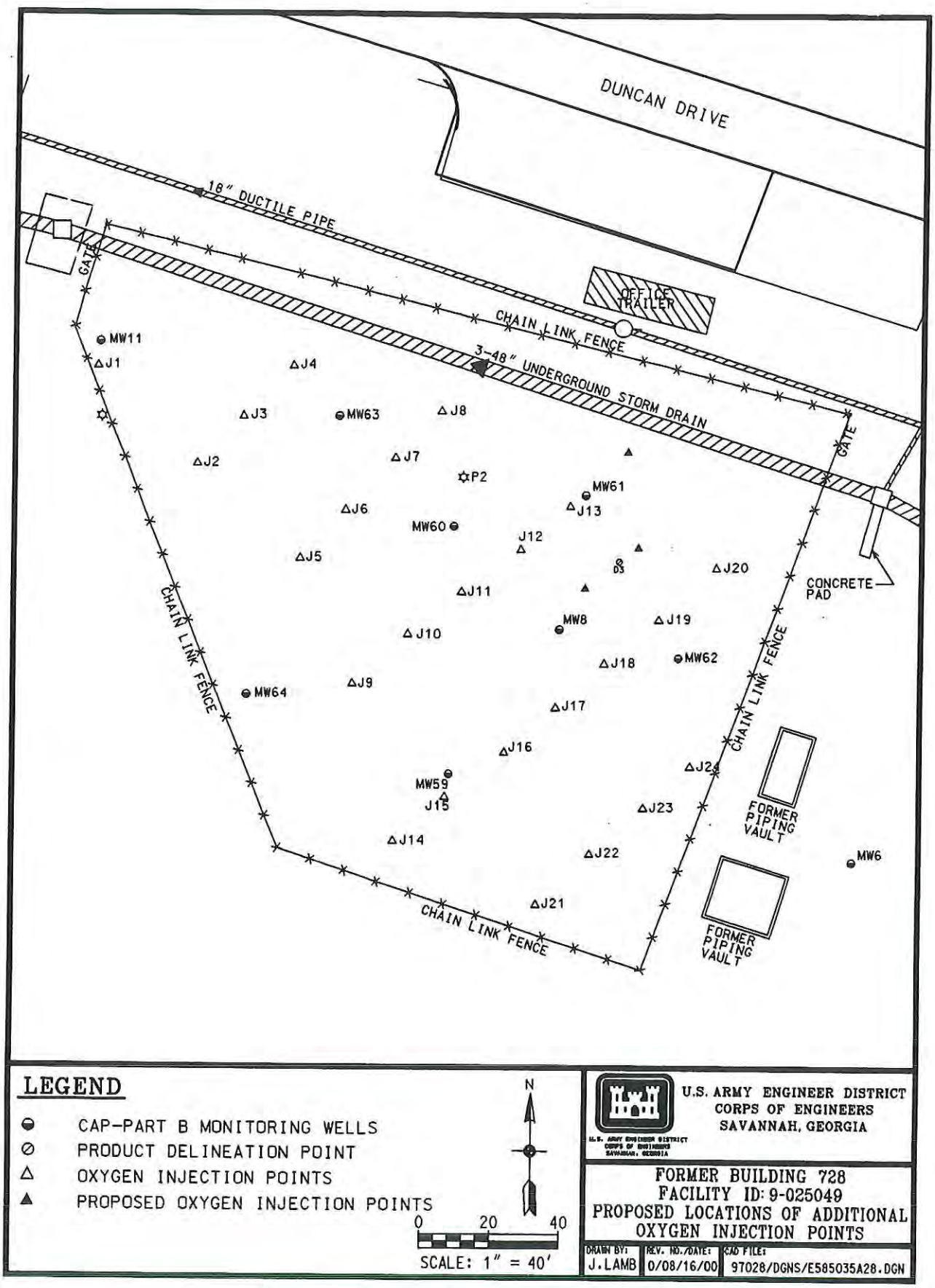

Figure 33. Proposed Locations of Additional Oxygen Injection Points at the Former Building 728 Site

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APPENDIX II

TABLES

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Table 1. Pilot Study – Well Construction Details

Boring Number	Date Installed	Boring Depth (ft BGS)	Screened Interval (ft BGS)	Type of Completion	Coordinates (NAD 83)		Elevation (NAVD 88)	
					Northing	Easting	Ground Surface	Top of Casing
Product Delineation Points								
D1	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740054.93	976051.27	19.7	20.07
D2	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740050.53	976070.34	19.3	19.60
D3	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740050.07	976089.18	19.4	19.69
D4	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740046.22	976107.88	19.4	19.66
D5	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740037.25	976028.69	19.5	19.88
D6	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740034.06	976047.99	19.3	19.66
D7	05/05/99	13.0	2.0 – 12.0	¾-inch PVC	740030.52	976086.58	19.0	19.35
D8	05/05/99	13.0	2.0 – 12.0	¾-inch PVC	740027.93	976103.98	19.3	19.60
D9	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740025.75	976125.99	19.7	20.02
D10	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740017.47	976027.72	19.2	19.57
D11	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740014.16	976047.52	19.2	19.57
D12	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	740011.86	976065.41	18.8	19.14
D13	05/05/99	12.9	2.0 – 12.0	¾-inch PVC	740011.61	976083.60	18.7	19.02
D14	05/05/99	13.0	2.0 – 12.0	¾-inch PVC	740007.57	976102.71	19.2	19.57
D15	05/06/99	13.0	2.0 – 12.0	¾-inch PVC	740003.89	976121.23	20.0	20.41
D16	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	739997.75	976022.32	18.8	19.13
D17	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	739995.73	976044.19	18.9	19.22
D18	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	739993.17	976061.28	18.8	19.18
D19	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	739991.20	976080.98	18.8	19.13
D20	05/06/99	12.5	2.0 – 12.0	¾-inch PVC	739976.07	976020.55	18.5	18.90
D21	05/06/99	13.0	2.0 – 12.0	¾-inch PVC	739971.67	976078.73	18.8	19.23
D22	05/07/99	12.5	2.0 – 12.0	¾-inch PVC	740069.38	976068.43	19.9	20.30
D23	05/08/99	13.0	2.5 – 12.5	¾-inch PVC	739999.74	976010.69	18.7	19.07
D24	05/08/99	12.5	2.5 – 12.5	¾-inch PVC	739977.16	976049.24	18.5	18.84
Oxygen Injection Points								
J1	05/04/99	15.5	14.5 – 15.5	¾-inch PVC	740104.80	975939.61	18.8	19.34
J2	05/04/99	15.5	14.5 – 15.5	¾-inch PVC	740077.21	975968.34	19.2	19.83
J3	05/04/99	15.5	14.5 – 15.5	¾-inch PVC	740090.75	975981.69	19.4	20.04
J4	05/04/99	15.5	14.5 – 15.5	¾-inch PVC	740105.14	975995.76	19.4	19.94
J5	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740050.31	975998.13	19.5	20.04
J6	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740064.10	976011.06	19.7	20.32
J7	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740079.00	976025.13	19.9	20.49
J8	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740092.29	976038.25	19.8	20.41
J9	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740014.69	976013.41	19.0	19.55
J10	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740028.91	976029.17	19.4	19.91
J11	05/05/99	15.5	14.5 – 15.5	¾-inch PVC	740040.97	976044.44	19.5	20.11
J12	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	740053.18	976061.26	19.2	19.73
J13	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	740065.56	976075.42	20.0	20.49
J14	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	739969.84	976025.51	18.8	19.29
J15	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	739982.53	976040.17	18.7	19.13
J16	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	739995.29	976056.95	18.9	19.38
J17	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	740008.13	976071.76	18.8	19.32
J18	05/06/99	15.5	14.5 – 15.5	¾-inch PVC	740020.77	976085.46	18.9	19.43
J19	05/06/99	15.5	14.0 – 15.0	¾-inch PVC	740033.25	976101.09	19.3	19.74
J20	05/07/99	15.0	14.0 – 15.0	¾-inch PVC	740048.06	976117.43	19.8	20.27
J21	05/07/99	13.0	11.2 – 12.2	¾-inch PVC	739952.01	976066.51	18.7	19.18
J22	05/07/99	13.0	11.5 – 12.5	¾-inch PVC	739966.45	976081.80	18.9	19.37
J23	05/07/99	14.0	12.5 – 13.5	¾-inch PVC	739979.58	976097.09	19.2	19.64
J24	05/07/99	15.0	14.0 – 15.0	¾-inch PVC	739991.47	976110.47	19.5	19.99

Table 1. Pilot Study – Well Construction Details (continued)

Boring Number	Date Installed	Boring Depth (ft BGS)	Screened Interval (ft BGS)	Type of Completion	Coordinates (NAD 83)		Elevation (NAVD 88)	
					Northing	Easting	Ground Surface	Top of Casing
Observation Points								
P1	05/06/99	12.6	2.5 – 12.5	¾-inch PVC	740097.33	975961.13	19.0	19.42
P2	05/07/99	12.6	2.5 – 12.5	¾-inch PVC	740073.70	976044.53	20.0	20.34
P3	05/07/99	12.6	2.5 – 12.5	¾-inch PVC	740072.60	975987.25	19.5	19.91
P4	05/07/99	12.5	2.0 – 12.0	¾-inch PVC	740044.16	976010.15	19.4	19.79
P5	05/08/99	13.0	2.5 – 12.5	¾-inch PVC	739965.59	976102.85	19.5	19.84
Vapor Test Points								
V1	05/06/99	12.3	2.2 – 12.2	¾-inch PVC	739822.95	976270.18	19.3	19.54
V2	05/07/99	12.2	2.1 – 12.1	¾-inch PVC	739806.61	976282.91	19.3	19.20
VW-1	05/09/99	12.3	11.8 – 11.8	¾-inch PVC	739818.57	976268.30	19.4	19.29
VEW-1	05/17/99	6.0	2.0 – 6.0	¾-inch PVC	739816.06	976264.79	19.4	19.60
P-1	05/17/99	6.0	2.0 – 6.0	¾-inch PVC	739816.70	976261.58	19.3	20.02
P-2	05/17/99	6.0	2.0 – 6.0	¾-inch PVC	739817.27	976259.08	19.3	20.22
Product Recovery Wells								
MW-8A	06/02/99	14.5	4.0 – 14.0	2-inch PVC	740034.10	976071.08	19.0	18.67
PR-1	06/02/99	14.5	3.6 – 13.6	2-inch PVC	740026.22	976090.39	18.9	18.64
PR-2	06/02/99	14.5	4.0 – 14.0	2-inch PVC	740008.71	976055.87	18.9	18.54
PR-3	10/09/99	18.0	2.0 – 17.0	2-inch PVC	740000.94	976026.62	18.9	18.68
PR-4	10/09/99	18.0	2.0 – 17.0	2-inch PVC	740020.46	976024.53	19.1	19.01
PR-5	10/09/99	18.0	2.0 – 17.0	2-inch PVC	740036.19	976043.98	19.4	19.11
CAP-Part B Monitoring Wells (utilized during corrective action)								
MW-6	1996	~13.0	2.9 – 12.9	2-inch PVC	739964.64	976156.50	19.6	19.40
MW-8	1996	~13.5	3.5 – 13.5	2-inch PVC	740030.55	976072.57	19.0	18.58
MW-11	1996	~12.5	2.3 – 12.3	2-inch PVC	740111.90	975940.19	18.4	18.09
MW-59	02/26/97	14.0	2.0 – 12.0	2-inch PVC	739989.17	976041.23	18.8	18.61
MW-60	02/26/97	15.0	3.0 – 13.0	2-inch PVC	740059.72	976042.02	19.9	19.70
MW-61	02/26/97	15.0	3.0 – 13.0	2-inch PVC	740068.72	976079.81	20.0	19.73
MW-63	02/26/97	15.0	4.0 – 14.0	2-inch PVC	740090.82	976009.04	19.7	19.55
MW-64	02/27/97	15.0	3.0 – 13.0	2-inch PVC	740011.54	975983.20	18.4	18.18

Table 2. Pilot Study – Soil Analytical Results

Sample Location	Sample ID	Depth (ft BGS)	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH (mg/kg)
Product Delineation Points - Pre-Pilot Study Baseline Results – May 1999									
D1	AED111	7.2 - 8.2	05/06/99	***0.206 J***	0.181 J	0.297 J	0.952 U	0.684	15.2 U
D3	AED311	7.0 - 8.0	05/06/99	***0.111 J***	0.078 =	**0.651** =	2.58 =	3.42	12.4 U
D4	AED411	8.0 - 9.1	05/06/99	***0.0718 J***	0.128 J	0.281 J	0.512 J	0.993	13.5 J
D5	AED511	6.9 - 8.9	05/06/99	***0.161 J***	**0.518** =	0.0791 =	0.38 J	1.1381	48.4 J
D10	AEDA11	7.0 - 8.0	05/06/99	***0.625*** =	**9.76** =	**4.52** =	***23.2*** =	38.105	25.7 =
D13	AEDD11	8.0 - 8.8	05/05/99	0.0019 U	0.0019 U	0.0019 U	0.0052 U	ND	68.6 =
D15	AEDF11	8.0 - 8.8	05/06/99	***0.0144 J***	0.0057 J	0.643 J	0.283 J	0.9461	701 =
D17	AEDK11	7.0 - 8.0	05/06/99	**0.0098** =	0.0019 U	0.0045 =	0.005 U	0.0143	12.8 J
D18	AEDL11	10.0 - 10.7	05/06/99	0.0016 J	0.0086 =	0.0104 =	0.0466 =	0.0672	11.8 U
D21	AEDM11	8.0 - 8.5	05/06/99	0.0019 U	0.0019 U	0.0019 U	0.0048 U	ND	22.8 =
D6	AED611	7.1 - 8.1	05/06/99	[a]	[a]	[a]	[a]	[a]	469 =
D7	AED711	8.0 - 9.0	05/06/99	[a]	[a]	[a]	[a]	[a]	2000 =
D8	AED811	8.0 - 9.0	05/06/99	[a]	[a]	[a]	[a]	[a]	769 =
D9	AED911	4.5 - 6.5	05/06/99	[a]	[a]	[a]	[a]	[a]	405 =
D11	AEDB11	6.5 - 7.5	05/06/99	[a]	[a]	[a]	[a]	[a]	621 =
D12	AEDC11	7.8 - 8.8	05/06/99	[a]	[a]	[a]	[a]	[a]	127 =
D14	AEDE11	8.0 - 8.6	05/06/99	[a]	[a]	[a]	[a]	[a]	92.2 =
D16	AEDG11	6.2 - 7.2	05/06/99	[a]	[a]	[a]	[a]	[a]	578 =
Observation Points - Pre-Pilot Study Baseline Results – May 1999									
P1	AEP111	4.0 - 6.0	05/07/99	0.002 U	0.002 U	0.002 U	0.003 U	ND	119 =
P2	AEP211	4.0 - 6.0	05/07/99	0.0032 U	0.0032 U	0.0032 U	0.0049 U	ND	59.5 =
P3	AEP311	5.0 - 6.0	05/07/99	0.002 U	0.002 U	0.002 U	0.003 U	ND	1.61 U
P4	AEP411	5.4 - 6.4	05/07/99	0.0022 U	0.0022 U	0.0022 U	0.0032 U	ND	66.1 =
P5	AEP511	4.0 - 6.0	05/08/99	0.0028 U	0.0028 U	0.0028 U	0.0012 J	0.0012	105 =
Vapor Test Wells - Pre-Pilot Study Baseline Results – May 1999									
V1	AEV111	8.0 – 9.3	05/06/99	**0.0052 J**	0.0046 J	0.520 =	0.157 J	0.6868	[b]
V2	AEV211	8.0 – 9.2	05/07/99	**0.0069 J**	0.0010 J	0.0783 J	0.148 J	0.2342	[b]
VW-1	AEVW11	5.0 – 7.0	05/09/99	***0.0219 J***	0.0020 U	0.721 J	1.16 J	1.9029	[b]
GA UST Soil Threshold Levels (Table A, Column 1)				0.005	0.37	0.40	20	NRC	NRC
Alternate Threshold Levels				0.012	58.5	11.1	20	—	—

NOTES:

Bold values exceed GA UST Soil Threshold Levels (Table A, Column 1)
Italic values exceed alternate threshold levels (Appendix VI)

[a] Samples were analyzed for TPH only.
[b] Samples were also analyzed for SVOCs, TPH-DRO, and TPH-GRO, with the results presented in Appendix V.

BGS Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylene
DRO Diesel range organics
GRO Gasoline range organics
NRC No regulatory criteria
TPH Total petroleum hydrocarbon

Laboratory Qualifiers

U Indicates that the compound was not detected above the reported sample quantitation limit.
UJ Indicates that the compound was not detected above an approximated sample quantitation limit.
J Indicates that the value for the compound was an estimated value.
= Indicates that the compound was detected at the concentration reported.

Table 3. Pilot Study – Groundwater Analytical Results

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
CAP-Part B Investigation – March 1997								
MW1	MW0102	3.2 – 13.2	3/31/97	1 U	1 U	1 U	2 U	ND
MW2	MW0202	3.8 – 13.8	3/31/97	1 U	1 U	1 U	2 U	ND
MW3	MW0302	2.6 – 12.6	3/31/97	4.2 =	1 U	5.3 =	2 U	9.5
MW5	MW0502	3.3 – 13.3	3/31/97	1 U	1 U	1 U	2 U	ND
MW6	MW0602	2.9 – 12.9	4/1/97	24 =	6.4 =	54 =	27 =	111.4
MW9	MW0902	3.1 – 13.1	3/31/97	1 U	1 U	1 U	2 U	ND
MW10	MW1002	2.9 – 12.9	3/31/97	1 U	1 U	1 U	2 U	ND
MW11	MW1102	2.3 – 12.3	4/1/97	***1700*** =	600 =	380 =	2300 =	4980
MW12	MW1202	2.9 – 12.9	4/1/97	56 J	28 J	40 J	50 UJ	124
MW13	MW1302	4.0 – 14.0	4/1/97	1.4 =	1 U	1 U	2 U	1.4
MW14	MW1402	4.0 – 14.0	4/1/97	1 U	1 U	1 U	2 U	ND
MW55	MW5501	2.0 – 12.0	3/31/97	1 U	1 U	1 U	2 U	ND
MW56	MW5601	1.4 – 11.4	3/31/97	17 =	3.3 =	9.1 =	34 =	63.4
MW57	MW5701	2.0 – 12.0	3/31/97	24 =	49 =	40 =	170 =	283
MW58	MW5801	2.0 – 12.0	3/31/97	41 J	11 J	16 J	94 J	162
MW60	MW6001	3.0 – 13.0	4/1/97	***1400*** =	290 =	280 =	1600 =	3570
MW61	MW6101	3.0 – 13.0	4/1/97	***910 J***	25 UJ	140 J	760 J	1810
MW63	MW6001	4.0 – 14.0	4/1/97	***2400*** =	300 =	460 =	2000 =	5160
MW64	MW6101	3.0 – 13.0	4/1/97	***81*** =	50 =	36 =	320 =	487
MW65	MW6001	3.0 – 13.0	4/1/97	1 U	1 U	1 U	2 U	ND
MW66	MW6101	35.6 – 40.6	4/1/97	1 U	1 U	1 U	2 U	ND
MW67	MW6001	33.0 – 38.0	4/1/97	1 U	1 U	1 U	2 U	ND
Pre-Pilot Study Baseline Results – May 1999								
MW6	AE0612	2.9 - 12.9	05/10/99	2.1 J	2 U	2 U	3 U	2.1
MW11	AE1112	4.0 - 14.0	05/10/99	***256*** =	21.1 =	32.1 =	197 =	506.2
MW60	AE6012	3.0 - 13.0	05/10/99	***1610*** =	122 =	300 =	1330 =	3362
MW61	AE6112	3.0 - 13.0	05/10/99	***612*** =	15 J	121 =	465 =	1213
MW63	AE6312	4.0 - 14.0	05/10/99	***1310*** =	113 =	154 =	710 =	2287
MW64	AE6412	3.0 - 13.0	05/10/99	***107*** =	170 =	73.3 =	706 =	1056.3
D1	AED112	2.0 - 12.0	05/10/99	***1460*** =	111 =	284 =	725 =	2580
D3	AED312	2.0 - 12.0	05/10/99	***2580 J***	853 =	521 =	1480 =	5434
D4	AED412	2.0 - 12.0	05/10/99	***288*** =	76.4 =	89.5 =	211 =	664.9
D21	AEDM12	2.0 - 12.0	05/10/99	***251*** =	8.3 J	784 =	2340 =	3383.3
P1	AEP112	2.5 - 12.5	05/07/99	***1890*** =	2390 =	344 =	2100 =	6724
P2	AEP212	2.5 - 12.5	05/07/99	***2510*** =	2070 =	447 =	1980 =	7007
P3	AEP312	2.5 - 12.5	05/07/99	***2600*** =	4250 =	578 =	3360 =	10788
P4	AEP412	2.0 - 12.0	05/07/99	***823*** =	1950 =	237 =	1510 =	4520
P5	AEP512	2.5 - 12.5	05/08/99	7.2 J	10 U	208 =	600 =	745.8
In Stream Water Quality Standard (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit				78	—	—	—	—

Table 3. Pilot Study – Groundwater Analytical Results (continued)

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
First Sampling Event – June 1999								
MW6	AE0622	2.9 - 12.9	06/15/99	3.7 =	0.56 J	3.5 =	1.9 J	9.66
MW11	AE1122	4.0 - 14.0	06/15/99	***114*** =	17.2 =	4.7 =	37.1 =	173
MW60	AE6022	3.0 - 13.0	06/15/99	***2360*** =	180 =	411 =	1900 =	4851
MW61	AE6122	3.0 - 13.0	06/15/99	5.2 =	2 U	0.73 J	7.6 =	13.53
MW63	AE6322	4.0 - 14.0	06/15/99	***1960*** =	226 =	245 =	1140 =	3571
MW64	AE6422	3.0 - 13.0	06/15/99	149 =	183 =	90.5 =	814 =	1236.5
D1	AED122	2.0 - 12.0	06/15/99	58.5 =	2 U	3.7 =	16.7 =	78.9
D3	AED322	2.0 - 12.0	06/15/99	***3180*** =	1300 =	1150 =	3320 =	8950
D4	AED422	2.0 - 12.0	06/15/99	***104*** =	50.3 =	25.5 =	126 =	305.8
D21	AEDM22	2.0 - 12.0	06/15/99	9.7 =	1.4 J	49.6 =	106 =	166.7
P1	AEP122	2.5 - 12.5	06/15/99	***2420*** =	4660 =	523 =	2790 =	10393
P2	AEP222	2.5 - 12.5	06/15/99	***3370*** =	3400 =	709 =	3120 =	10599
P3	AEP322	2.5 - 12.5	06/15/99	***3200*** =	6720 =	789 =	4430 =	15139
P4	AEP422	2.0 - 12.0	06/15/99	***2010*** =	4750 =	708 =	4490 =	11958
P5	AEP522	2.5 - 12.5	06/15/99	3 J	10 U	534 =	1720 =	2257
Second Sampling Event – July 1999								
MW6	AE0632	2.9 - 12.9	07/08/99	9.6 =	2 U	29.6 =	6 U	39.2
MW11	AE1132	4.0 - 14.0	07/08/99	0.82 J	2 U	2 U	6 U	2.82
MW60	AE6032	3.0 - 13.0	07/08/99	***3260*** =	197 =	531 =	2720 =	6708
MW61	AE6132	3.0 - 13.0	07/08/99	1.1 J	0.56 J	2 U	1.3 J	2.96
MW63	AE6332	4.0 - 14.0	07/08/99	***648*** =	88.1 =	135 =	523 =	1394.1
MW64	AE6432	3.0 - 13.0	07/08/99	***85.4*** =	154 =	72.3 =	624 =	935.7
D1	AED132	2.0 - 12.0	07/08/99	62.7 =	5 =	10.9 =	51.3 =	129.9
D3	AED332	2.0 - 12.0	07/08/99	***3430*** =	3830 =	1250 =	4460 =	12970
D4	AED432	2.0 - 12.0	07/08/99	***111 J***	612 =	533 =	3180 =	4436
D21	AEDM32	2.0 - 12.0	07/08/99	2 U	0.95 J	0.87 J	3.1 J	6.92
P1	AEP132	2.5 - 12.5	07/08/99	***1770*** =	3820 =	402 =	2050 =	8042
P2	AEP232	2.5 - 12.5	07/08/99	***2540*** =	1600 =	565 =	2170 =	6875
P3	AEP332	2.5 - 12.5	07/08/99	***3150*** =	8020 =	1030 =	5090 =	17290
P4	AEP432	2.0 - 12.0	07/08/99	***1990*** =	6080 =	789 =	4610 =	13469
P5	AEP532	2.5 - 12.5	07/08/99	2 U	0.62 J	9.2 =	27.9 =	37.72
In Stream Water Quality Standard (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit				78	—	—	—	—

NOTES:

Bold values exceed in-stream water quality standard
Italic values exceed alternate concentration limit
BGS Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylene
ND Not detected
NRC No regulatory criteria

Laboratory Qualifiers

U Indicates that the compound was not detected above the reported sample quantitation limit.
UJ Indicates that the compound was not detected above an approximated sample quantitation limit.
J Indicates that the value for the compound was an estimated value.
= Indicates that the compound was detected at the concentration reported.

Table 3. Pilot Study – Groundwater Analytical Results (continued)

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
Third Sampling Event – August 1999								
MW6	AE0642	2.9 - 12.9	08/25/99	2 U	2 U	9.2 =	1.8 J	11
MW11	AE1142	4.0 - 14.0	08/25/99	13.7 =	2 U	1.3 J	10.1 =	25.1
MW60	AE6042	3.0 - 13.0	08/24/99	***257*** =	10 U	69.4 =	335 =	661.4
MW61	AE6142	3.0 - 13.0	08/25/99	33.1 =	0.56 J	4.4 =	11.2 =	49.26
MW63	AE6342	4.0 - 14.0	08/24/99	***844*** =	46.8 =	124 =	542 =	1556.8
MW64	AE6442	3.0 - 13.0	08/24/99	19.8 =	0.71 J	21.9 =	109 =	151.41
D1	AED142	2.0 - 12.0	08/24/99	30.6 =	2 U	2 U	6 U	30.6
D3	AED342	2.0 - 12.0	08/24/99	***3460*** =	2330 =	1530 =	4550 =	11870
D4	AED442	2.0 - 12.0	08/24/99	***130*** =	10 U	50.8 =	60.1 =	241
D21	AEDM42	2.0 - 12.0	08/24/99	2 U	2 U	0.62 J	0.86 J	1.48
P1	AEP142	2.5 - 12.5	08/24/99	***1770*** =	3140 =	484 =	2430 =	7824
P2	AEP242	2.5 - 12.5	08/24/99	***3020*** =	960 =	686 =	2440 =	7106
P3	AEP342	2.5 - 12.5	08/24/99	***1940*** =	3890 =	496 =	2590 =	8916
P4	AEP442	2.0 - 12.0	08/24/99	***516*** =	1530 =	309 =	2080 =	4435
P5	AEP542	2.5 - 12.5	08/24/99	10 U	10 U	65.4 =	185 =	250.4
Fourth Sampling Event – September 1999								
MW6	AE0652	2.9 - 12.9	09/29/99	2 U	2 U	4.1 =	6 U	4.1
MW11	AE1152	4.0 - 14.0	09/29/99	27 =	15.5 =	3.8 =	20.1 =	66.4
MW60	AE6052	3.0 - 13.0	09/29/99	***98.2*** =	1.4 J	62.8 =	130 =	292.4
MW61	AE6152	3.0 - 13.0	09/29/99	37.4 =	2 U	4.8 =	9.4 =	51.6
MW63	AE6352	4.0 - 14.0	09/29/99	2.4 =	2 U	2 U	0.85 J	3.25
MW64	AE6452	3.0 - 13.0	09/29/99	4 =	2 U	3.8 =	18.6 =	26.4
D1	AED152	2.0 - 12.0	09/29/99	2.7 =	2 U	2 U	6 U	2.7
D3	AED352	2.0 - 12.0	09/29/99	***3710*** =	1840 =	1910 =	4940 =	12400
D4	AED452	2.0 - 12.0	09/29/99	***1360*** =	22.6 =	220 =	263 =	1865.6
D21	AEDM52	2.0 - 12.0	09/29/99	2 U	2 U	0.6 J	0.79 J	1.39
P1	AEP152	2.5 - 12.5	09/29/99	***1740*** =	3360 =	431 =	2470 =	8001
P2	AEP252	2.5 - 12.5	09/29/99	***1590*** =	273 U	405 =	1390 =	3385
P3	AEP352	2.5 - 12.5	09/29/99	***2810*** =	5680 =	838 =	4550 =	13878
P4	AEP452	2.0 - 12.0	09/29/99	***682*** =	443 =	239 =	1110 =	2474
P5	AEP552	2.5 - 12.5	09/29/99	2 U	2 U	2.6 =	7.6 =	7.6
In Stream Water Quality Standard (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit				78	—	—	—	—

NOTES:

Bold values exceed in-stream water quality standard
Italic values exceed alternate concentration limit

BGS Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylene
ND Not detected
NRC No regulatory criteria

Laboratory Qualifiers

U Indicates that the compound was not detected above the reported sample quantitation limit.
UJ Indicates that the compound was not detected above an approximated sample quantitation limit.
J Indicates that the value for the compound was an estimated value.
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Table 3. Pilot Study – Groundwater Analytical Results (continued)

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
Fifth Sampling Event – October 1999								
MW6	AE0662	2.9 - 12.9	10/27/99	3.7 =	2 U	7.5 =	1.5 J	12.7
MW11	AE1162	4.0 - 14.0	10/27/99	2 U	2 U	0.55 J	0.53 J	1.08
MW60	AE6062	3.0 - 13.0	10/27/99	56.6 =	2 U	11.5 =	5.5 J	73.6
MW61	AE6162	3.0 - 13.0	10/27/99	46.9 =	8.7 =	7 =	14.6 =	77.2
MW63	AE6362	4.0 - 14.0	10/27/99	***715*** =	50 U	54.7 =	154 =	923.7
MW64	AE6462	3.0 - 13.0	10/27/99	2.2 =	2 U	2.9 =	21 =	26.1
D1	AED162	2.0 - 12.0	10/27/99	***1650*** =	928 =	316 =	2140 =	5034
D3	AED362	2.0 - 12.0	10/27/99	***3760*** =	2680 =	2070 =	6020 =	14530
D4	AED462	2.0 - 12.0	10/27/99	***2320*** =	50 U	369 =	294 =	2983
D21	AEDM62	2.0 - 12.0	10/27/99	1.3 J	1.6 J	1.9 J	3.3 J	8.1
P1	AEP162	2.5 - 12.5	10/27/99	0.78 J	2 U	2 U	0.84 J	1.62
P2	AEP252	2.5 - 12.5	10/27/99	***977*** =	70.9 =	192 =	698 =	1937.9
P3	AEP362	2.5 - 12.5	10/27/99	***2090*** =	3180 =	632 =	4120 =	10022
P4	AEP462	2.0 - 12.0	10/27/99	11.5 =	37 =	40.4 =	216 =	304.9
P5	AEP552	2.5 - 12.5	10/27/99	1.1 J	2 U	6.6 =	17.6 =	25.3
Sixth Sampling Event – December 1999								
MW6	AE0672	2.9 - 12.9	12/01/99	3.8 J	2 UJ	12.2 J	2.6 J	18.6
MW11	AE1172	4.0 - 14.0	12/01/99	5.6 =	2 U	2 U	0.52 J	6.12
MW60	AE6072	3.0 - 13.0	12/01/99	40.8 =	2 U	2.3 =	1.2 J	44.3
MW61	AE6172	3.0 - 13.0	12/01/99	***773*** =	18.6 =	106 =	241 =	1138.6
MW63	AE6372	4.0 - 14.0	12/01/99	***184*** =	4 U	2.7 J	57.8 =	244.5
MW64	AE6472	3.0 - 13.0	12/01/99	1 J	2 U	0.74 J	8.2 =	9.94
D1	AED172	2.0 - 12.0	12/01/99	1.2 J	2 U	2 U	0.56 J	1.76
D3	AED372	2.0 - 12.0	12/01/99	***3700*** =	2950 =	1770 =	5710 =	14130
D4	AED472	2.0 - 12.0	12/01/99	***672*** =	7.5 J	26.9 =	21.6 J	728
D21	AEDM72	2.0 - 12.0	12/01/99	1.3 J	2 U	3 =	0.52 J	4.82
P1	AEP172	2.5 - 12.5	12/01/99	***576*** =	72.7 =	103 =	542 =	1293.7
P2	AEP272	2.5 - 12.5	12/01/99	***586*** =	97.6 =	204 =	766 =	1653.6
P3	AEP372	2.5 - 12.5	12/01/99	***523*** =	1010 =	295 =	2050 =	3878
P4	AEP472	2.0 - 12.0	12/01/99	5.3 =	2.6 =	10.7 =	39.3 =	57.9
P5	AEP572	2.5 - 12.5	12/01/99	3.2 =	0.59 J	17.4 =	62 =	83.19
In Stream Water Quality Standard (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit				78	—	—	—	—

NOTES:

Bold values exceed in-stream water quality standard
Italic values exceed alternate concentration limit

BGS Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylene
ND Not detected
NRC No regulatory criteria

Laboratory Qualifiers

U Indicates that the compound was not detected above the reported sample quantitation limit.
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Table 3. Pilot Study – Groundwater Analytical Results (continued)

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
Seventh Sampling Event – January 2000								
MW6	AE0682	2.9 - 12.9	1/4/00	25.1 J	1 UJ	0.88 J	2.2 J	29.18
MW11	AE1182	4.0 - 14.0	1/4/00	48 =	27.3 =	25.9 =	144 =	245.2
MW60	AE6082	3.0 - 13.0	1/4/00	8 =	1 U	6.7 =	3.6 =	18.3
MW61	AE6182	3.0 - 13.0	1/4/00	***1410*** =	14.8 U	180 =	346 =	1936
MW63	AE6382	4.0 - 14.0	1/4/00	***78.8*** =	1 U	0.44 J	14.8 =	94.04
MW64	AE6482	3.0 - 13.0	1/4/00	1 =	1 U	0.37 J	8.7 =	10.07
D1	AED182	2.0 - 12.0	1/4/00	7 ***J***	1 UJ	0.14 J	3 UJ	7.14
D3	AED382	2.0 - 12.0	1/4/00	***2210 J***	1150 J	1010 J	3180 J	7550
D4	AED482	2.0 - 12.0	1/4/00	***821 J***	2 UJ	113 J	137 J	1071
D21	AEDM82	2.0 - 12.0	1/4/00	0.2 J	1 U	0.47 J	1 J	1.67
P1	AEP182	2.5 - 12.5	1/4/00	***146 J***	3.8 UJ	40 J	152 J	338
P2	AEP282	2.5 - 12.5	1/4/00	***324 J***	100 UJ	120 J	403 J	847
P3	AEP382	2.5 - 12.5	1/4/00	***168 J***	206 J	116 J	573 J	1063
P4	AEP482	2.0 - 12.0	1/4/00	1.2 J	1.2 UJ	2.2 J	22.4 J	25.8
P5	AEP582	2.5 - 12.5	1/4/00	2.3 J	5 U	273 =	679 =	954.3
Eighth Sampling Event – March 2000								
MW6	AE0692	2.9 - 12.9	03/28/00	2.4 =	1 U	2.5 U	4 U	2.4
MW11	AE1192	4.0 - 14.0	03/28/00	1 U	1 U	1 U	3.7 U	ND
MW60	AE6092	3.0 - 13.0	03/28/00	1 U	1 U	1.6 U	4.4 U	ND
MW61	AE6192	3.0 - 13.0	03/28/00	***1160*** =	140 U	213 U	580 U	1160
MW63	AE6392	4.0 - 14.0	03/28/00	***198*** =	1 U	6.8 U	52.2 U	198
D1	AED192	2.0 - 12.0	03/28/00	3.7 =	20.6 =	6.3 U	60.7 U	24.3
D3	AED392	2.0 - 12.0	03/28/00	***1820*** =	1590 =	1250 =	5280 =	9940
D4	AED492	2.0 - 12.0	03/28/00	***532*** =	9.4 =	78.2 =	2860 =	3479.6
D6	AED692	2.0 - 12.0	03/28/00	***958*** =	9350 =	2510 =	16700 =	29518
D10	AED092	2.0 - 12.0	03/28/00	***538*** =	2820 =	578 =	5780 =	9716
D17	AEDG92	2.0 - 12.0	03/28/00	***114 J***	1550 =	1320 =	9840 =	12824
P1	AEP192	2.5 - 12.5	03/28/00	***85.1*** =	1 U	4.9 U	67.5 U	85.1
P2	AEP292	2.5 - 12.5	03/28/00	41.4 =	4.3 U	34.2 =	191 =	266.6
P3	AEP392	2.5 - 12.5	03/28/00	***98.1*** =	1 U	12.8 =	198 =	308.9
P4	AEP492	2.0 - 12.0	03/28/00	1 U	1 U	1.6 U	7.8 U	ND
In Stream Water Quality Standard (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit				78	—	—	—	—

NOTES:

Due to the continuing nondetects in MW64, D19, and P5, sampling was discontinued in these wells in March 2000 in lieu of samples collected from D6, D10, and D17 that are located in the area where free product recovery is taking place.

Bold values exceed in-stream water quality standard.

Italic values exceed alternate concentration limit.

BGS Below ground surface

BTEX Benzene, toluene, ethylbenzene, and xylene

ND Not detected

NRC No regulatory criteria

Laboratory Qualifiers

U Indicates that the compound was not detected above the reported sample quantitation limit.

UJ Indicates that the compound was not detected above an approximated sample quantitation limit.

J Indicates that the value for the compound was an estimated value.

= Indicates that the compound was detected at the concentration reported.

Table 3. Pilot Study – Groundwater Analytical Results (continued)

Sample Location	Sample ID	Screened Interval (ft BGS)	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	Total BTEX (µg/L)
Ninth Sampling Event – May 2000								
MW6	AE0602	2.9 - 12.9	05/23/00	5.2 =	0.43 J	7.1 =	3.3 =	16.03
MW11	AE1102	4.0 - 14.0	05/23/00	1 U	1 U	1 U	0.23 J	0.23
MW60	AE6002	3.0 - 13.0	05/23/00	2.3 =	1 U	0.44 J	1.2 J	3.94
MW61	AE6102	3.0 - 13.0	05/23/00	***2010 J***	152 =	584 =	1640 =	4386
MW63	AE6302	4.0 - 14.0	05/23/00	53.4 =	1 U	0.69 J	13.2 =	67.29
D1	AED102	2.0 - 12.0	05/23/00	8.3 =	1 U	0.52 J	4.1 =	12.92
D3	AED302	2.0 - 12.0	05/23/00	***671*** =	130 =	422 =	2040 =	3263
D4	AED402	2.0 - 12.0	05/23/00	***541 J***	18.8 =	64.5 =	277 =	901.3
D6	AED602	2.0 - 12.0	05/23/00	***1320 J***	1160 J	573 =	4300 J	7353
D10	AED002	2.0 - 12.0	05/23/00	***460*** =	2160 J	360 =	4110 =	7090
D17	AEDG02	2.0 - 12.0	05/23/00	**75.4** =	814 =	505 J	2170 =	3564.4
P1	AEP102	2.5 - 12.5	05/23/00	***88.7*** =	1 U	7.6 =	83.6 =	179.9
P2	AEP202	2.5 - 12.5	05/23/00	68.2 =	1.4 =	11 =	91.1 =	171.7
P3	AEP302	2.5 - 12.5	05/23/00	**74.3** =	0.31 J	9.3 =	115 =	198.91
P4	AEP402	2.0 - 12.0	05/23/00	1 U	1 U	0.22 J	1.6 J	1.82
In Stream Water Quality Standard (GA EPD Chapter 391-3-6)				71.28	200,000	28,718	NRC	NRC
Alternate Concentration Limit				78	—	—	—	—

NOTES:

Due to the continuing nondetects in MW64, D19, and P5, sampling was discontinued in these wells in March 2000 in lieu of samples collected from D6, D10, and D17 that are located in the area where free product recovery is taking place.

Bold values exceed in-stream water quality standard.

Italic values exceed alternate concentration limit.

BGS Below ground surface
BTEX Benzene, toluene, ethylbenzene, and xylene
ND Not detected
NRC No regulatory criteria

Laboratory Qualifiers

U Indicates that the compound was not detected above the reported sample quantitation limit.
UJ Indicates that the compound was not detected above an approximated sample quantitation limit.
J Indicates that the value for the compound was an estimated value.
= Indicates that the compound was detected at the concentration reported.

Table 4. Pilot Study – Groundwater Elevations

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Baseline Monitoring Event – May 1999								
D1	5/9/99	19.7	20.07	2.0 – 12.0	n/a	8.71	0	11.36
D2	5/9/99	19.3	19.60	2.0 – 12.0	sheen	7.17	sheen	12.43
D3	5/9/99	19.4	19.69	2.0 – 12.0	n/a	7.18	0	12.51
D4	5/9/99	19.4	19.66	2.0 – 12.0	n/a	7.08	0	12.58
D5	5/9/99	19.5	19.88	2.0 – 12.0	sheen	7.51	sheen	12.37
D6	5/9/99	19.3	19.66	2.0 – 12.0	sheen	7.23	sheen	12.43
D7	5/9/99	19.0	19.35	2.0 – 12.0	6.58	7.01	0.43	12.34
D8	5/9/99	19.3	19.60	2.0 – 12.0	6.84	7.22	0.38	12.38
D9	5/9/99	19.7	20.02	2.0 – 12.0	sheen	7.28	sheen	12.74
D10	5/9/99	19.2	19.57	2.0 – 12.0	7.12	7.13	0.01	12.44
D11	5/9/99	19.2	19.57	2.0 – 12.0	7.01	7.19	0.18	12.38
D12	5/9/99	18.8	19.14	2.0 – 12.0	6.37	6.40	0.03	12.74
D13	5/9/99	18.7	19.02	2.0 – 12.0	sheen	5.81	sheen	13.21
D14	5/9/99	19.2	19.57	2.0 – 12.0	sheen	6.41	sheen	13.16
D15	5/9/99	20.0	20.41	2.0 – 12.0	sheen	7.34	sheen	13.07
D16	5/9/99	18.8	19.13	2.0 – 12.0	6.57	6.74	0.17	12.39
D17	5/9/99	18.9	19.22	2.0 – 12.0	6.60	6.61	0.01	12.61
D18	5/9/99	18.8	19.18	2.0 – 12.0	sheen	6.48	sheen	12.70
D19	5/9/99	18.8	19.13	2.0 – 12.0	sheen	5.8	sheen	13.33
D20	5/9/99	18.5	18.90	2.0 – 12.0	sheen	6.27	sheen	12.63
D21	5/9/99	18.8	19.23	2.0 – 12.0	n/a	5.82	0	13.41
D22	5/9/99	19.9	20.30	2.0 – 12.0	n/a	7.93	0	12.37
D23	5/9/99	18.7	19.07	2.5 – 12.5	n/a	6.6	0	12.47
D24	5/9/99	18.5	18.84	2.5 – 12.5	sheen	6.09	sheen	12.75
MW6	5/10/99	19.6	19.40	2.9 – 12.9	n/a	10.19	0	9.21
MW11	5/10/99	18.4	18.09	2.3 – 12.3	n/a	9.81	0	8.28
MW60	5/10/99	19.9	19.70	3.0 – 13.0	n/a	10.99	0	8.71
MW61	5/10/99	20.0	19.73	3.0 – 13.0	n/a	11.60	0	8.13
MW63	5/10/99	19.7	19.55	4.0 – 14.0	n/a	11.03	0	8.52
MW64	5/10/99	18.4	18.18	3.0 – 13.0	n/a	10.20	0	7.98

NOTE:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
First Sampling Event – June 1999								
D1	6/14/99	19.7	20.07	2.0 – 12.0	n/a	7.68	0	12.39
D2	6/14/99	19.3	19.60	2.0 – 12.0	n/a	7.19	0	12.41
D3	6/14/99	19.4	19.69	2.0 – 12.0	n/a	7.19	0	12.50
D4	6/14/99	19.4	19.66	2.0 – 12.0	n/a	6.47	0	13.19
D5	6/14/99	19.5	19.88	2.0 – 12.0	sheen	7.56	sheen	12.32
D6	6/14/99	19.3	19.66	2.0 – 12.0	7.15	7.85	0.70	11.81
D7	6/14/99	19.0	19.35	2.0 – 12.0	6.63	6.78	0.15	12.57
D8	6/14/99	19.3	19.60	2.0 – 12.0	sheen	6.71	sheen	12.89
D9	6/14/99	19.7	20.02	2.0 – 12.0	n/a	7.29	0	12.73
D10	6/14/99	19.2	19.57	2.0 – 12.0	7.15	7.22	0.07	12.35
D11	6/14/99	19.2	19.57	2.0 – 12.0	7.00	7.03	0.03	12.54
D12	6/14/99	18.8	19.14	2.0 – 12.0	n/a	6.24	0	12.90
D13	6/14/99	18.7	19.02	2.0 – 12.0	sheen	5.68	sheen	13.34
D14	6/14/99	19.2	19.57	2.0 – 12.0	sheen	6.34	sheen	13.23
D15	6/14/99	20.0	20.41	2.0 – 12.0	sheen	7.42	sheen	12.99
D16	6/14/99	18.8	19.13	2.0 – 12.0	6.48	6.86	0.38	12.27
D17	6/14/99	18.9	19.22	2.0 – 12.0	sheen	6.53	sheen	12.69
D18	6/14/99	18.8	19.18	2.0 – 12.0	n/a	6.50	0	12.68
D19	6/14/99	18.8	19.13	2.0 – 12.0	n/a	5.77	0	13.36
D20	6/14/99	18.5	18.90	2.0 – 12.0	n/a	6.27	0	12.63
D21	6/14/99	18.8	19.23	2.0 – 12.0	n/a	5.81	0	13.42
D22	6/14/99	19.9	20.30	2.0 – 12.0	n/a	7.95	0	12.35
D23	6/14/99	18.7	19.07	2.5 – 12.5	sheen	6.61	sheen	12.46
D24	6/14/99	18.5	18.84	2.5 – 12.5	sheen	6.04	sheen	12.80
MW6	6/14/99	19.6	19.40	2.9 – 12.9	n/a	5.95	0	13.45
MW11	6/14/99	18.4	18.09	2.3 – 12.3	n/a	6.72	0	11.37
MW60	6/14/99	19.9	19.70	3.0 – 13.0	n/a	7.52	0	12.18
MW61	6/14/99	20.0	19.73	3.0 – 13.0	n/a	7.47	0	12.26
MW63	6/14/99	19.7	19.55	4.0 – 14.0	n/a	7.55	0	12.00
MW64	6/14/99	18.4	18.18	3.0 – 13.0	n/a	6.06	0	12.12
P1	6/14/99	19.0	19.42	2.5 – 12.5	n/a	7.61	0	11.81
P2	6/14/99	20.0	20.34	2.5 – 12.5	n/a	8.09	0	12.25
P3	6/14/99	19.5	19.91	2.5 – 12.5	n/a	7.87	0	12.04
P4	6/14/99	19.4	19.79	2.0 – 12.0	n/a	7.61	0	12.18
P5	6/14/99	19.5	19.84	2.5 – 12.5	n/a	6.72	0	13.12

NOTE:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Second Sampling Event – July 1999								
D1	7/6/99	19.7	20.07	2.0 – 12.0	sheen	5.77	sheen	14.30
D2	7/6/99	19.3	19.60	2.0 – 12.0	n/a	5.40	0	14.20
D3	7/6/99	19.4	19.69	2.0 – 12.0	n/a	5.54	0	14.15
D4	7/6/99	19.4	19.66	2.0 – 12.0	n/a	5.26	0	14.40
D5	7/6/99	19.5	19.88	2.0 – 12.0	n/a	5.87	0	14.01
D6	7/6/99	19.3	19.66	2.0 – 12.0	4.83	7.41	2.58	12.25
D7	7/6/99	19.0	19.35	2.0 – 12.0	sheen	4.77	sheen	14.58
D8	7/6/99	19.3	19.60	2.0 – 12.0	4.91	5.12	0.22	14.48
D9	7/6/99	19.7	20.02	2.0 – 12.0	sheen	5.61	sheen	14.41
D10	7/6/99	19.2	19.57	2.0 – 12.0	5.31	6.05	0.74	13.52
D11	7/6/99	19.2	19.57	2.0 – 12.0	4.48	7.45	2.97	12.12
D12	7/6/99	18.8	19.14	2.0 – 12.0	sheen	3.68	sheen	15.46
D13	7/6/99	18.7	19.02	2.0 – 12.0	n/a	3.49	0	15.53
D14	7/6/99	19.2	19.57	2.0 – 12.0	n/a	4.01	0	15.56
D15	7/6/99	20.0	20.41	2.0 – 12.0	4.92	5.49	0.57	14.92
D16	7/6/99	18.8	19.13	2.0 – 12.0	4.50	6.16	1.66	12.97
D17	7/6/99	18.9	19.22	2.0 – 12.0	3.60	5.54	1.94	13.68
D18	7/6/99	18.8	19.18	2.0 – 12.0	n/a	3.13	0	16.05
D19	7/6/99	18.8	19.13	2.0 – 12.0	n/a	3.35	0	15.78
D20	7/6/99	18.5	18.90	2.0 – 12.0	n/a	4.54	0	14.36
D21	7/6/99	18.8	19.23	2.0 – 12.0	n/a	3.42	0	15.81
D22	7/6/99	19.9	20.30	2.0 – 12.0	sheen	5.92	sheen	14.38
D23	7/6/99	18.7	19.07	2.5 – 12.5	n/a	4.94	0	14.13
D24	7/6/99	18.5	18.84	2.5 – 12.5	n/a	4.14	0	14.70
MW6	7/6/99	19.6	19.40	2.9 – 12.9	n/a	4.23	0	15.17
MW11	7/6/99	18.4	18.09	2.3 – 12.3	n/a	5.51	0	12.58
MW60	7/6/99	19.9	19.70	3.0 – 13.0	n/a	6.04	0	13.66
MW61	7/6/99	20.0	19.73	3.0 – 13.0	n/a	5.97	0	13.76
MW63	7/6/99	19.7	19.55	4.0 – 14.0	n/a	6.18	0	13.37
MW64	7/6/99	18.4	18.18	3.0 – 13.0	n/a	4.80	0	13.38
P1	7/6/99	19.0	19.42	2.5 – 12.5	n/a	6.37	0	13.05
P2	7/6/99	20.0	20.34	2.5 – 12.5	n/a	6.66	0	13.68
P3	7/6/99	19.5	19.91	2.5 – 12.5	n/a	6.56	0	13.35
P4	7/6/99	19.4	19.79	2.0 – 12.0	n/a	6.21	0	13.58
P5	7/6/99	19.5	19.84	2.5 – 12.5	n/a	4.41	0	15.43

NOTES:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Third Sampling Event Event – August 1999								
D1	8/23/99	19.7	20.07	2.0 – 12.0	n/a	7.21	0	12.86
D2	8/23/99	19.3	19.60	2.0 – 12.0	n/a	6.79	0	12.81
D3	8/23/99	19.4	19.69	2.0 – 12.0	n/a	6.83	0	12.86
D4	8/23/99	19.4	19.66	2.0 – 12.0	n/a	6.92	0	12.74
D5	8/23/99	19.5	19.88	2.0 – 12.0	sheen	7.01	sheen	12.87
D6	8/23/99	19.3	19.66	2.0 – 12.0	6.63	6.79	0.16	12.87
D7	8/23/99	19.0	19.35	2.0 – 12.0	sheen	6.42	sheen	12.93
D8	8/23/99	19.3	19.60	2.0 – 12.0	n/a	6.46	0	13.14
D9	8/23/99	19.7	20.02	2.0 – 12.0	6.95	6.96	0.01	13.06
D10	8/23/99	19.2	19.57	2.0 – 12.0	6.50	7.30	0.8	12.27
D11	8/23/99	19.2	19.57	2.0 – 12.0	6.55	6.96	0.41	12.61
D12	8/23/99	18.8	19.14	2.0 – 12.0	n/a	3.99	0	15.15
D13	8/23/99	18.7	19.02	2.0 – 12.0	n/a	5.26	0	13.76
D14	8/23/99	19.2	19.57	2.0 – 12.0	n/a	5.81	0	13.76
D15	8/23/99	20.0	20.41	2.0 – 12.0	sheen	7.10	sheen	13.31
D16	8/23/99	18.8	19.13	2.0 – 12.0	5.92	7.03	1.11	12.10
D17	8/23/99	18.9	19.22	2.0 – 12.0	n/a	6.13	0	13.09
D18	8/23/99	18.8	19.18	2.0 – 12.0	sheen	6.18	sheen	13.00
D19	8/23/99	18.8	19.13	2.0 – 12.0	n/a	5.32	0	13.81
D20	8/23/99	18.5	18.90	2.0 – 12.0	n/a	5.88	0	13.02
D21	8/23/99	18.8	19.23	2.0 – 12.0	sheen	5.42	sheen	13.81
D22	8/23/99	19.9	20.30	2.0 – 12.0	n/a	7.53	0	12.77
D23	8/23/99	18.7	19.07	2.5 – 12.5	sheen	6.07	sheen	13.00
D24	8/23/99	18.5	18.84	2.5 – 12.5	sheen	5.79	sheen	13.05
MW6	8/23/99	19.6	19.40	2.9 – 12.9	n/a	6.00	0	13.40
MW11	8/23/99	18.4	18.09	2.3 – 12.3	n/a	6.37	0	11.72
MW60	8/23/99	19.9	19.70	3.0 – 13.0	n/a	7.09	0	12.61
MW61	8/23/99	20.0	19.73	3.0 – 13.0	n/a	7.14	0	12.59
MW63	8/23/99	19.7	19.55	4.0 – 14.0	n/a	7.09	0	12.46
MW64	8/23/99	18.4	18.18	3.0 – 13.0	n/a	5.66	0	12.52
P1	8/23/99	19.0	19.42	2.5 – 12.5	n/a	7.16	0	12.26
P2	8/23/99	20.0	20.34	2.5 – 12.5	n/a	7.63	0	12.71
P3	8/23/99	19.5	19.91	2.5 – 12.5	n/a	7.39	0	12.52
P4	8/23/99	19.4	19.79	2.0 – 12.0	n/a	7.07	0	12.72
P5	8/23/99	19.5	19.84	2.5 – 12.5	n/a	6.05	0	13.79

NOTES:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Fourth Sampling Event – September 1999								
D1	9/29/99	19.7	20.07	2.0 – 12.0	n/a	6.23	0	13.84
D2	9/29/99	19.3	19.60	2.0 – 12.0	n/a	5.73	0	13.87
D3	9/29/99	19.4	19.69	2.0 – 12.0	n/a	5.81	0	13.88
D4	9/29/99	19.4	19.66	2.0 – 12.0	n/a	5.75	0	13.91
D5	9/29/99	19.5	19.88	2.0 – 12.0	n/a	5.88	0	14.00
D6	9/29/99	19.3	19.66	2.0 – 12.0	5.24	6.94	1.7	12.72
D7	9/29/99	19.0	19.35	2.0 – 12.0	5.26	5.53	0.27	13.82
D8	9/29/99	19.3	19.60	2.0 – 12.0	n/a	5.61	0	13.99
D9	9/29/99	19.7	20.02	2.0 – 12.0	sheen	5.96	sheen	14.06
D10	9/29/99	19.2	19.57	2.0 – 12.0	5.29	6.54	1.25	13.03
D11	9/29/99	19.2	19.57	2.0 – 12.0	4.91	7.24	2.33	12.33
D12	9/29/99	18.8	19.14	2.0 – 12.0	n/a	3.23	0	15.91
D13	9/29/99	18.7	19.02	2.0 – 12.0	n/a	4.13	0	14.89
D14	9/29/99	19.2	19.57	2.0 – 12.0	n/a	4.79	0	14.78
D15	9/29/99	20.0	20.41	2.0 – 12.0	n/a	6.19	0	14.22
D16	9/29/99	18.8	19.13	2.0 – 12.0	4.91	5.47	0.56	13.66
D17	9/29/99	18.9	19.22	2.0 – 12.0	4.64	6.28	1.64	12.94
D18	9/29/99	18.8	19.18	2.0 – 12.0	n/a	4.86	0	14.32
D19	9/29/99	18.8	19.13	2.0 – 12.0	n/a	4.05	0	15.08
D20	9/29/99	18.5	18.90	2.0 – 12.0	n/a	4.62	0	14.28
D21	9/29/99	18.8	19.23	2.0 – 12.0	n/a	4.32	0	14.91
D22	9/29/99	19.9	20.30	2.0 – 12.0	n/a	6.51	0	13.79
D23	9/29/99	18.7	19.07	2.5 – 12.5	n/a	5.03	0	14.04
D24	9/29/99	18.5	18.84	2.5 – 12.5	n/a	4.52	0	14.32
MW6	9/29/99	19.6	19.40	2.9 – 12.9	n/a	4.88	0	14.52
MW11	9/29/99	18.4	18.09	2.3 – 12.3	n/a	5.31	0	12.78
MW60	9/29/99	19.9	19.70	3.0 – 13.0	n/a	5.94	0	13.76
MW61	9/29/99	20.0	19.73	3.0 – 13.0	n/a	5.95	0	13.78
MW63	9/29/99	19.7	19.55	4.0 – 14.0	n/a	6.04	0	13.51
MW64	9/29/99	18.4	18.18	3.0 – 13.0	n/a	4.52	0	13.66
P1	9/29/99	19.0	19.42	2.5 – 12.5	n/a	6.13	0	13.29
P2	9/29/99	20.0	20.34	2.5 – 12.5	n/a	6.60	0	13.74
P3	9/29/99	19.5	19.91	2.5 – 12.5	n/a	6.37	0	13.54
P4	9/29/99	19.4	19.79	2.0 – 12.0	n/a	6.01	0	13.78
P5	9/29/99	19.5	19.84	2.5 – 12.5	n/a	5.16	0	14.68

NOTE:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Fifth Sampling Event – October 1999								
D1	10/27/99	19.7	20.07	2.0 – 12.0	n/a	6.92	0	13.15
D2	10/27/99	19.3	19.60	2.0 – 12.0	n/a	6.49	0	13.11
D3	10/27/99	19.4	19.69	2.0 – 12.0	n/a	6.44	0	13.25
D4	10/27/99	19.4	19.66	2.0 – 12.0	n/a	6.36	0	13.30
D5	10/27/99	19.5	19.88	2.0 – 12.0	n/a	6.81	0	13.07
D6	10/27/99	19.3	19.66	2.0 – 12.0	6.33	7.48	1.15	12.18
D7	10/27/99	19.0	19.35	2.0 – 12.0	5.82	6.20	0.38	13.15
D8	10/27/99	19.3	19.60	2.0 – 12.0	6.07	6.52	0.45	13.08
D9	10/27/99	19.7	20.02	2.0 – 12.0	n/a	6.56	0	13.46
D10	10/27/99	19.2	19.57	2.0 – 12.0	6.06	7.80	1.74	11.77
D11	10/27/99	19.2	19.57	2.0 – 12.0	6.05	7.04	0.99	12.53
D12	10/27/99	18.8	19.14	2.0 – 12.0	n/a	4.54	0	14.60
D13	10/27/99	18.7	19.02	2.0 – 12.0	n/a	4.64	0	14.38
D14	10/27/99	19.2	19.57	2.0 – 12.0	n/a	5.07	0	14.50
D15	10/27/99	20.0	20.41	2.0 – 12.0	6.31	6.77	0.46	13.64
D16	10/27/99	18.8	19.13	2.0 – 12.0	5.51	7.22	1.71	11.91
D17	10/27/99	18.9	19.22	2.0 – 12.0	5.74	6.22	0.48	13.00
D18	10/27/99	18.8	19.18	2.0 – 12.0	n/a	5.45	0	13.73
D19	10/27/99	18.8	19.13	2.0 – 12.0	n/a	4.45	0	14.68
D20	10/27/99	18.5	18.90	2.0 – 12.0	n/a	5.51	0	13.39
D21	10/27/99	18.8	19.23	2.0 – 12.0	n/a	4.61	0	14.62
D22	10/27/99	19.9	20.30	2.0 – 12.0	n/a	7.2	0	13.10
D23	10/27/99	18.7	19.07	2.5 – 12.5	n/a	5.89	0	13.18
D24	10/27/99	18.5	18.84	2.5 – 12.5	n/a	5.32	0	13.52
MW6	10/27/99	19.6	19.4	2.9 – 12.9	n/a	4.90	0	14.50
MW11	10/27/99	18.4	18.09	2.3 – 12.3	n/a	6.11	0	11.98
MW60	10/27/99	19.9	19.70	3.0 – 13.0	n/a	6.65	0	13.05
MW61	10/27/99	20.0	19.73	3.0 – 13.0	n/a	6.41	0	13.32
MW63	10/27/99	19.7	19.55	4.0 – 14.0	n/a	6.78	0	12.77
MW64	10/27/99	18.4	18.18	3.0 – 13.0	n/a	5.34	0	12.84
P1	10/27/99	19.0	19.42	2.5 – 12.5	n/a	7.00	0	12.42
P2	10/27/99	20.0	20.34	2.5 – 12.5	n/a	7.30	0	13.04
P3	10/27/99	19.5	19.91	2.5 – 12.5	n/a	7.24	0	12.67
P4	10/27/99	19.4	19.79	2.0 – 12.0	n/a	6.86	0	12.93
P5	10/27/99	19.5	19.84	2.5 – 12.5	n/a	5.22	0	14.62

NOTES:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Sixth Sampling Event – December 1999								
D1	12/01/99	19.7	20.07	2.0 – 12.0	n/a	8.01	0	12.06
D2	12/01/99	19.3	19.60	2.0 – 12.0	n/a	7.52	0	12.08
D3	12/01/99	19.4	19.69	2.0 – 12.0	n/a	7.46	0	12.23
D4	12/01/99	19.4	19.66	2.0 – 12.0	n/a	7.38	0	12.28
D5	12/01/99	19.5	19.88	2.0 – 12.0	n/a	7.92	0	11.96
D6	12/01/99	19.3	19.66	2.0 – 12.0	7.45	8.21	0.76	11.45
D7	12/01/99	19.0	19.35	2.0 – 12.0	n/a	7.07	0	12.28
D8	12/01/99	19.3	19.60	2.0 – 12.0	n/a	7.27	0	12.33
D9	12/01/99	19.7	20.02	2.0 – 12.0	7.52	7.56	0.04	12.46
D10	12/01/99	19.2	19.57	2.0 – 12.0	7.04	7.60	0.56	11.97
D11	12/01/99	19.2	19.57	2.0 – 12.0	7.19	7.58	0.39	11.99
D12	12/01/99	18.8	19.14	2.0 – 12.0	n/a	6.59	0	12.55
D13	12/01/99	18.7	19.02	2.0 – 12.0	n/a	6.01	0	13.01
D14	12/01/99	19.2	19.57	2.0 – 12.0	n/a	6.71	0	12.86
D15	12/01/99	20.0	20.41	2.0 – 12.0	7.54	7.71	0.17	12.70
D16	12/01/99	18.8	19.13	2.0 – 12.0	6.51	8.08	1.57	11.05
D17	12/01/99	18.9	19.22	2.0 – 12.0	6.71	6.91	0.20	12.31
D18	12/01/99	18.8	19.18	2.0 – 12.0	n/a	6.71	0	12.47
D19	12/01/99	18.8	19.13	2.0 – 12.0	n/a	5.88	0	13.25
D20	12/01/99	18.5	18.90	2.0 – 12.0	n/a	6.41	0	12.49
D21	12/01/99	18.8	19.23	2.0 – 12.0	n/a	5.96	0	13.27
D22	12/01/99	19.9	20.30	2.0 – 12.0	n/a	8.19	0	12.11
D23	12/01/99	18.7	19.07	2.5 – 12.5	n/a	6.87	0	12.20
D24	12/01/99	18.5	18.84	2.5 – 12.5	n/a	6.35	0	12.49
MW6	12/01/99	19.6	19.40	2.9 – 12.9	n/a	7.95	0	11.45
MW11	12/01/99	18.4	18.09	2.3 – 12.3	n/a	7.01	0	11.08
MW60	12/01/99	19.9	19.70	3.0 – 13.0	n/a	7.79	0	11.91
MW61	12/01/99	20.0	19.73	3.0 – 13.0	n/a	7.89	0	11.84
MW63	12/01/99	19.7	19.55	4.0 – 14.0	n/a	7.71	0	11.84
MW64	12/01/99	18.4	18.18	3.0 – 13.0	n/a	6.24	0	11.94
P1	12/01/99	19.0	19.42	2.5 – 12.5	n/a	7.87	0	11.55
P2	12/01/99	20.0	20.34	2.5 – 12.5	n/a	8.35	0	11.99
P3	12/01/99	19.5	19.91	2.5 – 12.5	n/a	8.15	0	11.76
P4	12/01/99	19.4	19.79	2.0 – 12.0	n/a	7.87	0	11.92
P5	12/01/99	19.5	19.84	2.5 – 12.5	n/a	6.73	0	13.11

NOTES:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Seventh Sampling Event – January 2000								
D1	01/04/00	19.7	20.07	2.0 – 12.0	n/a	7.89	0	12.18
D2	01/04/00	19.3	19.60	2.0 – 12.0	n/a	7.38	0	12.22
D3	01/04/00	19.4	19.69	2.0 – 12.0	n/a	7.35	0	12.34
D4	01/04/00	19.4	19.66	2.0 – 12.0	n/a	7.24	0	12.42
D5	01/04/00	19.5	19.88	2.0 – 12.0	n/a	7.71	0	12.17
D6	01/04/00	19.3	19.66	2.0 – 12.0	7.32	7.78	0.46	11.88
D7	01/04/00	19.0	19.35	2.0 – 12.0	n/a	6.9	0	12.45
D8	01/04/00	19.3	19.60	2.0 – 12.0	7.11	7.12	0.01	12.48
D9	01/04/00	19.7	20.02	2.0 – 12.0	n/a	7.45	0	12.57
D10	01/04/00	19.2	19.57	2.0 – 12.0	7.21	7.67	0.46	11.90
D11	01/04/00	19.2	19.57	2.0 – 12.0	7.18	7.42	0.24	12.15
D12	01/04/00	18.8	19.14	2.0 – 12.0	n/a	6.4	0	12.74
D13	01/04/00	18.7	19.02	2.0 – 12.0	n/a	6.05	0	12.97
D14	01/04/00	19.2	19.57	2.0 – 12.0	n/a	6.72	0	12.85
D15	01/04/00	20.0	20.41	2.0 – 12.0	n/a	7.57	0	12.84
D16	01/04/00	18.8	19.13	2.0 – 12.0	6.70	7.23	0.53	11.90
D17	01/04/00	18.9	19.22	2.0 – 12.0	6.45	6.87	0.42	12.35
D18	01/04/00	18.8	19.18	2.0 – 12.0	n/a	6.67	0	12.51
D19	01/04/00	18.8	19.13	2.0 – 12.0	n/a	5.94	0	13.19
D20	01/04/00	18.5	18.90	2.0 – 12.0	n/a	6.45	0	12.45
D21	01/04/00	18.8	19.23	2.0 – 12.0	n/a	6.03	0	13.20
D22	01/04/00	19.9	20.30	2.0 – 12.0	n/a	8.12	0	12.18
D23	01/04/00	18.7	19.07	2.5 – 12.5	n/a	6.79	0	12.28
D24	01/04/00	18.5	18.84	2.5 – 12.5	sheen	6.30	sheen	12.54
MW6	01/04/00	19.6	19.40	2.9 – 12.9	n/a	6.03	0	13.37
MW11	01/04/00	18.4	18.09	2.3 – 12.3	n/a	below pump	0	n/a
MW60	01/04/00	19.9	19.70	3.0 – 13.0	n/a	7.57	0	12.13
MW61	01/04/00	20.0	19.73	3.0 – 13.0	n/a	7.54	0	12.19
MW63	01/04/00	19.7	19.55	4.0 – 14.0	n/a	7.67	0	11.88
MW64	01/04/00	18.4	18.18	3.0 – 13.0	n/a	6.29	0	11.89
P1	01/04/00	19.0	19.42	2.5 – 12.5	n/a	7.84	0	11.58
P2	01/04/00	20.0	20.34	2.5 – 12.5	n/a	8.24	0	12.10
P3	01/04/00	19.5	19.91	2.5 – 12.5	n/a	8.08	0	11.83
P4	01/04/00	19.4	19.79	2.0 – 12.0	n/a	7.72	0	12.07
P5	01/04/00	19.5	19.84	2.5 – 12.5	n/a	6.83	0	13.01

NOTE:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Eigth Sampling Event – March 2000								
D1	3/27/00	19.7	20.07	2.0 – 12.0	n/a	6.97	0	13.10
D2	3/27/00	19.3	19.60	2.0 – 12.0	n/a	6.67	0	12.93
D3	3/27/00	19.4	19.69	2.0 – 12.0	n/a	6.76	0	12.93
D4	3/27/00	19.4	19.66	2.0 – 12.0	n/a	6.82	0	12.84
D5	3/27/00	19.5	19.88	2.0 – 12.0	n/a	7.02	0	12.86
D6	3/27/00	19.3	19.66	2.0 – 12.0	6.49	7.59	1.10	12.07
D7	3/27/00	19.0	19.35	2.0 – 12.0	n/a	6.80	0	12.55
D8	3/27/00	19.3	19.60	2.0 – 12.0	n/a	6.85	0	12.75
D9	3/27/00	19.7	20.02	2.0 – 12.0	n/a	6.90	0	13.12
D10	3/27/00	19.2	19.57	2.0 – 12.0	6.38	7.79	1.41	11.78
D11	3/27/00	19.2	19.57	2.0 – 12.0	6.56	6.72	0.16	12.85
D12	3/27/00	18.8	19.14	2.0 – 12.0	n/a	3.58	0	15.56
D13	3/27/00	18.7	19.02	2.0 – 12.0	n/a	5.34	0	13.68
D14	3/27/00	19.2	19.57	2.0 – 12.0	n/a	6.28	0	13.29
D15	3/27/00	20.0	20.41	2.0 – 12.0	n/a	6.79	0	13.62
D16	3/27/00	18.8	19.13	2.0 – 12.0	n/a	6.15	0	12.98
D17	3/27/00	18.9	19.22	2.0 – 12.0	n/a	6.12	0	13.10
D18	3/27/00	18.8	19.18	2.0 – 12.0	n/a	5.70	0	13.48
D19	3/27/00	18.8	19.13	2.0 – 12.0	n/a	4.49	0	14.64
D20	3/27/00	18.5	18.90	2.0 – 12.0	n/a	5.76	0	13.14
D21	3/27/00	18.8	19.23	2.0 – 12.0	n/a	5.01	0	14.22
D22	3/27/00	19.9	20.30	2.0 – 12.0	n/a	7.39	0	12.91
D23	3/27/00	18.7	19.07	2.5 – 12.5	n/a	6.14	0	12.93
D24	3/27/00	18.5	18.84	2.5 – 12.5	5.45	6.28	0.83	12.56
MW6	3/27/00	19.6	19.40	2.9 – 12.9	n/a	5.23	0	14.17
MW11	3/27/00	18.4	18.09	2.3 – 12.3	n/a	6.51	0	11.58
MW60	3/27/00	19.9	19.70	3.0 – 13.0	n/a	7.01	0	12.69
MW61	3/27/00	20.0	19.73	3.0 – 13.0	n/a	6.87	0	12.86
MW63	3/27/00	19.7	19.55	4.0 – 14.0	n/a	7.17	0	12.38
MW64	3/27/00	18.4	18.18	3.0 – 13.0	nm	nm	nm	nm
P1	3/27/00	19.0	19.42	2.5 – 12.5	n/a	7.19	0	12.23
P2	3/27/00	20.0	20.34	2.5 – 12.5	n/a	7.54	0	12.80
P3	3/27/00	19.5	19.91	2.5 – 12.5	n/a	7.4	0	12.51
P4	3/27/00	19.4	19.79	2.0 – 12.0	n/a	7.07	0	12.72
P5	3/27/00	19.5	19.84	2.5 – 12.5	n/a	5.81	0	14.03

NOTES:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 4. Pilot Study – Groundwater Elevations (continued)

Well Number	Date Measured	Elevation (ft MSL)		Depth of Screened Interval (ft BGS)	Depth of Free Product (ft BTOC)	Water Depth (ft BTOC)	Product Thickness (ft)	Groundwater Elevation (ft MSL)
		Ground Surface	Top of Casing					
Ninth Sampling Event – May 2000								
D1	5/22/00	19.7	20.07	2.0 – 12.0	n/a	7.87	0	12.20
D2	5/22/00	19.3	19.60	2.0 – 12.0	n/a	7.35	0	12.25
D3	5/22/00	19.4	19.69	2.0 – 12.0	n/a	7.35	0	12.34
D4	5/22/00	19.4	19.66	2.0 – 12.0	n/a	7.25	0	12.41
D5	5/22/00	19.5	19.88	2.0 – 12.0	n/a	7.69	0	12.19
D6	5/22/00	19.3	19.66	2.0 – 12.0	n/a	7.41	0	12.25
D7	5/22/00	19.0	19.35	2.0 – 12.0	n/a	6.79	0	12.56
D8	5/22/00	19.3	19.60	2.0 – 12.0	n/a	7.11	0	12.49
D9	5/22/00	19.7	20.02	2.0 – 12.0	n/a	7.51	0	12.51
D10	5/22/00	19.2	19.57	2.0 – 12.0	7.28	7.45	0.17	12.12
D11	5/22/00	19.2	19.57	2.0 – 12.0	n/a	7.22	0	12.35
D12	5/22/00	18.8	19.14	2.0 – 12.0	n/a	5.57	0	13.57
D13	5/22/00	18.7	19.02	2.0 – 12.0	n/a	5.00	0	14.02
D14	5/22/00	19.2	19.57	2.0 – 12.0	n/a	6.52	0	13.05
D15	5/22/00	20.0	20.41	2.0 – 12.0	n/a	7.46	0	12.95
D16	5/22/00	18.8	19.13	2.0 – 12.0	n/a	6.78	0	12.35
D17	5/22/00	18.9	19.22	2.0 – 12.0	n/a	6.78	0	12.44
D18	5/22/00	18.8	19.18	2.0 – 12.0	6.61	6.62	0.01	12.56
D19	5/22/00	18.8	19.13	2.0 – 12.0	n/a	5.85	0	13.28
D20	5/22/00	18.5	18.90	2.0 – 12.0	n/a	6.46	0	12.44
D21	5/22/00	18.8	19.23	2.0 – 12.0	n/a	5.93	0	13.30
D22	5/22/00	19.9	20.30	2.0 – 12.0	n/a	8.10	0	12.20
D23	5/22/00	18.7	19.07	2.5 – 12.5	n/a	6.78	0	12.29
D24	5/22/00	18.5	18.84	2.5 – 12.5	n/a	6.30	0	12.54
MW6	5/22/00	19.6	19.4	2.9 – 12.9	n/a	5.83	0	13.57
MW11	5/22/00	18.4	18.09	2.3 – 12.3	n/a	6.96	0	11.13
MW60	5/22/00	19.9	19.70	3.0 – 13.0	n/a	7.63	0	12.07
MW61	5/22/00	20.0	19.73	3.0 – 13.0	n/a	7.54	0	12.19
MW63	5/22/00	19.7	19.55	4.0 – 14.0	n/a	7.73	0	11.82
MW64	5/22/00	18.4	18.18	3.0 – 13.0	nm	nm	nm	nm
P1	5/22/00	19.0	19.42	2.5 – 12.5	n/a	7.73	0	11.69
P2	5/22/00	20.0	20.34	2.5 – 12.5	n/a	8.19	0	12.15
P3	5/22/00	19.5	19.91	2.5 – 12.5	n/a	8.01	0	11.90
P4	5/22/00	19.4	19.79	2.0 – 12.0	n/a	7.68	0	12.11
P5	5/22/00	19.5	19.84	2.5 – 12.5	n/a	6.69	0	13.15

NOTE:

MSL	Mean sea level
BGS	Below ground surface
BTOC	Below top of casing
n/a	Not applicable

Table 5. Pilot Study – Area of Groundwater Contamination and Free Product

Sampling Event	Area of Benzene Contamination in Groundwater (ft^2)	Area of Free Product (ft^2)
May 1999	22,700	1,850
June 1999	18,600	1,800
July 1999	17,050	2,375 + 500 = 2,875
August 1999	18,000	1,950
September 1999	14,875	2,225
October 1999	15,475	2,850
December 1999	8,575	1,500 + 340 = 1,840
January 2000	10,650	1,770 + 100 = 1,870
March 2000	6,450 + 3,000 = 9,450	580 + 213 = 793
May 2000	6,550 + 2,665 = 8,815	188 + 271 = 459

APPENDIX III

WATER RESOURCES SURVEY DOCUMENTATION

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WATER RESOURCES SURVEY DOCUMENTATION

1.0 LOCAL WATER RESOURCES

As required by the Georgia Environment Protection Division (GA EPD) Underground Storage Tank (UST) Corrective Action Plan (CAP)-Part A Guidance (GA EPD 1998a), a water resource survey documenting information for public and non-public water supply wells, surface water bodies, underground utilities, and potential receptors was conducted for the Former Building 728 site. The information presented in this section provides the supporting documentation for Section II.B.1 of the CAP-Part B Report.

1.1 WATER SUPPLY WELL SURVEY

The water supply well survey was conducted using the following GA EPD guidelines/requirements:

- Hunter Army Airfield (HAAF) is located in an area of average or higher groundwater pollution susceptibility (GA EPD 1976).
- Locate all public supply wells, as defined by the GA EPD, that exist within 2 miles of the investigation sites.
- Locate all non-public supply wells that exist within 0.5 miles of the investigation sites.
- Locate all supply wells nearest the investigation sites.
- Locate all wells downgradient of the investigation sites.

The required survey was accomplished by obtaining information for the Fort Stewart Directorate of Public Work (DPW) and the City of Savannah Bureau of Water Operations, performing a field survey, obtaining a U.S. Environmental Protection Agency site map displaying Public Water Supply for HAAF, and conducting a U.S. Geological Survey (USGS) database search. A summary of the information obtained from the survey is provided in the following sections.

1.1.1 Fort Stewart Directorate of Public Works Survey Summary

According to the DPW, nine water supply wells are located within the confines of the HAAF area. These wells have the potential to provide up to 3890 gpm of water to occupants of the HAAF installation. The Fort Stewart DPW was unable to provide documentation listing the companies responsible for well installation and drillers' logs showing as-built information and subsurface geologic data. The DPW provided well locations, pump rates, treatment methods, casing depths, and total depths for three of the nine wells located within three miles of the subject site (Table III-A). However, documentation of subsurface geology based on HAAF drill logs remains extremely limited. Therefore, other references containing deep-well information were used to document the subsurface geology and aquifer characteristics beneath the HAAF area.

Wells 1, 2, and 3 are located within a 2-mile radius of the Former Building 728 site. Wells 1 and 2 are both public water supply wells located in the cantonment area of HAAF, and constitute the main water supply system at the HAAF installation. Well 1, located at Building 711 on the corner of Moore Road and Douglas Street, is a 12-inch-diameter well with a 100-hp turbine pump serving a 100,000-gallon elevated storage tank (Tank 1) through 10-inch lines. Water from Well 1 is injected with hydrofluosilic acid and chlorine gas solution at the well house. Well 2, located at Building 1205 on the corner of Neal Street and Lightning Road, is a 12-inch-diameter well with a 100-hp turbine pump serving a 200,000-gallon elevated tank (Tank 2) through 10-inch lines. Water from Well 2 is also injected with hydrofluosilic acid and chlorine gas solution

at the well house. Wells 1 and 2 provide water to a 500,000-gallon elevated storage tank (Tank 3) located on Middleground Road behind Noncommissioned Officer family housing. This tank provides potable water to 694 service connections, which are used by an average of at least 5,000 individuals year-round.

Well 3 is a public supply well located outside the cantonment area of HAAF. Well 3, located at Building 8455, is a 4.0-inch-diameter well with a 1.0-hp electric submersible pump serving a 1,000-gallon hydropneumatic storage tank through 1.5-inch galvanized steel lines. Water from Well 3 is treated with calcium hypochlorite solution and is consumed by approximately 25 people during daytime hours, year-round.

Pump rates, casing depths, bore depths, treatment methods, and storage tank information for Wells 1, 2, and 3 are provided in Table III-A.

1.1.2 City of Savannah Bureau of Water Operations Survey Summary

Four City of Savannah water supply wells are located outside the boundary of HAAF, within 2 miles of the Former Building 728 site. The closest of these wells is Well 25, which is located 1.1 miles northwest of the site. Data concerning casing depths, borehole depths, casing sizes, and capacities are listed in Table III-B. The City of Savannah Bureau of Water Operations was unable to provide drilling logs or as-built well information.

1.2 SURFACE WATER BODIES

Surface water(s) in the state of Georgia shall mean any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs producing 100,000 gallons per day, and all other bodies of surface water, natural or artificial, lying within or forming a part of the boundaries of the State, which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation (GA EPD 1998b). The surface water body survey was conducted using the following GA EPD guidelines/requirements:

- surface water bodies that exist within one mile of the investigation sites,
- all surface water bodies nearest the investigation sites if these bodies lie outside the 1-mile radius of concern,
- all surface water bodies downgradient of the investigation sites, and
- the storm and sanitary sewers adjacent to investigation sites.

The locations of surface water bodies at HAAF were obtained from USGS topographic maps, and from maps provided by the DPW. Storm and sanitary sewer location maps, storm sewer invert elevations, and storm sewer and culvert construction details were provided by the DPW.

1.3 POTENTIAL RECEPTOR SURVEY SUMMARY OF THE FORMER BUILDING 728 SITE

Metcalf & Eddy conducted a field potential receptor survey for the Former Building 728 site during the CAP-Part B investigation (Metcalf & Eddy 1997). The site and adjacent areas were surveyed for locations of surface water bodies, utility lines, and basements. Basements do not exist in the buildings adjacent to the site. Additional information, provided by the Fort Stewart DPW, was used to determine the location of the nearest public supply wells and downgradient surface water bodies not located during the field survey.

1.3.1 Water Supply Wells Near the Former Building 728 Site

The following information is presented to provide supplemental information to Section II.B.1 of the CAP-Part B Report dated December 1997 and to provide detailed information relating to public and non-public water supply wells located 2 miles and 0.5 mile, respectively, from the Former Building 728 site.

- Well 1, located on the corner of Moore Road and Douglas Street, at Building 711, is located approximately 350 feet south (upgradient) of the Former Building 728 site.
- Well 2, located at Building 1205 on the corner of Neal Street and Lightning Road, is located approximately 3,600 feet southeast (upgradient) of the Former Building 728 site.
- Well 3, located at Building 8455, is approximately 12,600 feet southwest (upgradient) of the Former Building 728 site.

Therefore, the Former Building 728 site is classified as being located less than 500 feet to these withdrawal points. Based on the estimated nature and extent of petroleum-related groundwater contamination at the site, there is no indication that Wells 1, 2, or 3 have been impacted. Therefore, collection and analysis of groundwater samples from Wells 1, 2, or 3 are not recommended. However, Well 1 is being sampled as part of the Former Building 710, Facility ID 9-025029 monitoring only program and has not contained any benzene, ethylbenzene, toulene, and kylenes (BTEX) or polynuclear aromatic hydrocarbon (PAH) contaminants.

1.3.2 Surface Water Bodies Near the Former Building 728 Site

A man-made, open-channel drainage ditch is located approximately 290 feet northwest (i.e., downgradient) of the MW8 at the Former Building 728 site. The man-made surface water drainage feature flows west toward Lamar Canal, which is located approximately 850 feet west of the Former Building 728 site. The surface water then flows to the southwest until it reaches Springfield Canal, which eventually joins the Little Ogeechee River more than 3 miles downstream of the site. Because of the ditch 290 feet northwest of the Former Building 728 site, the site is classified as being less than 500 feet to a downgradient surface water body.

1.3.3 Underground Utilities at the Former Building 728 Site

An underground storm drain is located approximately 65 feet north (i.e., downgradient) of MW8 at the Former Building 728 site. The invert depth of the underground storm drain in the vicinity of the site is approximately 8.9 feet BGS. Thus, the invert depth of the underground storm drain is located below the water table. The underground storm drain discharges into the man-made, open-channel drainage ditch located northwest of the site.

1.4 References

GA EPD (Georgia Environmental Protection Division) 1976. *Geologic Map of Georgia*, Department of Natural Resources, Environmental Protection Division, Georgia Geologic Survey (reprinted 1997).

GA EPD 1998a. *Guidance Document for the Preparation of an Underground Storage Tank Corrective Action Plan, Part A*, May.

GA EPD 1998b. *Rules of Georgia Department of Natural Resources, Environmental Protection Division, Chapter 391-3-6, Water Quality Control*, May.

Metcalf & Eddy 1997. *Final Corrective Action Plan - Part B Report for Former Building 728, EPD Facility ID: 9-025035 and 9-025049, Hunter Army Airfield, Georgia*, December.

Table III-A. Water Supply Well Information Provided by the Fort Stewart DPW

Building	Well ID	Year Drilled	Bore Depth	Casing Depth	Pump Rate (gpm)	Number of Service Connections	Population	Public or Non-Public Supply
711	1	1941	550	250	1300	525	7500	Public
1205	2	1941	600	250	1300	525	7500	Public
8455	3	1951	360	40	30	2	25	Public
8581	4a	1976	300	92	80	10	15	Public

Table III-B. Water Supply Information Provided by the City of Savannah Bureau of Water Operations

Well ID	Year Drilled	Bore Depth	Casing Depth	Pump Rate (gpm)	Number of Service Connections	Population	Public or Non-Public Supply
6	TBD	750	1240	1500	TBD	TBD	Public
13	TBD	TBD	TBD	2200	TBD	TBD	Public
14	TBD	800	338	571	TBD	TBD	Public
15	TBD	414	252	1000	TBD	TBD	Public
23	TBD	639	320	1056	TBD	TBD	Public
25	TBD	540	287	1120	TBD	TBD	Public
27	TBD	550	321	1468	TBD	TBD	Public

NOTE: TBD = to be determined

APPENDIX IV

SOIL BORING LOGS

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HTRW DRILLING LOG

HOLE NUMBER AE-D1

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		silty SAND, fine grained, nonplastic, dry, light olive brown (2.5Y5/3)				
	2					
		clayey SILT, non-plastic, some fine grained sand, loose, moist, gray (2.5Y5/1)				
	4					
		silty SAND, fine grained, loose, non plastic, moist, light olive gray (2.5Y5/4)				
	6					
			44.5ppm		AEDIII	
	8					▽ WET BELOW 8.2FT
		SAND, fine grained, some silt, non plastic, wet, light gray (5Y7/2) to light bluish gray (5B7/1)				
	10					
	12					
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D2

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR M. Vest

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		sandy SILT, fine grained, non plastic, low density, loose, dry, mottled gray and brown				
	2					
		clayey SILT, medium plasticity, soft, moist, light olive brown (2.5 Y 5/4) to olive gray (5 Y 4/2)				
	4					
	6	sandy SILT, fine grained, loose, non plastic, moist, gray (2.5 Y 6/1)				
	8		47.3 ppm			▽ WET BELOW 8.5 FT
		SAND, fine grained, some silt, loose, non-plastic, wet light gray (5 Y 7/1) to gray (2.5 Y 6/1)				
	10					
	12					
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D3

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–2	Sandy SILT, fine grained, loose, non plastic, dry, light gray (2.5Y7/1)				
	2–8	Clayey SILT, low density, some fine grained sand, non-plastic, damp, light olive gray (2.5Y5/4) to light gray (5Y7/2)	1.7ppm		AED311	▽ WET BELOW 8.0 FT
	8–12.5	SAND, fine grained, some silt, wet, light gray (5Y7/1) light bluish gray (5B7/1)				
	12.5	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS

HTRW DRILLING LOG

HOLE NUMBER AE-D4

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine grained, dry, brown (10YR 4/3)				
		Silty SAND, fine grained, dry, white (10YR 8/1) and black (10 YR 2/1)				
	2	Sandy CLAY, medium plasticity, moist, gray (10YR 8/1) to light bluish gray (5B 7/1)				
	4					
	6					
	8		153 ppm		AED411	▽ WET BELOW 9.1 FT
		SAND, fine to medium grained, wet, light gray (10YR 7/1) to dark greenish gray (10BG 4/1)				
	10					
	12					
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D5

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Top Soil				
		sandy SILT, fine grained, non plastic, dry, light gray (2.5Y 7/1)				
	2					
	4	clayey SILT, low density, non plastic, some fine grained sand, damp, light olive brown (2.5Y 5/4) to olive gray (5Y 4/2)				
	6	CLAY, low to medium plasticity, soft, damp to moist, some silt, light olive brown (2.5Y 5/4)				
	8		80.2 ppm		AEDS11	
		SAND, fine grained, loose, non plastic, wet, light gray (5Y 7/1) to light bluish gray (5B 7/1)				▽ WET BELOW 8.9 FT
	10					
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					No groundwater sample was collected from this boring
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D6

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOPSOIL				
		Silty SAND, fine grained, nonplastic, dry, light olive brown (2.5 Y 5/3)				
	2					
		clayey SAND, fine grained loose, nonplastic, damp to moist, some silt, gray (2.5 Y 5/1)				
	4					
	6					
		SAND, fine grained, loose, some silt, moist to wet, light gray (5Y 7/2) to light bluish gray (5B 7/1)	2047 ppm			▽ WET BELOW 8.1 FT
	8					
	10					
	12					
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D7

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	silty SAND, fine grained, moist, mottled yellow (10YR 7/6) and dary gray (10YR4/1)				
	2	silty SAND, fine grained, moist, numerous thin clay beds, greenish gray (10Y6/1)				
	4					
	6					
	8		494ppm			▽ WET BELOW 9.0 FT STRONG PETROLEUM ODOR AND SHEEN ON WATER
	10	silty SAND, fine grained, wet, thin clay beds, very dark gray (N3), stained from petroleum products				
	12	silty SAND, fine grained, wet thin clay beds, greenish gray				
	14	END OF DRILLING AT 13.0FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D8

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR T. Coffey

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, medium grained, loose, dry, yellow (10YR 7/6)				
		silty SAND, thin clay beds, dry, gray (10YR 6/1) to light gray (10YR 7/1)				
	2					
	4					
	6					
	8		1061 ppm			▽ WET BELOW 9.0 FT
		silty SAND, numerous thin clay beds, wet, greenish gray (10Y 6/1)				
	10					
	12					
		END OF DRILLING AT 13.0 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D9

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR T. COFFEY

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	silty SAND, fine grained, loose, dry, yellowish brown (10 YR 5/4)				
	2	sandy CLAY, plastic, moist, gray (10 YR 6/1) to bluish gray (5B 6/1)				
	4					
	6		1397ppm		AED911	▽ WET BELOW 6.5 FT
	8	SAND, fine to medium grained, loose, wet, light gray (10 YR 7/1) to dark bluish gray (5B 4/1)				
	10					
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					No groundwater sample collected from this boring
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D10

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Top Soil				
		silty SAND, fine grained, loose, nonplastic, dry, light olive brown (2.5 Y 5/3) to dark gray (2.5 Y 4/1)				
	8		301 ppm		AEDA11	▽ WET BELOW 8.0 FT
		SAND, fine grained, some silt, wet, light gray (5 Y 7/1).				
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FTBGS

HTRW DRILLING LOG

HOLE NUMBER AE-D11

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. Vest | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Top soil				
		Sandy SILT, fine grained, non plastic, dry, light gray (2.5 Y 7/1)				
	2					
		Clayey SILT, non plastic, some sand, damp, light olive brown (2.5 Y 5/4) to olive gray (5 Y 4/2)				
	4					
	6					
		Silty SAND, fine grained, loose, silty sand, moist, light olive gray (2.5 Y 5/4)	1960ppm			
		SAND, fine grained, loose, some silt, non plastic, wet, gray (5 Y 7/1) to light bluish gray (5B 7/1)				▽ WET BELOW 7.5 Ft
	8					
	10					
	12					
		END OF DRILLING AT 12.5 Ft				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 Ft
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D12

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M.West | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to medium grained, damp to moist, yellow (2.5Y 7/6) to pale yellow (2.5 Y 7/4)				
	6	Sandy SILT, fine grained, loose, moist to wet, non plastic				▽ WET BELOW 7.0 FT
	8		2011 ppm			
	10	SAND, fine grained, some silt, non plastic, wet, light bluish gray (5 B 7/1) to light greenish gray (10 Y 7/1)				
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D13

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, coarse grained, medium dense, dry, dark grayish brown (10YR4/2) to yellow (10YR7/8)				
	2	Silty SAND, fine to medium grained, laminated, moist, light bluish gray (10B7/1) to very pale brown (10YR8/1) to yellow (10YR7/8)				
	4					
	6	Silty SAND, fine to medium grained, moist to wet, dark greenish gray (10Y6/1) to light brownish gray (10YR6/2)				
	8		27.4ppm		AEDD11	▽ WET BELOW 8.8 FT
	10					
	12					
		END OF DRILLING AT 12.9 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D14

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Silty SAND, some pebbles, dry, mottled, medium to coarse grained, dark yellowish brown (10YR4/4) to yellow (10YR7/8)				
	2	Silty SAND, dense, some pebbles, mottled, very dark gray (10YR3/1) to greenish black (5GY 2.5/1) to pale yellow (2.5Y8/4)				
	8	Silty SAND, moist to wet, greenish-gray (10Y6/1)	191 ppm			▽ WET BELOW 8.6 FT
	14	END OF DRILLING AT 13.0 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D15

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR T. Coffey

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to medium grained, loose, dry, brownish yellow (10YR 6/8) to yellow (10YR 7/8)				
	2	silty SAND, fine grained, dry light gray (10YR 7/2) to dark gray (10YR 4/1)				
	4					
	6					
	8		1424 ppm		AEDF11	▽ = WET BELOW 8.8FT
	10	silty SAND, fine to medium grained, wet, pale red (10R 6/2)				
	12	SAND, medium grained, loose, wet, very pale brown (10YR 8/2)				
	14	END OF DRILLING AT 13.0 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D16

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		sandy SILT, fine grained, non plastic, dry, light gray (2.5 Y 7/1)				
	2					
		clayey SILT, non plastic, some fine grained sand, damp, light olive brown (2.5 Y 5/4) to dark gray (5 Y 4/2)				
	4					
	6	silty SAND, fine grained, non plastic, moist, light olive gray (2.5 Y 5/4)	2020 ppm			
		SAND, fine grained, loose, some silt, non plastic, wet, light gray (5 Y 7/1) to light bluish gray (5B 7/1)				▽ WET BELOW 7.2 FT
	8					
	10					
	12					
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D17

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		sandy SILT, fine grained, non plastic, loose, dry, grayish brown (2.5 Y 5/2)				
	2					
		clayey SILT, low to medium dense, damp to moist, light olive brown (2.5 Y 5/4) to olive gray (5 Y 4/2)				
	4					
		silty SAND, fine grained, loose, non-plastic, moist, light olive gray (2.5 Y 5/4)	1880 ppm		AEDK11	▽ WET BELOW 7.0 FT
	6	SAND, fine grained, some silt, loose, non-plastic, light gray (5 Y 7/1) to light bluish gray (5 B 7/1)				
	8					
	10					
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D18

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR T. COFFEY

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to medium grained, loose, dry, grayish brown (10YR5/4) to yellow (10YR7/8)				
	2					
	4					
	6	Silty SAND, fine grained some clay, moist, dark greenish gray (5BG4/1)				
	8					
	10		1284ppm		AEDL11	▽ WET BELOW 10.7FT
	12	SAND, medium grained, loose, wet, light greenish gray (10G7/1)				
	14	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D19

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to medium grained, dry, brownish yellow (10 YR 6/8)				
	4	Silty SAND, fine to medium grained, dry, brownish yellow (10 YR 6/6) to dark gray (10YR4/1)				
	6	SAND, fine to medium grained, moist, very pale brown (10YR 7/4)				
	8		12 ppm		AEDM11	▽ WET BELOW 8.5 FT
	10	SAND, fine grained, wet gray (10YR 5/1)				
	12	Silty SAND, fine grained, wet, black (10YR 2/1)				
		END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D20

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
	2	Sandy SILT, fine grained, non plastic, loose, dry, grayish brown (2.5Y 5/2)				
	4	Clayey silt, low plasticity moist, light olive brown (2.5Y 5/4) to olive gray (5Y 4/2)				
	6	Silty SAND, fine grained, loose, non plastic, moist, light olive gray (2.5Y 5/4)	5.3ppm			▽ WET BELOW 6.0 FT
	8	SAND, fine grained, loose, some silt, non plastic, wet light gray (5Y 7/1) to light bluish gray (5B 7/1)				
	10					
	12					
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D21

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to medium grained, loose, dry, yellow (10YR 7/8) to very pale brown (10YR 7/4)				
	2					
	4					
			149 ppm			
	6					▽ WET BELOW 5.9 FT
	8					
	10					
		Silty SAND, medium grained, wet, loose, greenish gray (5BG 6/1)				
	12	Sandy CLAY, plastic, wet very dark gray (N3)				
		END OF DRILLING AT 13.0 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D22

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	NO SOIL SAMPLES COLLECTED FOR LITHOLOGY DESCRIPTION				
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS No soil or groundwater samples were collected from this boring

HTRW DRILLING LOG

HOLE NUMBER AE-D23

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Top Soil				
	2	silty SAND, fine grained, moist, some clay, brown to bluish gray				
	4					
	6					▽ WET BELOW 7.0 FT
	8	SAND, fine grained, some clay lenses, wet, gray				
	10					
	12					
	14	END OF DRILLING AT 13.0 FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.5 TO 12.5 FT BGS
	16					No groundwater or soil samples were collected from this boring
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-D24

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	NO SOIL SAMPLES COLLECTED FOR LITHOLOGY DESCRIPTION				
	12	END OF DRILLING AT 12.5FT				SET TEMPORARY PIEZOMETER SCREENED FROM 2.0 TO 12.0 FT BGS No ground water or soil samples were collecting from this boring

HTRW DRILLING LOG

HOLE NUMBER AE-J1

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to medium grained, black to dark brown				
	2	sandy CLAY, medium grained sand, light brown to gray				
	6				AEJ111	▽ wet below 7.0 FT
	8	CLAY, very stiff, slight amount of sand, gray, wet				
	10	SAND, very fine to fine grained, wet, tan, well sorted				
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT

HTRW DRILLING LOG

HOLE NUMBER AE-J2

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. Jordan | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine to mediumgrained, organics, black				
	2		N/A			
		sandy CLAY, 40% sand, gray				
	4		<1 ppm			
	6		N/A			
		clayey SAND, fine to medium grained, wet, gray	65.8 ppm			▽ WET BELOW 7.5 Ft
	8					
	10					
		SAND, well sorted, gray				noticable odor Possibly fuel
	12					
	14					
		END OF DRILLING AT 15.5 Ft				SET INJECTION POINT SCREENED FROM 14.5 15.5 Ft
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J3

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–2	SAND, well sorted, light orange	2.4 ppm			
	2–4		3.1 ppm			
	4–6	CLAY, gray to brown	N/A	AEJ331		
	6–8	SAND, fine grained, 10% clay, light gray to white wet	2.2 ppm			▽ wet below 7
	8–10		179 ppm			
	10–12					
	12–14					
	14–16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	16–18					
	18–20					

HTRW DRILLING LOG

HOLE NUMBER AE-34

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. Jordan | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, organics, dark brown medium to fine grained				
	2		<1 ppm			
	4		<1 ppm			
	6					▽ wet below 6.8
	8	SAND, fine to medium grained, gray	1.8 ppm			
	10		N/A			
	12		28 ppm			
	14		287 ppm			
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-JS

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOPSOIL				
	2	SAND, very fine to fine grained, gray to brown w/ increasing clay	26 ppm			
	4		22 ppm			
		CLAY & SAND, 50/50, brown				
	6		N/A	AEJS31		
	8	SAND, very fine grained, white	238 ppm			▽ wet below 7.5 FT
	10		22			
	12	CLAY, gray	46 ppm			
	14	SAND, very fine grained gray w/ clayey sand lenses	22 ppm			
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J6

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOPSOIL	26ppm			
	2	SAND, fine grained, tan to brown	30.8 ppm			
	4	sandy clay, ~20% sand, firm, light brown	N/A			
	6					
	8		26.2ppm			▽ wet below 7.5 FT
	10	clayey SAND				
	12	SAND, very fine grained, clean, white	N/A			
	14		10.2ppm			
	16	END OF DRILLING AT 15.5FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					No soil samples collected for laboratory analysis
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-17

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, medium to fine grained, organics, black	5.5 ppm			
	2		7.5ppm			
	4	Sandy CLAY, firm, 20% sand, gray	7.8ppm			
	6	Clayey SAND, fine grained, gray	N/A			▽ WET BELOW 7.8
	8	SAND, very fine grained, gray	92 ppm			STRONG ODOR
	10		87ppm			
	12		68 ppm			
	14		41ppm			
	16	END OF DRILLING AT 15.5Ft				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5Ft
	18					No soil samples collected for laboratory analysis
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J8

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		SAND, black to brown w/debris frock fragments to 4.0	N/A			
	2		12.0 ppm			
	4		10.5 ppm			
	6	SAND & CLAY, 50/50, green	11.2 ppm			▽ WET BELOW 7.5 FT
	8		41 ppm			ODOR BELOW 11.0
	10	Clayey SAND, very fine grained 20% clay, light gray	60.5 ppm			
	12	SAND, finegrained, light gray	68 ppm			
	14		83 ppm			
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J9

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR S. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOPSOIL				
		SAND, medium grained, dark brown	7.2 ppm			
	2					
		sandy CLAY, ~40% sand, brown	9.0 ppm			
	4					
			10.5 ppm			
	6					
		SAND & CLAY, 50/50, gray	745 ppm			
	8					V = WET BELOW 8.0 FT
			318 ppm			STRONG ODOR
	10					
		SAND, very fine, white to gray	N/A			
	12					
			220 ppm			
			49.7 ppm			
	14					
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J10

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. Jordan | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		SAND, Fine grained, black to brown	19.2 ppm			
	2	sandy CLAY, soft, brown to gray	16 ppm			
	4		160 ppm			
	6	SAND & CLAY, 50/50, gray	616 ppm			▽ = WET BELOW 7.5 Ft STRONG ODOR
	8	clayey SAND, gray to white very fine grained	652 ppm			
	10	SAND, very fine grained gray to white				
	12					
	14					
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AEJ11

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOPSOIL	18.9 ppm			
	2	SAND, fine to medium grained, dark brown				
		Clayey SAND, ~40% clay brown	23.6 ppm			
	4	Sandy CLAY, soft, gray				
			1255 ppm			
	6					
			1786 ppm			▽ WET BELOW 7.8 FT
	8	SAND, very fine grained, gray				STRONG ODOR
			259 ppm			
	10					
			519 ppm			
	12	Clayey SAND, ~20% clay, gray				
			48.4 ppm			
			N/A			
	14	SAND, very fine grained, gray				
			59.9 ppm			
	16	END OF DRILLING AT 15.0 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE.J12

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL	65 ppm			
	2	Sandy CLAY, brown to gray				
			8.2 ppm			
	4	CLAY, soft, gray				
			886 ppm			STRONG ODOR @ 5.0
	6					
		sandy CLAY, soft, gray	690 ppm			
			590 ppm			▽ = WET BELOW 7.0 FT STRONG ODOR
	8					
		SAND, very fine grained light gray	443 ppm			
	10					
			N/A			
	12					
			69.7 ppm			
			229 ppm			
	14					
			N/A			
	16	END OF DRILLING AT 15.5 FT				SET INJECTION POINT SCREENED FROM 14.5 TO 15.5 FT
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J13

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR J. JORDAN

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, organics, black				
	2		N/A			
	4	Clayey SAND, finegrained dark brown to light gray	34ppm		AEJC11	
	6		N/A	AEJC31		
	8		N/A			▽ WET BELOW 5.5
			304ppm			
	10	SAND, very fine grained white to gray				
			303ppm			
	12		318ppm			
			291ppm			
	14		457ppm			
	16	End of drilling at 15.5FT				set injection point screened from 14.5 to 15.5 ft
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J14

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–2	SAND, organics, black	2.7 ppm			
	2–4	SAND & CLAY, 50/50, medium grained sand	49 ppm			
	4–6	clayey SAND, brown to gray, very fine grained	47 ppm		AEJD11	
	6–8		N/A	AEJD31		▽ WET BELOW 7.0 Some odor
	8–10		241 ppm			
	10–12		197 ppm			
	12–14		N/A			
	14–16	End of drilling at 15.5 ft				set injection point screened from 14.5 to 15.5 ft
	16–18					
	18–20					

HTRW DRILLING LOG

HOLE NUMBER AE-J15

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, organics, black to brown	13.6ppm			
	2		2204ppm			
	4	SAND, well sorted, light gray to white, very fine grained	1461ppm			very strong odor
	6		837ppm			
	8		1923ppm			▽ WET BELOW 7.5
	10		892ppm			FREE PRODUCT OBSERVED IN SOIL SAMPLE
	12					
	14					
	16	End of drilling at 15.5ft				set injection point screened from 14.5 to 15.5ft
	18					No soil samples collected for laboratory analysis
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J16

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, orange (FILL)	29.2 ppm			
	2		566 ppm			
	4	Sandy CLAY, ~30% sand brown	1312 ppm			
	6		203 ppm			
	8		1012 ppm			▽ WET BELOW 8.0 FT STRONG ODOR
	10	SAND, very fine grained light gray	236 ppm			
	12		N/A			
	14		89 ppm			
	16	End of drilling at 15.5 ft	N/A			Set injection point screened from 14.5 to 15.5 ft
	18		68 ppm			No soil samples collected for laboratory analysis
	20		N/A			

HTRW DRILLING LOG

HOLE NUMBER AE-J17

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR J. JORDAN

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, orange (FILL)				
	2		70.7 ppm			
	4		27 ppm			
	6		N/A			
	8	sandy CLAY, soft, ~40% sand brown	1398 ppm			▽ WET BELOW 7.0 FT ODOR
	10	clayey SAND, brown				
	12	sandy CLAY, very fine grained sand, light gray	495 ppm			
	14	SAND, very fine grained, light gray	1398 ppm			
	16	End of drilling at 15.5 ft				set injection point screened from 14.5 to 15.5 ft
	18					No soil samples collected for laboratory analysis
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-SB

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–2	SAND, medium to coarse grained, orange, (FILL)	38ppm			
	2–4	sandy clay, ~40% sand gray	2030ppm			
	4–6	Clayey SAND, ~30% clay gray	1027ppm			▽ WET BELOW 6.0 FT STRONG FUEL ODOR
	6–8		2027ppm			
	8–10		1385ppm			
	10–12		649ppm			
	12–14		206ppm			
	14–16		N/A			
	16–18	End of drilling at 15.5ft				Set injection point screened from 14.5 to 15.5ft No soil samples collected for laboratory analysis
	18–20					

HTRW DRILLING LOG M. Vest

HOLE NUMBER AE-J19

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, fine grained, loose, non-plastic, various shades of light grays & browns				
	6	silty CLAY, soft, medium plasticity, moist, gray (2.5 Y 6/1)				
	8	sandy SILT, fine grained sand, loose, non plastic, gray (2.5 Y 6/1) to bluish gray (7/1, 5 B)				▽ WET BELOW 8.1 FT
	12	END SOIL SAMPLING AT 12.0 FT				
	16					PUSHED TO 15.0 FT BGS TO SET INJECTION POINT SCREENED FROM 14.0 TO 15.0 FT
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-S20

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. Jordan | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, w/organics, black	<1 ppm			
	2	sandy CLAY, ~40% sand brown to gray	20.6ppm			
	4		60.1ppm			
	6	CLAY, firm, gray to bluish gray	16.7ppm			▽ wet below 7.0ft
	8	SAND, very fine grained, some clay, light gray	>2500ppm			
	10		282ppm			No soil sample collected for laboratory analysis
	12		252ppm			
	14		N/A			
	16	End of drilling at 15.0ft				set injection point screened from 14.0 to 15.0ft
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J21

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR J. Jordan

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–2	SAND, medium grained well sorted, light brown to orange, possibly fill	<1 ppm			
	2–4		7.8 ppm			
	4–6	SAND, medium grained light gray (FILL)	73.5 ppm			▽ = WET BELOW 6.0 Ft
	6–8		49 ppm			STRONG FUEL ODOR
	8–10		> 2500 ppm			
	10–12		57 ppm			
	12	SAND & CLAY, greenish gray (not native)	> 2500 ppm			
	12–14	Refusal at 13.0 ft				Set injection point screened from 11.2 to 12.2 ft
	14–16					
	16–18					No soil samples collected for laboratory analysis
	18–20					

HTRW DRILLING LOG

HOLE NUMBER AE-J22

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR J. JORDAN

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, poorly graded, yellowish orange (FILL) medium grained	<1ppm			
	2		<1ppm			
	4		N/A			▽ WET BELOW 6.0 FT
	6		N/A			
	8	SAND, medium grained, gray (FILL)	>2500ppm			STRONG ODOR
	10	clayey SAND, <20% clay, not cohesive, gray (FILL)	N/A			
	12		823ppm			
	14	Refusal at 13.0 ft				set injection point screened from 11.5 to 12.5 ft
	16					No soil samples collected for laboratory analysis
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J23

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. Jordan | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, medium grained, poorly sorted, yellowish orange (FILL	N/A			
	2					
	4		>2500ppm			
		clayey SAND, medium grained, poorly graded gray (FILL)	1082ppm			
	6					▽ WET BELOW 6.0Ft STRONG ODOR
			>2500ppm			
	8					
		Sandy CLAY, gray (FILL)	>2500ppm			
	10					
		clayey sand, poorly sorted gray (FILL)	2354ppm			
	12					
	14					
		Refusal at 14.0ft				set injection point screened from 14.5 to 15.5ft
	16					
						No soil samples collected for laboratory analysis
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-J24

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. Jordan | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, yellowish orange (FILL	27.8 ppm			
	2		>2500 ppm			
	4	clayey SAND, very fine grained, gray to olive gray	>2500 ppm			
	6		N/A			▽ = WET BELOW 7.5 Ft
	8		2067 ppm			
	10		>2500 ppm			
	12		>2500 ppm			
	14		N/A			
	16	End of drilling at 15.2				Set injection point screened from 14.0 to 15.0 ft
	18					No soil samples collected for laboratory analysis
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-P1

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–4	Lithology not observed				
	4–6	clayey SAND, very finegrained, black to brown	18.6		AEP111	
	6–12	Lithology not observed				
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY OBSERVATION PIEZOMETER SCREENED FROM 2.5 TO 12.5 FT BGS Collected groundwater sample AEP112 from 3/4" monitoring point

HTRW DRILLING LOG

HOLE NUMBER AE-P2

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–4	Lithology not observed				
	4–6	Clayey SAND, very fine grained, black to brown	Not Recorded		AEP211	
	6–12					
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY OBSERVATION PIEZOMETER SCREENED FROM 2.5 to 12.5 FT BGS Collected groundwater sample AEP212 from 3/4" monitoring point
	14–20					

HTRW DRILLING LOG

HOLE NUMBER AE-P3

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Lithology not observed				
	6	Clayey SAND, very fine grained, well graded, black	Not Recorded		AEP311	
	6	Lithology not observed				
	12	END OF DRILLING AT 12.5 FT				SET TEMPORARY OBSERVATION PIEZOMETER SCREENED FROM 2.5 to 12.5 FT BGS COLLECTED GROUNDWATER SAMPLE AEP312 FROM 3/4" MONITORING POINT

HTRW DRILLING LOG

HOLE NUMBER AE-P4

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. VEST | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	TOP SOIL				
		SILT, nonplastic, loose, dry				
	2					
		Silty SAND, fine grained, loose, low density, nonplastic, damp, olive yellow (2.5Y6/6) and light yellowish brown (2.5Y6/3)				
	4					
		CLAY, soft, medium to high plasticity, damp, grayish yellow (2.5Y5/2) mottled w/ red (5YR5/8)	22.3ppm		AEP411	
	6					▽ WET BELOW 6.4 FT
		SAND, fine grained, loose, non plastic, wet, gray (2.5Y7/1)				
		No soil samples collected below 7.0 ft bgs				
	8					
	10					
	12					
		END OF DRILLING AT 12.5 FT				SET TEMPORARY OBSERVATION PIEZOMETER SCREENED FROM 2.5 TO 12.5 FT BGS
	14					Collected groundwater sample AEP412 from 3/4" monitoring point
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-PS

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR J. JORDAN | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–4	SAND, medium to coarse grained, well sorted, orange (FILL MATERIAL)				
	4–6	SAND, coarse grained, poorly sorted, orange to brown	22 ppm		AEPS11	▽ WET BELOW 6.5 FT
	6–12	NO SOIL SAMPLES BELOW 7.0 FT BGS				
	12	END OF DRILLING AT 13.0 FT				SET TEMPORARY OBSERVATION PIEZOMETER SCREENED FROM 2.5 TO 12.5 FT BGS Collected groundwater sample AEPS12 from 3/4" monitoring point

HTRW DRILLING LOG

HOLE NUMBER VW1-1

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR M. Vest | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–2	Silty SAND, fine grained, loose, non-plastic, moist to damp, pale yellow (2.5Y 7/4) to dark gray (7.5YR 4/1)	0.0 ppm			
	2–4		N/A	Soil Sample AEVW31		
	4–6		834 ppm		Soil Sample AEVW11	
	6–8	SAND, fine grained, loose, some silt and clay, wet, dark gray mottled with yellow and brownish gray	2214 ppm			▽ WET BELOW 7.4 FT
	8–10		1739 ppm			
	10–12	Silty SAND, fine grained, loose, non-plastic, wet, gray (7.5YR 5/1)	1430 ppm			
	12–14	REFUSAL AT 12.5 FT BGS				PULLED RODS BACK TO 9.5 FT BGS AND COLLECTED GROUNDWATER SAMPLE AEVW12 FROM SCREENED INTERVAL OF 9.5 TO 12.5 FT BGS
	14–16					
	16–18					BOREHOLE WAS OVERDRILLED WITH 4.25" ID HOLLOW STEM AUGERS IN ORDER TO SET 2" MONITORING WELL
	18–20					

HTRW DRILLING LOG

HOLE NUMBER AE-V1

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, medium grained, some pebbles, yellow (10YR8/6)				
	2		N/A			
		Silty SAND, fine grained, moderately packed, dry, massive, black (10YR3/1)				
	4					
		Silty SAND, fine grained, lt greenish gray (10Y8/1)				
	6	Silty SAND, fine grained, massive, black (10YR3/1	N/A			
	8				Soil Sample AEV111	
			190ppm			▽ WET BELOW 9.3FT
	10					
	12	Rock Fragments, white (N8)				
		REFUSAL AT 12.3 FT BGS				SET 3/4" MONITORING POINT SCREENED FROM 2.2 TO 12.2 FT BGS
	14					Collected groundwater sample AEV112 from monitoring point
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER AE-V2

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, mediumgrained, some pebbles, moist, yellow (10YR 8/6)				
	2	Silty SAND, finegrained dense, weakly remanted, dry, very dark gray (10YR 3/1)	N/A			
	4					
	6		N/A			
	8		1585 ppm		AEV211	▽ WET BELOW 9.2 FT
	10		N/A			
	12	weathered decayed concrete				
		Refusal at 12.2 FT				Set 3/4" monitoring point screened from 2.1 to 12.1 ft BGS Collected groundwater sample AEV112 from monitoring point
	14					
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER MW 8A

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, loose, dry, light yellowish brown (10YR6/4) (cuttings)	N/A			
	6	silty clayey SAND, dark grayish brown (10YR4/2) (cuttings)				▽ WET BELOW ~7 FT
	10	SAND, greenish gray (10G5/1) (cuttings)				
	14.5	END OF DRILLING AT 14.5FT				SET 2" PRODUCT RECOVERY WELL SCREENED FROM 4.0 TO 14.0 FT BGS NO SOIL OR GROUNDWATER SAMPLES WERE COLLECTED.

HTRW DRILLING LOG

HOLE NUMBER PR-1

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, loose, dry, light yellowish brown (10YR6/4) (cuttings)	N/A			
	6	silty clayey SAND, grayish brown (10 YR 4/2) (cuttings)				▽ = WET BELOW ~ 7.0 FT
	10	SAND, greenish gray (10G5/1) (cuttings)				
	14	END OF DRILLING AT 14.5 FT				SET 2" PRODUCT RECOVERY WELL SCREENED FROM 3.6 TO 13.6 NO SOIL OR GROUNDWATER SAMPLES COLLECTED
	20					

HTRW DRILLING LOG

HOLE NUMBER PR-2

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	SAND, dry, loose, light yellowish brown (10YR 6/4) (cuttings)	N/A			
	2	silty SAND, black (10YR 2/1) (cuttings)				
		sandy CLAY, pale brown (10YR 6/3) (cuttings)				
	4					
	6					▽ WET BELOW ~7.0 FT
	8					
		SAND, white (10YR 8/1) (cuttings)				
	10					
	12					
		SAND, very pale brown (10YR 7/4) (cuttings)				
	14	END OF DRILLING AT 14.5 FT				SET 2" PRODUCT RECOVERY WELL SCREENED FROM 4.0 TO 14.0 FT BGS NO SOIL OR GROUNDWATER SAMPLES WERE COLLECTED
	16					
	18					
	20					

HTRW DRILLING LOG

HOLE NUMBER PR-3

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	silty Sandy TOPSOIL, fine grained, organic material, moist, black (10YR2/1)				
	2	silty/clayey SAND, fine grained, moist, dark yellowish brown (10YR4/4)	6.5ppm			
	4					
	6		1700ppm			
	8	clayey SAND, fine grained, slightly plastic, mottled, wet, light gray (10YR7/1)				▽ WET BELOW 8.0FT
	10					
	12		122ppm			
	14					
	16					
	18	END OF DRILLING AT 18.0FT				SET 2" PRODUCT RECOVERY WELL SCREENED FROM 2.0 TO 17.0 FT DGS
	20					

HTRW DRILLING LOG

HOLE NUMBER PR-4

PROJECT: HAAF Building 728 Pilot Study | INSPECTOR T. COFFEY | SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0–4	Silty Sandy TOPSOIL, fine grained, organic material, moist, black (10YR2/1)	18.2ppm			
	4–6	Silty/clayey SAND, fine grained, moist, dark yellowish brown				
	6–8	Sandy CLAY, plastic, cohesive, moist, yellowish brown (10YR 5/8)	383ppm			
	8–10	clayey SAND, fine grained, slightly plastic, wet, light gray				▽ WET BELOW 8.0 FT
	10–12					
	12–14		394ppm			
	14–16					
	16–18		62.9ppm			
	18–20	END OF DRILLING AT 18.0				SET 2" PRODUCT RECOVERY WELL SCREENED FROM 2.0 TO 17.0 FT BGS

HTRW DRILLING LOG

HOLE NUMBER PR-5

PROJECT: HAAF Building 728 Pilot Study

INSPECTOR S. Budd

SHEET 1 OF 1

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0	Silty sandy TOPSOIL containing organic matter, dark gray to fine grained silty/clayey SAND	95.0ppm			
	6	sandy CLAY, COHESIVE, moist, gray	22.5ppm			
	10					▽ WET BELOW 10.0 FT
	12		197.0ppm			
	16		163.0ppm			
	18	END OF DRILLING AT 18.0				SET 2" PRODUCT RECOVERY WELL SCREENED FROM 2.0 TO 17.0 FT BGS
	20					

APPENDIX V

SOIL LABORATORY RESULTS

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SOIL ANALYTICAL RESULTS
BASELINE SAMPLING

MAY 1999

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AED111

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905235-03

Sample wt/vol: 4.9 (g/mL) G Lab File ID: 2J410

Level: (low/med) MED Date Received: 05/07/99

% Moisture: not dec. 35 Date Analyzed: 05/20/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10(ml) Soil Aliquot Volume: 100(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	206	J	J
108-88-3	toluene	181	J	J
100-41-4	ethylbenzene	297	J	J
1330-20-7	xylenes (total)	952	B	J FD1, FD7

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: June 17, 1999

Sample ID : AED111
Lab ID : 9905235-03
Matrix : Soil
Date Collected : 05/06/99
Date Received : 05/07/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	-1.69	U 15.2	30.8	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		35.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

9905235-03

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AED311

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905235-01

Sample wt/vol: 5.9 (g/mL) G Lab File ID: 2J310

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 20 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

USR

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	111	E	J NØ3
108-88-3	toluene	78.0		=
100-41-4	ethylbenzene	651 ~~111~~	~~E~~ D	=
1330-20-7	xylenes (total)	2580 ~~382~~	~~EB~~ DB	= FØ8

MMP 6/16/99

FORM I VOA OLM03.0

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: June 17, 1999

Sample ID : AED311
Lab ID : 9905235-01
Matrix : Soil
Date Collected : 05/06/99
Date Received : 05/07/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	-0.869	12.4	25.0	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		20.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
The qualifiers in this report are defined as follows:
ND indicates that the analyte was not detected at a concentration greater than the detection limit.
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
U indicates that the analyte was not detected at a concentration greater than the detection limit.
* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

DATA VALIDATION COPY

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

9905235-01

RINSATE

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AED315

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002W

Matrix: (soil/water) WATER Lab Sample ID: 9905236-01

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 7J329

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. _____ Date Analyzed: 05/20/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	benzene	2.0	U
108-88-3	toluene	2.0	U
100-41-4	ethylbenzene	2.0	U
1330-20-7	xylenes (total)	3.0	U

DATA VALIDATION
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RINSATE

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AED315
Lab ID	: 9905236-01
Matrix	: Water
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons	J	0.280	J F08	0.277	1.00	mg/l	1.0	AAT	05/21/99	2100	149713	1

M = Method	Method-Description
M 1	EPA 418.1

Notes:
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This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AED411

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905236-08

Sample wt/vol: 5.7 (g/mL) G Lab File ID: 2J318

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 19 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	benzene	71.8	J G01
108-88-3	toluene	128 E	
100-41-4	ethylbenzene	281 D ~~122~~ E	
1330-20-7	xylenes (total)	512 EB	J FD8

DO NOT USE

USE

MAY

6/19/99

Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Ms. Leslie Barbour
Project Description:	Remdial Design and Pilot Study, Former Bldg. 728

DATA VALIDATION

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AED411
Lab ID	: 9905236-08
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	J	13.5 J	12.2	24.7	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		19.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AED511

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905236-11

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 2J320

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 18 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	161 ~~125~~	E DJ	J
108-88-3	toluene	518 ~~306~~	E D	=
100-41-4	ethylbenzene	79.1		=
1330-20-7	xylenes (total)	380	EB	J FDB, NDJ

USE

FORM I VOA OLM03.0

60

DATA VA...
G...

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AED511
Lab ID	: 9905236-11
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		48.4 JHO2	12.1	24.4	mg/kg	1.0	AAT	05/21/99	1500	149518	1
Evaporative Loss @ 105 C		18.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AED513

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905236-06

Sample wt/vol: 6.2 (g/mL) G Lab File ID: 2J316

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 23 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	40.1		=
108-88-3	toluene	1400 ~~128~~	ED	=
100-41-4	ethylbenzene	24.2		=
1330-20-7	xylenes (total)	127	B	= F08

mnl 6/16/99

USE

DUPLICATE

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800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AED513
Lab ID	: 9905236-06
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	2.00	U 12.9	26.0	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		23.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

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Client: Science Applications International Corp.
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800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

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cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AED611
Lab ID	: 9905236-04
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	=	469	60.4	122	mg/kg	5.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		18.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

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Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AED711
Lab ID	: 9905215-03
Matrix	: Soil
Date Collected	: 05/05/99
Date Received	: 05/06/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		2000 =	119	241	mg/kg	10.	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		17.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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cc: SAIC00999 Report Date: May 25, 1999 Page 1 of 1

Sample ID	: AED811
Lab ID	: 9905215-04
Matrix	: Soil
Date Collected	: 05/05/99
Date Received	: 05/06/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		769 =	55.0	111	mg/kg	5.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		10.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
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cc: SAIC00999 Report Date: May 25, 1999 Page 1 of 1

Sample ID	: AED911
Lab ID	: 9905236-12
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		405	=	11.8	23.8	mg/kg	1.0	AAT	05/21/99	1508	149518	1
Evaporative Loss @ 105 C		16.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AEDA11

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905236-07

Sample wt/vol: 4.8 (g/mL) G Lab File ID: 1J424

Level: (low/med) MED Date Received: 05/07/99

% Moisture: not dec. _____ Date Analyzed: 05/20/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10(ml) Soil Aliquot Volume: 100(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	benzene	625	
108-88-3	toluene	9760	
100-41-4	ethylbenzene	4520	
1330-20-7	xylenes (total)	23200	

Client: Science Applications International Corp.
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800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999 Page 1 of 1

Sample ID	: AEDA11
Lab ID	: 9905236-07
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		25.7	=	12.1	24.4	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		18.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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264

Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Ms. Leslie Barbour
Project Description:	Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999 Page 1 of 1

Sample ID	: AEDB11
Lab ID	: 9905236-09
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		621	=	61.1	123	mg/kg	5.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		19.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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DATA VALIDATION COPY

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800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study. Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEDC11
Lab ID	: 9905236-05
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		127	=	11.8	23.8	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		16.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AEDD11

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS001S

Matrix: (soil/water) SOIL Lab Sample ID: 9905215-05

Sample wt/vol: 5.9 (g/mL) G Lab File ID: 2J223

Level: (low/med) LOW DATA VALIDATION Date Received: 05/06/99

% Moisture: not dec. 13 COPY Date Analyzed: 05/18/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	1.9	U	U
108-88-3	toluene	1.9	U	U
100-41-4	ethylbenzene	1.9 ~~1.8~~	JB	U FO1, FO6
1330-20-7	xylenes (total)	5.2 ~~5.2~~	B	U FO1, FO7

MMP
6/8/99

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25

DATA VALIDATION
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Client: Science Applications International Corp.
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Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEDD11
Lab ID	: 9905215-05
Matrix	: Soil
Date Collected	: 05/05/99
Date Received	: 05/06/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		68.6 =	11.4	23.0	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		13.0	1.00	1.00	wt%	1.0	LTB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).
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800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEDE11
Lab ID	: 9905215-06
Matrix	: Soil
Date Collected	: 05/05/99
Date Received	: 05/06/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons		92.2 =	11.0	22.2	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		10.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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9905215-06

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AEDF11

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905235-09

Sample wt/vol: 5.4 (g/mL) G Lab File ID: 2J314

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 12 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	benzene	14.4	J GPI
108-88-3	toluene	5.7	J
100-41-4	ethylbenzene	~~94.2~~	=
1330-20-7	xylenes (total)	283	B

6+3 D

↓ ↓ ,FDB

DO NOT USE

USE

6/18/99

FORM I VOA OLM03.0

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: June 17, 1999

Sample ID	: AEDF11
Lab ID	: 9905235-09
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		701	=	56.2	114	mg/kg	5.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		12.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

Data reported in mass/mass units is reported as 'dry weight'.

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in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Valerie Davis at (843) 769-7391.

Reviewed By

9905235-09

Client:	Science Applications International Corp. P.O. Box 2502 800 Oak Ridge Turnpike Oak Ridge, Tennessee 37831
Contact:	Ms. Leslie Barbour
Project Description:	Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEDG11
Lab ID	: 9905236-13
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		578	=	58.9	119	mg/kg	5.0	AAT	05/21/99	1500	149518	1
Evaporative Loss @ 105 C		16.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

Notes:
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Reviewed By

270

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AEDK11

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905235-08

Sample wt/vol: 6.0 (g/mL) G Lab File ID: 2J313

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 13 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	9.8		=
108-88-3	toluene	1.9	U	=
100-41-4	ethylbenzene	4.5		=
1330-20-7	xylenes (total)	5.0	B	U F01, F07

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: June 17, 1999

Sample ID : AEDK11
Lab ID : 9905235-08
Matrix : Soil
Date Collected : 05/06/99
Date Received : 05/07/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons	J	12.8	J	11.4	23.0	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		13.0		1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

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Reviewed By

9905235-08

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AEDL11

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905236-10

Sample wt/vol: 5.9 (g/mL) G Lab File ID: 2J319

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 16 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	1.6	J	J =
108-88-3	toluene	8.6		=
100-41-4	ethylbenzene	10.4		=
1330-20-7	xylenes (total)	46.6	B	~~U FO1,F07~~ = FO

MAP
6/16/99

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEDL11
Lab ID	: 9905236-10
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Total Rec. Petro. Hydrocarbons	U	-4.15	11.8	23.8	mg/kg	1.0	AAT	05/21/99	1000	149421	1
Evaporative Loss @ 105 C		16.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149276	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AEDM11

Lab Name: GENERAL ENGINEERING LABOR Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: HPS002S

Matrix: (soil/water) SOIL Lab Sample ID: 9905235-05

Sample wt/vol: 5.8 (g/mL) G Lab File ID: 2J312

Level: (low/med) LOW Date Received: 05/07/99

% Moisture: not dec. 11 Date Analyzed: 05/19/99

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(ml) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
71-43-2	benzene	1.9	U	U
108-88-3	toluene	1.9	U	U
100-41-4	ethylbenzene	1.9	U	U
1330-20-7	xylenes (total)	4.8	B	U FD1,FD7

GENERAL ENGINEERING LABORATORIES

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Laboratory Certifications

STATE	GEL	EPI
FL	E87156/87294	E87472/87458
NC	233	
NJ	79002	79002
SC	10120	10582
TN	02934	02934

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: June 17, 1999

Sample ID : AEDM11
Lab ID : 9905235-10
Matrix : Soil
Date Collected : 05/06/99
Date Received : 05/07/99
Priority : Routine
Collector : Client

Parameter	Qualifier	Result		DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry												
Total Rec. Petro. Hydrocarbons		22.8	=	11.1	22.5	mg/kg	1.0	AAT	05/20/99	1000	149421	1
Evaporative Loss @ 105 C		11.0		1.00	1.00	wt%	1.0	GJ	05/17/99	1000	149274	2

M = Method	Method-Description
M 1	EPA 418.1 Modified
M 2	EPA 3550

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Reviewed By

9905235-10

DATA VALIDATION
COPY

Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEJ111
Lab ID	: 9905215-01
Matrix	: Soil
Date Collected	: 05/04/99
Date Received	: 05/06/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		21.0	1.00	1.00	wt%	1.0	TSM2	05/11/99	0950	148808	1
TOTAL ORGANIC CARBON (TOC)		1050 = F08	43.1	100	mg/kg	1.0	LS	05/20/99	1436	149522	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 modified

Notes:
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DATA VALIDATION
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Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEJ511
Lab ID	: 9905215-02
Matrix	: Soil
Date Collected	: 05/05/99
Date Received	: 05/06/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		20.0	1.00	1.00	wt%	1.0	TSM2	05/11/99	0950	148808	1
TOTAL ORGANIC CARBON (TOC)		2710 = FDS	43.1	100	mg/kg	1.0	LS	05/20/99	1520	149522	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 modified

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Data reported in mass/mass units is reported as 'dry weight'.

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Reviewed By

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DATA VALIDATION
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Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEJC11
Lab ID	: 9905215-07
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		20.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	1
TOTAL ORGANIC CARBON (TOC)		3950 = F08	43.1	100	mg/kg	1.0	LS	05/20/99	1542	149522	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 modified

Notes:
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DATA VALIDATION
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Client: Science Applications International Corp.
P.O. Box 2502
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37831
Contact: Ms. Leslie Barbour
Project Description: Remdial Design and Pilot Study, Former Bldg. 728

cc: SAIC00999 Report Date: May 25, 1999

Sample ID	: AEJD11
Lab ID	: 9905215-08
Matrix	: Soil
Date Collected	: 05/06/99
Date Received	: 05/07/99
Priority	: Routine
Collector	: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
General Chemistry											
Evaporative Loss @ 105 C		14.0	1.00	1.00	wt%	1.0	LIB	05/17/99	1000	149274	1
TOTAL ORGANIC CARBON (TOC)		3860 = F08	43.1	100	mg/kg	1.0	LS	05/20/99	1607	149522	2

M = Method	Method-Description
M 1	EPA 3550
M 2	SW846 9060 modified

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Reviewed By

9905215-08

68