

Summary Remedial Investigation Report for FTMM-54 Building 296 Gasoline Storage

Fort Monmouth, New Jersey



November 2015



DEPARTMENT OF THE ARMY

OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
U.S. ARMY FORT MONMOUTH
P.O. 148
OCEANPORT, NEW JERSEY 07757

November 9, 2015

Ms. Linda Range
New Jersey Department of Environmental Protection
Case Manager
Bureau of Southern Field Operations
401 East State Street, 5th Floor
PO Box 407
Trenton, NJ 08625

**Re: Summary Remedial Investigation Report for FTMM-54 Building 296 Gasoline Storage
Fort Monmouth, NJ**

Attachments:

- A. Previous FTMM-54 Correspondence
- B. Location and Layout of FTMM-54
- C. Summary Table of FTMM-54 Underground Storage Tanks
- D. UST 296A Report for NJDEP Tank 81533-69
- E. USTs 296B Report for NJDEP Tanks 81533-213 thru 81533-223
- F. Comparison of FTMM-54 Soil Sampling Results with Standards and Criteria

Previous Correspondence (provided in Attachment A):

- 1. NJDEP letter to the Army dated January 10, 2003, re: *UST Closure Approval/NFA, Fort Monmouth Main Post, Monmouth County*
- 2. NJDEP letter to the Army dated August 14, 2007, re: *M-18 Landfill, Ft. Monmouth, NJ.*
- 3. Army letter to NJDEP dated December 1, 2014, re: *Request for No Further Action for Groundwater at FTMM-54, Fort Monmouth, Oceanport, Monmouth County, New Jersey.*
- 4. NJDEP letter to the Army dated February 4, 2015, re: *Approval, Unrestricted Use, Area of Concern: Ground Water at FTMM-54/Building 296, and no other areas.*

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) has reviewed and summarized relevant information concerning environmental investigations for the Installation Restoration Program (IRP) Site FTMM-54 Building 296 Gasoline Storage. Correspondence 1 (**Attachment A**) from the New Jersey Department of Environmental Protection (NJDEP) resulted in regulatory approval of No Further Action (NFA) for 11 underground storage tanks (USTs) associated with FTMM-54. Correspondence 2 (**Attachment A**) confirms that NFA was approved for FTMM-54 soils associated with the 11 USTs. More recent Correspondence 3 and 4 (**Attachment A**) resulted in regulatory approval of NFA for groundwater at FTMM-54.

This summary Remedial Investigation (RI) Report provides an overview of information for this site including documentation of NJDEP's NFA approval for various portions of affected media (soil and groundwater) for FTMM-54. We request NJDEP's approval of NFA for UST 296A (81533-69), as well as concurrence that all identified environmental issues have been adequately addressed for FTMM-54.

1.0 SITE DESCRIPTION

FTMM-54 was a former fuel distribution facility located near Building 296. According to the U.S. Army (2008), this facility was abandoned, and then the tanks and distribution piping were rediscovered in 1993 during a renovation project at Building 296. The facility dates back to the 1940s. Twelve USTs and the associated below-ground fuel distribution piping were subsequently removed in 1993 during the Building 296 renovation project. FTMM-54 is one of three IRP sites (in addition to FTMM-55 and FTMM-61) at Fort Monmouth that comprise Environmental Condition of Property (ECP) Parcel 50.

The location and layout of FTMM-54 is presented in **Attachment B**. FTMM-54 is located in the north-central portion of the Main Post, north of Sherrill Avenue and south of Parkers Creek. FTMM-54 is associated with Building 296, which is adjacent to existing Buildings 292 and 291 and former Building 290 (FTMM-55) (**Attachment B**). As shown on Figure 1.3 (**Attachment B**), the former fuel distribution piping associated with FTMM-54 extended to the north from the former UST area south of Building 296, terminating in the western portion of the FTMM-18 landfill. The former piping distributed fuel products from the Building 296 USTs to remote pumping islands located over 450 feet from the USTs, near Parker Creek and within FTMM-18.

As described previously (Correspondence 3 of **Attachment A**), the groundwater from the "Former Fuel Distribution Piping Excavation Area" located within the confines of the FTMM-18 landfill area and near the vicinity of monitor wells 296MW04 and 296MW06 will be addressed administratively within FTMM-18, and therefore not as part of FTMM-54. Therefore, the portions of FTMM-54 where NFA has previously been obtained includes the location south of Building 296 where USTs were removed, approximately 470 feet of formerly buried fuel distribution piping that extended into FTMM-18, and the soil associated with FTMM-54 within the confines of the FTMM-18 landfill, but excludes the groundwater at monitor wells 296MW04 and 296MW06 (which will be addressed in the FTMM-18 RI/FS Report). The rest of ECP Parcel 50 will be addressed under separate cover within the context of the remaining two IRP sites (FTMM-55 and FTMM-61).

Additional information concerning the FTMM-54 background and environmental setting are provided in Correspondence 3 (**Attachment A**) and in a previous RI Report prepared for the FTMM-18 landfill site (Versar, 2003).

2.0 UNDERGROUND STORAGE TANKS

A summary table of the USTs located within FTMM-54 is provided in **Attachment C**. The 12 USTs identified within FTMM-54 have been removed and 11 of the USTs were previously approved for NFA by NJDEP; documentation of this approval is provided in Correspondence 1 (**Attachment A**), and referenced below. Following are the USTs that were previously removed from the FTMM-54 area:

- UST 296A: one 550-gallon, steel, No. 2 fuel oil tank (NJDEP Registration No. 81533-69).
- UST 296B: nine 1,000- to 2,000-gallon, steel, gasoline USTs (NJDEP Registration Nos. 81533-213 through -221).
- Also designated as UST 296B: two 1,000 gallon, steel, diesel fuel USTs (NJDEP Registration Nos. 81533-222 and 81533-223).

The 11 tanks designated as UST 296B and the fuel distribution piping were approved for NFA by NJDEP in a letter dated 1/10/2003 (Correspondence 1 of **Attachment A**) based on the submittal of the May 2001 UST Closure and Site Investigation Report (see **Attachment E**). Previous reports may have indicated that the fuel oil tank designated as UST 296A was also approved for NFA within the same 1/10/2003 letter; however, upon closer examination it was determined that this letter did not address 296A, and no other previous NFA approval has been identified for this fuel oil UST. A closure report prepared by Smith Environmental for UST 296A is presented in **Attachment D**, which provides technical support for an NFA determination for this tank. Therefore, we request NFA approval for UST 296A (81533-69).

Since the time of the USTs 296A and 296B investigations, revisions to the analytical requirements for the investigation of petroleum hydrocarbons were made by NJDEP, notably the use of the extractable petroleum hydrocarbons (EPH) analysis which replaced the total petroleum hydrocarbons (TPH) analysis in September 2010. The EPH method focuses on the non-volatile products, such as No. 2 fuel oil. However, the quality (and abundance) of the TPH data previously developed at FTMM-54 using the Environmental Protection Agency (EPA) Method 418.1 method are believed to accurately characterize the No. 2 fuel oil at the site for the purpose of site closure. Specifically, the NJDEP response to FAQ#2 in NJDEP's Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons Frequency Asked Questions (NJDEP, 2010) indicates that TPH and EPH data generated from a NJDEP field study of residential fuel oil tanks in 2007 are comparable at a ratio of roughly 1:1.

A summary of the UST 296B soil sample analytical results is provided in Attachment F for informational purpose, and includes a screening comparison of the results to the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS). The NJDEP comparison criteria in Attachment F are based on current standards, rather than the standards that the previous NFA approval was based upon for the 11 USTs and former fuel distribution system (UST 296B).

3.0 SUMMARY

In summary, we request NFA for UST 296A (81533-69), and NJDEP's concurrence that a comprehensive NFA for all affected media has been obtained for the FTMM-54 former fuel distribution facility. The remaining IRP Sites FTMM-55 and FTMM-61 within Parcel 50, as well as the groundwater within the FTMM-18 landfill near monitor wells 296MW04 and 296MW06, will be further addressed under separate cover.

The technical Point of Contact (POC) for this matter is Kent Friesen at (732) 383-7201 or by email at kent.friesen@parsons.com. Should you have any questions or require additional information, please contact me by phone at (732) 383-5104 or by email at john.e.occhipinti.civ@mail.mil.

Sincerely,

A handwritten signature in black ink, appearing to read "John E. Occhipinti".

John E. Occhipinti
Fort Monmouth Site Manager

cc: Delight Balducci, HQDA ACSIM
Joseph Pearson, Calibre
James Moore, USACE
James Kelly, USACE
Cris Grill, Parsons

REFERENCES CITED:

- NJDEP. 2010. *Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons Frequency Asked Questions*. Version 4.0, August 9.
- U.S. Army. 2008. *U.S. Army BRAC 2005 Site Investigation Report, Fort Monmouth*. Final. 21 July.
- Versar Inc. 2003. *Final Remedial Investigation Report, M-18 Landfill Site, U.S. Army Garrison Fort Monmouth, Fort Monmouth, New Jersey*. Prepared for Directorate of Public Works. October.

ATTACHMENT A

Previous FTMM-54 Correspondence

Contents:

- NJDEP letter to the Army dated January 10, 2003, re: *UST Closure Approval/NFA, Fort Monmouth Main Post, Monmouth County*
- NJDEP letter to the Army dated August 14, 2007, re: *M-18 Landfill, Ft. Monmouth, NJ.*
- Army letter to NJDEP dated December 1, 2014, re: *Request for No Further Action for Groundwater at FTMM-54, Fort Monmouth, Oceanport, Monmouth County, New Jersey.* Abridged (tables and figures not included in Attachment A)
- NJDEP letter to the Army dated February 4, 2015, re: *Approval, Unrestricted Use, Area of Concern: Ground Water at FTMM-54/Building 296, and no other areas.*



State of New Jersey

James E. McGreevey
Governor

Department of Environmental Protection

Bradley M. Campbell
Commissioner

Mr. Dinkerrai Desai
DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY COMMUNICATIONS-ELECTRONIC COMMAND
FORT MONMOUTH, NJ 07703-5000

Re: UST Closure Approval/NFA
Fort Monmouth Main Post
Monmouth County

JAN 10 2003

Dear Mr. Desai:

The NJDEP is in receipt of sixty-eight (68) underground storage tank (UST) closure reports dated between July 17, 2001 and May 15, 2002. The Army has requested to receive No Further Action (NFA) approval letters for each of these reports. This letter approves the NFA requests for the following 68 UST that are located on the Main Post of the Fort Monmouth site:

Submittal Date	Building No.	NJDEP Reg. #	Residential
07/17/2001	104	90010-75	NO
07/17/2001	699A	81533-112	NO
07/17/2001	800A	81533-127	NO
07/17/2001	875	81533-234	NO
07/17/2001	949	81533-203	NO
07/17/2001	1220A	81533-184	NO
07/17/2001	2000B	192486-38	NO
01/02/2002	257	81533-200	NO
01/02/2002	283C	81533-229	NO
01/02/2002	290B	81533-224	NO
01/02/2002	290B	81533-225	NO
01/02/2002	491	90010-71	NO
01/02/2002	605	81533-85	NO
01/02/2002	678	81533-105	NO
01/02/2002	699	81533-236	NO
01/02/2002	699	81533-238	NO
01/02/2002	699	81533-237	NO
01/02/2002	699	81533-235	NO
01/02/2002	801B	81533-129	NO
01/02/2002	804A	81533-130	NO
01/02/2002	2337	81515-65	NO
01/02/2002	2562A	81515-41	NO
01/02/2002	2707	81515-50	NO
01/02/2002	2707	81515-49	NO
01/02/2002	2707	81515-51	NO
01/02/2002	2707	81515-47	NO
01/02/2002	2707	81515-48	NO

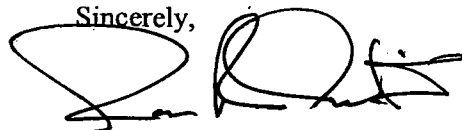
Submittal Date	Building No.	NJDEP Reg. #	Residential
02/13/2002	2044	192486-24	NO
02/13/2002	2044	192486-32	NO
02/13/2002	2044	192486-33	NO
02/26/2002	208B	81533-210	YES
03/05/2002	246	N/A	YES
03/05/2002	261B	N/A	YES
05/15/2002	106	90010-74	NO
05/15/2002	164	90010-15	NO
05/15/2002	173	90010-19	NO
05/15/2002	200	81533-2	NO
05/15/2002	208A	81533-6	YES
05/15/2002	233	81533-21	YES
05/15/2002	237	81533-25	YES
05/15/2002	271	81533-55	YES
05/15/2002	277	90010-24	NO
05/15/2002	296B	81533-217	NO
05/15/2002	296B	81533-223	NO
05/15/2002	296B	81533-221	NO
05/15/2002	296B	81533-220	NO
05/15/2002	296B	81533-222	NO
05/15/2002	296B	81533-218	NO
05/15/2002	296B	81533-216	NO
05/15/2002	296B	81533-215	NO
05/15/2002	296B	81533-214	NO
05/15/2002	296B	81533-213	NO
05/15/2002	296B	81533-219	NO
05/15/2002	426	90010-40	NO
05/15/2002	482	90010-54	NO
05/15/2002	600 A	81533-83	NO
05/15/2002	600 B	81533-212	NO
05/15/2002	611	81533-87	NO
05/15/2002	615	81533-89	NO
05/15/2002	618	81533-91	NO
05/15/2002	619	81533-92	NO
05/15/2002	621	81533-94	NO
05/15/2002	634	N/A	NO
05/15/2002	638	N/A	NO
05/15/2002	639-2	N/A	NO
05/15/2002	640	N/A	NO
05/15/2002	641	N/A	NO
05/15/2002	644	N/A	NO
05/15/2002	664	N/A	NO
05/15/2002	666	N/A	NO
05/15/2002	686	81533-107	NO
05/15/2002	697	81533-194	NO
05/15/2002	697	81533-195	NO

Submittal Date	Building No.	NJDEP Reg. #	Residential
05/15/2002	697	81533-196	NO
05/15/2002	876B	81533-139	NO
05/15/2002	886	81533-140	NO
05/15/2002	905	81533-145	NO
05/15/2002	1102	81533-162	NO
05/15/2002	1104	81533-164	NO
05/15/2002	2067	192486-37	NO
05/15/2002	2534	81515-24	NO
05/15/2002	2603	81515-60	NO
05/15/2002	2700 2,6	81515-61	NO

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent with the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation that assures us that all sources of contamination have been remediated.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Sincerely,



Ian R. Curtis, Case Manager
Bureau of Case Management
ICURTIS@DEP.STATE.NJ.US



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Remediation Management & Response
P.O. Box 413
Trenton, New Jersey 08625-0413

JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

AUG 14 2007

Mr. Joseph Fallon, CHMM
Directorate of Public Works
ATTN: IMNE-MON-PWE
167 Riverside Ave.
Fort Monmouth, NJ 07703-5101

RE: M-18 Landfill, Fort Monmouth, NJ

Dear Mr. Fallon:

The NJDEP Division of Remediation Management & Response (DRMR) has completed its review of the following reports on the M-18 Landfill at Fort Monmouth:

- Remedial Investigation Report, M-18 Landfill Site, dated October 1, 2003
- Remedial Investigation Report for Near Surface Soils, M-18 Landfill Site, dated March 17, 2004
- Remedial Investigation Report and Sediment Quality Evaluation, M-18 Landfill Site, dated February 23, 2004

NJDEP's comments are attached. NJDEP cannot make any No Further Action (NFA) determinations for soil, ground water, or sediments at the M-18 Landfill at this time, based upon the reports. Our comments describe the additional investigations or actions that would be needed before NFAs could be considered.

You or your staff may contact me at 609-633-0766 with any questions on the enclosed comments, or any other site remediation matters at Fort Monmouth.

Sincerely,

Larry Quinn, P.E., CHMM, Case Manager
Bureau of Design & Construction

Attachment

NJDEP COMMENTS ON M-18 LANDFILL SITE REPORTS
FORT MONMOUTH SITE

The comments below address the following reports on the M-18 Landfill Site:

- Remedial Investigation Report, M-18 Landfill Site, dated October 1, 2003
- Remedial Investigation Report for Near Surface Soils, M-18 Landfill Site, dated March 17, 2004
- Remedial Investigation Report and Sediment Quality Evaluation, M-18 Landfill Site, dated February 23, 2004

General

1. The Army should submit a comprehensive investigation workplan for NJDEP review and approval, prior to initiating any of the additional sampling requested below, to ensure complete agreement on all details prior to sampling. After sampling activities are completed, a supplemental remedial investigation (RI) report should be submitted.
2. To reiterate a comment provided on the M-12 and M-14 Landfills, NJDEP requests that the Army review, and re-visit if appropriate, the delineation of all landfill areas at Fort Monmouth, including M-18. There are no indications that test pitting was ever conducted to verify the limits of fill areas, which were created based upon geophysical surveys.

Surface Soils - Landfill

1. Surface soil sampling results indicate that semi-volatile organic compounds (SVOCs) and metals exceed the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) in the 0-12 inch surface soil interval in two distinct portions of the M-18 Landfill (Area SVOC-1 and Area Metals-1). Therefore, these surface soils pose a potential direct contact threat, and remedial action is required to minimize or eliminate the direct contact threat. Depending upon the location and extent of the soils that exceed the RDCSCC, targeted soil excavations may be feasible. At a minimum, engineering controls such as additional soil cover, fencing, and warning signs may be required, in conjunction with a deed notice.

Soil – UST Removals

1. **Building 296 – Eleven USTs** . Since no soil contamination in excess of the New Jersey RDCSCC remains in this area, no further investigation of soils is required.
2. **Building 290 – Two gasoline USTs**. Since no soil contamination in excess of the New Jersey RDCSCC remains in this area, no further investigation of soils is required.

NJDEP COMMENTS ON M-18 LANDFILL SITE REPORTS
FORT MONMOUTH SITE

3. Building 290 – One 2,000 gallon diesel fuel UST. Two post-excavation samples contained total petroleum hydrocarbons (TPHC) in excess of the RDCSCC (samples A and B at 16,200 and 11,900 ppm), both at a depth of 5.5 to 6 feet. No further excavation was conducted to address those spots. Additional excavations should be considered. If the Army proposes to leave the contaminated soils in place, a deed notice must be filed to document the contamination, including location.
4. Building 290 – Suspected Former Gasoline Pump Island. Since no soil contamination in excess of the New Jersey RDCSCC remains in this area, no further investigation of soils is required.

Surface Water and Sediments

1. A Baseline Ecological Evaluation (BEE) must be performed to determine whether receptors, especially within Parkers Creek, have been impacted by contaminants from the M-18 Landfill.
2. Due to the presence of measurable VOCs in surface water samples, additional surface water samples should be collected along Parkers Creek. At a minimum, sampling locations should be as follows: one immediately upstream of the landfill, one immediately downstream, and at least two alongside the landfill. Analytes should be TCL+30 and TAL metals. It is recommended that passive diffusion bags (PDB) be used to collect the samples for VOC analysis. The PDBs can be deployed in the sediments, to monitor shallow ground water discharging to Parkers Creek.
3. Sediment samples were analyzed for PCBs only. Based upon a review of all sampling data associated with the M-18 Landfill, additional sediment samples should be collected in conjunction with the aforementioned surface water sampling, and analyzed for full Target Compound List +30 (TCL+30) and Target Analyte List (TAL) metals.
4. In addition, the Army must evaluate/investigate any Army property upgradient of the M-18 Landfill that could be sources of the VOCs in Parkers Creek.

Ground Water

1. NJDEP agrees that the ground water classification at the M-18 Landfill is Class III-A, which necessitates that Class II-A ground water quality standards be utilized. The ground water model created for the M-18 Landfill and all model inputs are

NJDEP COMMENTS ON M-18 LANDFILL SITE REPORTS
FORT MONMOUTH SITE

acceptable. However, NFA for ground water cannot be issued at this time, due to the concerns and deficiencies discussed below.

2. One upgradient background well must be installed and sampled, to provide data for remedial decision-making. The background well should be near the landfill, but in an area that is clearly not impacted by the landfill. Samples from the background wells can be analyzed for TAL Metals only.
3. For reasons unknown to NJDEP, no monitoring wells were installed in the eastern portion of the M-18 Landfill. At least 2 wells should be installed and analyzed for TCL+30 and TAL metals.
4. Since the existing wells may not have been sampled since 2001, an additional round of samples from all wells is required for remedial decision-making. Analyses should be for TCL volatiles, MTBE (methyl tertiary butyl ether), TBA (tert-butyl alcohol), TCL semi-volatiles, and TAL metals.
5. The Army must submit a map that shows the former locations of all USTs and the existing M-18 monitoring wells. The Army must justify the location of monitoring wells in relation to the USTs and demonstrate that ground water contamination was delineated, and also document whether gasoline stored was leaded or unleaded.
6. The Army must document whether there was a pump island associated with any of the removed gasoline USTs. If a pump island(s) was/were present, then a ground water sample is required at the pump island location pursuant to N.J.A.C. 7:26E-4.4 (f)3 and a figure pursuant to N.J.A.C. 7:26E-4.2(d)1 must show the location of any pump islands.
7. Paper copies of all sampling documentation (such as ground water field parameters and low-flow sampling sheets) must be submitted in summary tables in reports.



DEPARTMENT OF THE ARMY

OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
U.S. ARMY FORT MONMOUTH
P.O. 148
OCEANPORT, NEW JERSEY 07757

December 1, 2014

Abridged Version; Tables and

Figures not included for brevity

Linda S. Range
State of New Jersey
Department of Environmental Protection
Bureau of Case Management
401 East Side Street
PO Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028

**Re: Request for No Further Action for Groundwater at FTMM-54, Fort Monmouth,
Oceanport, Monmouth County, New Jersey**

Dear Ms. Range:

As part of the ongoing process of property transfer at Fort Monmouth (FTMM), the US Army-Office of Assistant Chief of Staff for Installation Management (OACSIM) has learned that a prospective buyer has a particular interest in purchasing from Fort Monmouth Economic Revitalization Authority (FMERA) a series of properties in the north-central portion of the Main Post, including FTMM-54. In an effort to facilitate transfer of these properties, FTMM requests that New Jersey Department of Environmental Protection (NJDEP) review this summary letter report of groundwater chemistry results for FTMM-54 and, based on the review, the Army requests that NJDEP issue a No Further Action (NFA) for groundwater at FTMM-54. The Army believes that the data supports a NFA for groundwater at FTMM-54. The Army will submit a Remedial Investigation/Feasibility Study (RI/FS) report for FTMM-54 to NJDEP for review and approval, once the document is completed. This letter report contains the same chemistry results that will be presented in the FTMM-54 RI/FS report. At this stage in the property transfer process, a NFA for groundwater at FTMM-54 would serve as informational tool for the FMERA and prospective buyers of the property. Below is a brief summary of the site background, geology and hydrogeology, and groundwater chemistry results for FTMM-54 that provides our rationale for requesting a NFA for groundwater from the NJDEP.

Site Background

FTMM-54 is located in the north-central portion of the Main Post (**Figure 1.2**). It is associated with Building 296, which is adjacent to existing Buildings 292 and 291 and former Building 290 (FTMM-55) (**Figure 1.3**). FTMM-54 has also been referred to as Building 296 or Site 296 in historical documents. FTMM-54 includes the former UST area south of Building 296, and the fuel distribution piping that extended approximately 500 feet to the north into the western portion of FTMM-18 (**Figure 1.3**). Fuel products from the USTs at Building 296 were distributed from remote pumping islands located over 450 feet away within site FTMM-18, near Parkers Creek (U.S. Army, 2008). FTMM-54 is located within Parcel 50, which also includes nearby UST sites FTMM-55 (at former Building 290) and FTMM-61 (at Building 283).

FTMM-54 is located near other sites where fuel hydrocarbons were stored and or released, including FTMM-55 and FTMM-18 (**Figure 1.3**). At FTMM-55, four UST closures and the removal of a gasoline

dispenser island were conducted from 1991 to 1994. At FTMM-18, it was suspected that numerous fuel spills occurred during use of diesel and gasoline generators to support field exercises (Versar, 2003). FTMM-54 was used as a fuel distribution facility. The facility was abandoned, and the tanks and distribution piping were rediscovered during a renovation project at Building 296. The facility dates back to the 1940s. Twelve former USTs were associated with FTMM-54, including the following:

- one 550-gallon, steel, No. 2 diesel fuel tank NJDEP Registration No. 81533-69);
- nine 1,000- to 2,000-gallon steel gasoline USTs (NJDEP Registration Nos. 81515-213 through 221); and
- two 1,000-gallon steel diesel fuel USTs (NJDEP Registration Nos. 81515-222 and 81515-223).

The removal of UST No. 81533-69 and the associated site assessment were documented in a UST Closure and Site Investigation Report prepared by Smith Environmental Technologies Corp. in 1996. The Army requested a NFA approval letter for the removed diesel UST and associated piping, which was approved in a letter dated January 10, 2003 (NJDEP, 2003). Removal of the other 11 gasoline and diesel fuel USTs and associated piping is described in a UST Closure and Site Investigation Report prepared by Versar (2001). The 2001 closure report documented the removal of these USTs, associated piping, and soils completed in 1993 and 1994. Following review of this report, the NJDEP approved the Army's NFA request for these 11 tanks (and associated piping) in a letter dated January 10, 2003 (NJDEP, 2003).

Seven monitoring wells (**Figure 1.3**) were installed and hydraulically downgradient from FTMM-54 in 1994 and 1995. Quarterly groundwater sampling began at four of the wells in 1994. Quarterly sampling of all seven wells was initiated in 1995. The FTMM long-term groundwater monitoring program began in June 1997, and quarterly monitoring continued from June 1997 to August 2011.

Sampling at wells associated with FTMM-54 has also been conducted during RI activities at FTMM-18, including an RI by Versar in 2003 and an RI addendum in 2012.

In August 2013, groundwater sampling was conducted at FTMM-54 to re-establish baseline groundwater conditions following temporary suspension of groundwater sampling in late 2011. The results of the August 2013 baseline sampling are provided in a report prepared by Parsons (2013) and submitted to the NJDEP in March 2014.

Geology and Hydrogeology

The geology at the FTMM-54 consists of brown sand and clay or medium to coarse, yellow sand and silt to a depth of three feet. The soil below three feet down to 12.5-15 feet bgs is composed of green clay and sand or black and green sand and silt with traces of clay. The soils within FTMM-18 (downgradient of FTMM-54) have been altered by excavation or filling activities; the filled areas contain soils that consist of loamy material that is more than 20 inches thick, and contains concrete, asphalt, metal and glass remnants in some areas.

The depth to groundwater at the MP typically ranges from approximately 2 to 9 feet bgs. At FTMM-54, the groundwater depth ranges from 4 to 8 feet bgs based on water level depth measurements collected in 2010 and reported by the U.S. Army (2012). Potentiometric surface maps presented by Versar (2003) indicate that groundwater in the vicinity of Building 296 flows toward the north-northwest (i.e., toward Parkers Creek, **Figure 1.3**). The hydraulic conductivity of the subsurface materials ranges from 0.34 ft/day to 14.3 ft/day with a calculated geometric mean of 2.5 ft/day, and the average groundwater velocity for the site was calculated to be 0.14 ft/day (51 feet per year).

Groundwater Chemistry

Groundwater chemistry results for FTMM-54 is provided in the attached tables, **Tables 1 and 2**.

One VOC (benzene) exceeded the NJDEP GWQS, but the exceedance was limited to monitoring well 296MW06, which is located within FTMM-18. Although fuel distribution piping from the former Building 296 USTs extended beneath FTMM-18 (most likely to support training exercises at FTMM-18), it is suspected that fuel spills occurred at FTMM-18 during use of diesel and gasoline generators to support the field exercises. Since the benzene concentrations exceeding the GWQS were limited to the footprint of FTMM-18, the VOCs are attributed to releases at FTMM-18 and not FTMM-54. Therefore the VOCs in well 296MW06 will be administratively addressed under the RI/FS report for FTMM-18.

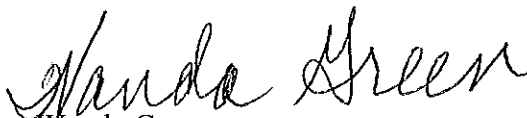
Metals detected in the most recent 8 quarters of sampling and the 2013 baseline sampling were largely below the background concentrations for the Main Post established by Weston (1995). Exceptions to this include manganese, which upgradient of FTMM-18 is mostly less than background, and zinc which exceeds the GWQS only in 296MW02. Zinc is not related to diesel or gasoline fuel, and is therefore not a site contaminant of concern. Manganese is related to FTMM-18, not FTMM-54, so similarly to the VOC, it will be administratively addressed under the RI/FS report for FTMM-18.

Conclusion and Recommendation

Based on the summary of site conditions, geology and hydrogeology, and groundwater chemistry, the Army believes that there is sufficient justification to support a NFA for groundwater at FTMM-54. A more complete description of the same groundwater chemistry results will be provided in the RI/FS report for FTMM-54 to be submitted to NJDEP at a later date. The Army appreciates NJDEP's consideration of this request, as we challenge ourselves to develop creative and pragmatic ways to facilitate property transfers at Fort Monmouth.

Please contact me if you have any questions.

Sincerely,



Wanda Green

BRAC Environmental Coordinator

OACSIM – U.S. Army Fort Monmouth

Cc: Parsons
USACE

Encl

References cited attached.

References Cited

- New Jersey Department of Environmental Protection (NJDEP). 2003. Letter Communication between Mr. Ian R. Curtis, Case Manager NJDEP and Mr. Dinkerrai Desai, Department of the Army, FTMM. January 10.
- Parsons, March 2014. August 2013 Baseline Groundwater Sampling Report, Fort Monmouth, Oceanport, Monmouth County, New Jersey.
- U.S. Army. 2008. Final Site Investigation Report, Fort Monmouth. July 21.
- U.S. Army. 2012. M-18 Landfill (FTMM-54) Remedial Investigation Report Addendum (2nd Quarter 2001 through 3rd Quarter 2010). U.S. Army Garrison Fort Monmouth, Main Post, Fort Monmouth, New Jersey. Prepared by: U.S. Army, Office of the Assistant Chief of Staff for Installation Management, Fort Monmouth, New Jersey. October 2012.
- VERSAR, Inc., May 2001. Subject: *Underground Storage Tank Closure and Site Investigation Report, Building 296, Main Post-West Area Fort Monmouth, New Jersey.*
- Versar Inc., 2003.
- Weston (Roy F. Weston, Inc.), December 1995, *Site Investigation Report - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey.*
- Smith Environmental Technologies Corp. in 1996

TABLES

**Groundwater Sampling Results (2008-2011) Site FTMM-54 and
Groundwater Sampling Results for Baseline Groundwater Monitoring
(August 2013) Site FTMM-54**

(Tables not included for brevity)

FIGURES

FTMM-54 Location and Layout of FTMM-54

(Figures not included for brevity; see Attachment B)



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
Mail Code 401-05F
P.O. Box 420
Trenton, New Jersey 08625-0420
Telephone: 609-633-1455

CHRIS CHRISTIE
Governor

BOB MARTIN
Commissioner

KIM GUADAGNO
Lt. Governor

February 4, 2015

Wanda Green
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Approval

Re: **Remedial Action Type:** *Unrestricted Use*

Scope of Remediation: *Area of Concern: Ground Water at FTMM-54/Building 296, and no other areas*

Fort Monmouth
Monmouth County
SRP PI# G000000032
RPC000001

Dear Ms. Green:

The New Jersey Department of Environmental Protection (Department) has reviewed the *Request for No Further Action for Groundwater at FTMM-54* report submitted by the Department of the Army on December 3, 2014. The Department concurs with the Department of the Army that all remedial actions necessary for the ground water located within FTMM-54/Building 296 are complete. This applies to ground water only, specifically for the Building 296 parcel located along Sherrill Avenue. It does not include the area north of same, surrounding monitor well 296MW06 (as noted on Figure 1.3 of the above report), located within FTMM-18, and which will be addressed under the RI/FS report for FTMM-18. The determination that the remedial action for ground water is complete is based upon information in the Department's case file, the report submitted by the Department of the Army, and the certified representations and information provided to the Department.

If you have any questions regarding this matter contact Linda Range at (609)984-6606.

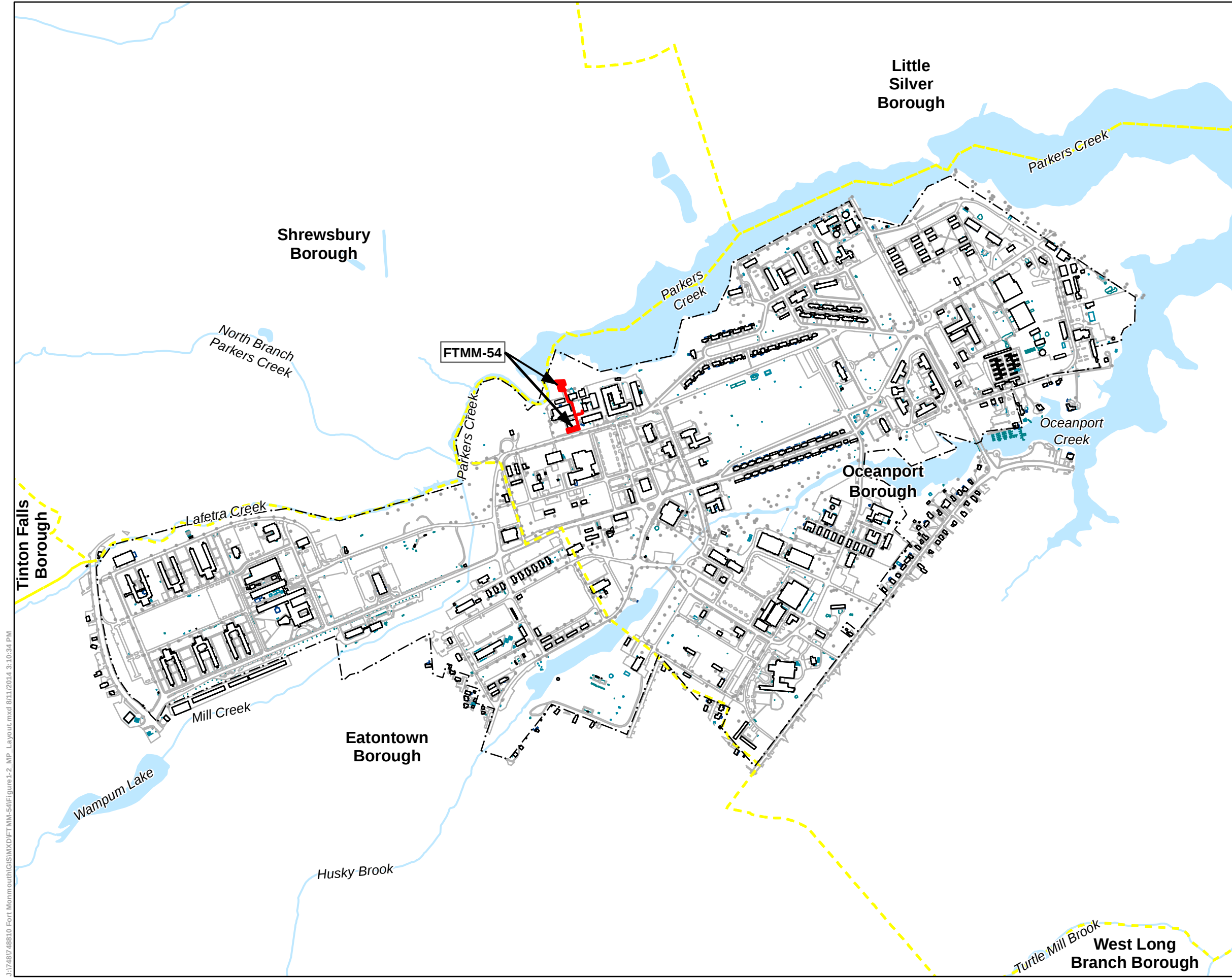
Sincerely,

Gwen B. Zervas, P.E., Section Chief
Bureau of Case Management

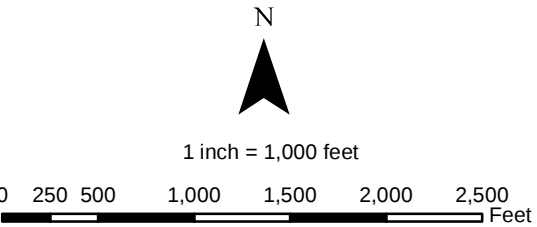
cc: Joe Pearson, Calibre Systems
Rich Harrison, FMERA
Joe Fallon, FMERA

ATTACHMENT B

Location and Layout of FTMM-54

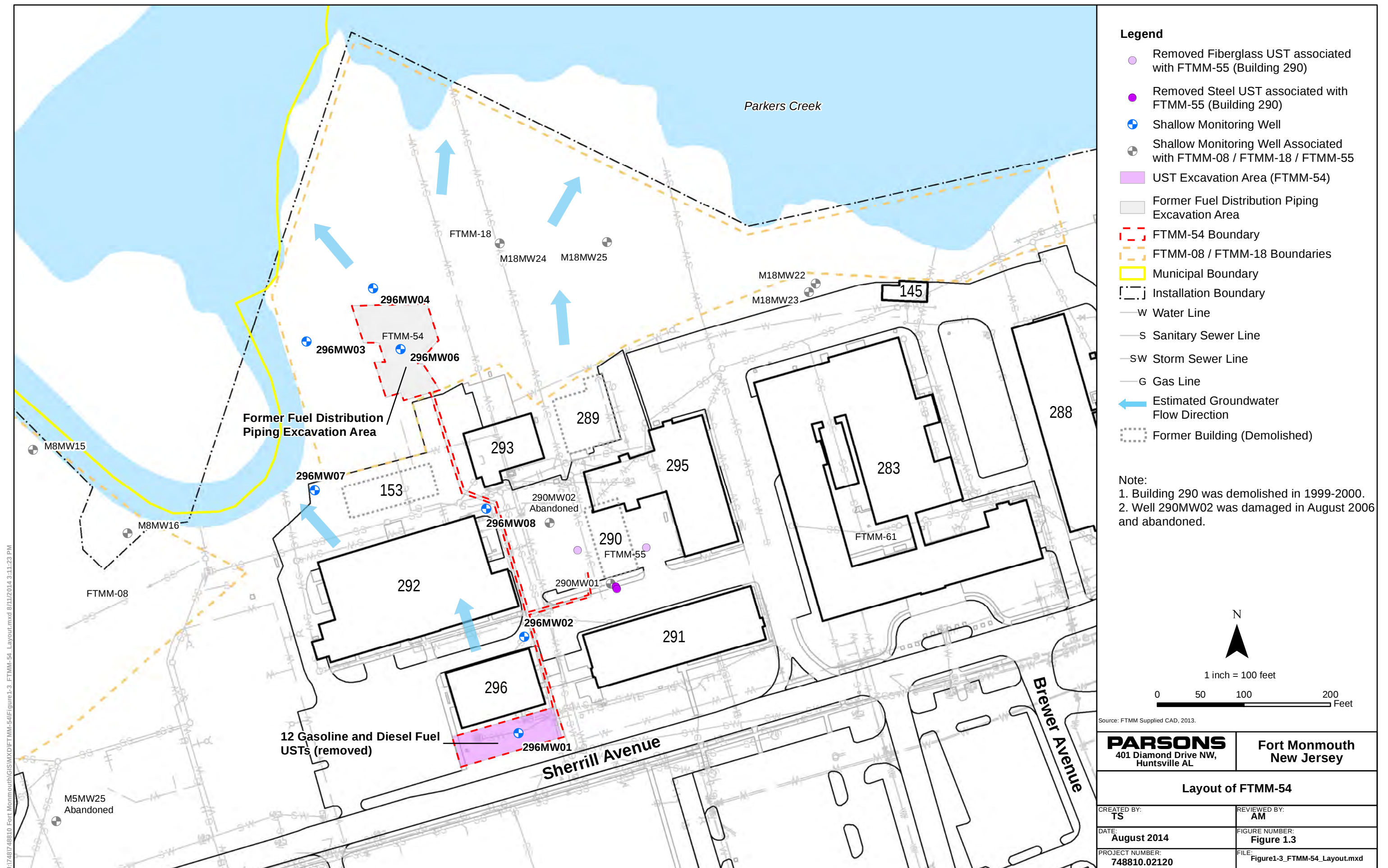


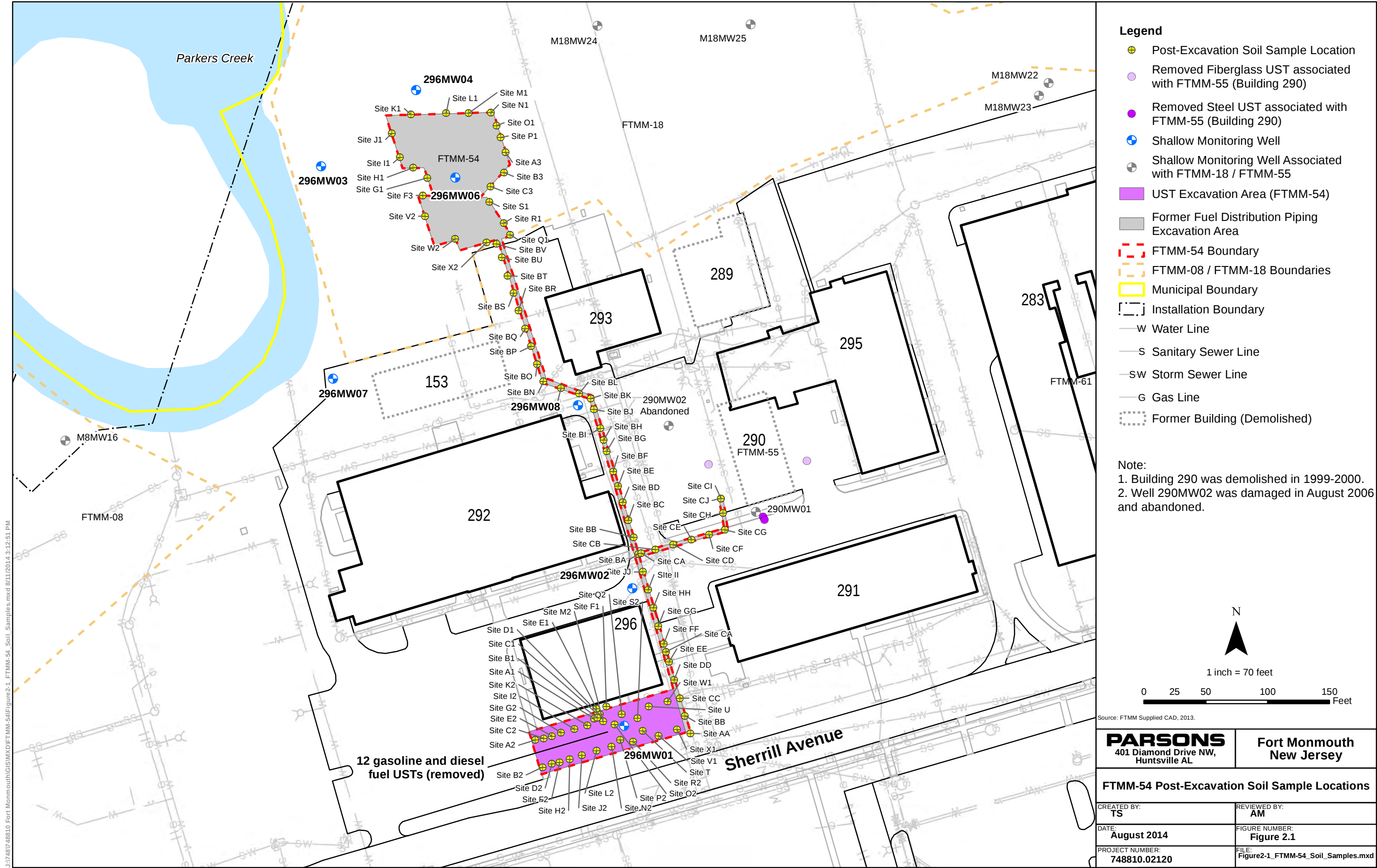
- Legend**
- FTMM-54 Boundary
 - Installation Boundary
 - Municipal Boundary
 - Surface Water Feature



Source: FTMM Supplied CAD, 2013; ESRI Data and Maps, 2011; USGS NHD, 2012.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
FTMM-54 Location	
CREATED BY: TS	REVIEWED BY: AM
DATE: August 2014	FIGURE NUMBER: Figure 1.2
PROJECT NUMBER: 748810.02120	FILE: Figure1-2_MP_Layout.mxd





ATTACHMENT C

Summary Table of FTMM-54 Underground Storage Tanks

UST CLOSURE STATUS

Site Name	RESIDENTIAL	Registration ID	DICAR	Tank Size and Type	Product	Army CaseStatus	Comments on Current or Requested NJDEP Status
296A	NO	81533-69		550 gal. steel	#2 FUEL OIL	Case Closed	Submit Smith report; request NFA
296B	NO	81533-216	93-11-2-1200-13	2000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-223	93-11-2-1200-13	1000 gal. steel	DIESEL	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-217	93-11-2-1200-13	1000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-218	93-11-2-1200-13	1000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-219	93-11-2-1200-13	1000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-215	93-11-2-1200-13	1000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-221	93-11-2-1200-13	1000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-214	93-11-2-1200-13	2000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-213	93-11-2-1200-13	2000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-222	93-11-2-1200-13	1000 gal. steel	DIESEL	Case Open	NFA approved per 1/10/2003 NJDEP letter
296B	NO	81533-220	93-11-2-1200-13	1000 gal. steel	GASOLINE	Case Open	NFA approved per 1/10/2003 NJDEP letter

ATTACHMENT D

UST 296A Report

United States Army

Fort Monmouth, New Jersey

Underground Storage Tank Closure and Site Investigation Report

***Building 296
Main Post Area***

**NJDEP UST Registration No. 081533-69
NJDEP Closure Approval No. C-93-3917**

February 1996

SMITH
ENVIRONMENTAL TECHNOLOGIES CORPORATION

**UNDERGROUND STORAGE TANK
CLOSURE AND SITE INVESTIGATION REPORT**

BUILDING 296

**MAIN POST AREA
NJDEP UST REGISTRATION NO. 081533-69
NJDEP CLOSURE APPROVAL NO. C-93-3917**

FEBRUARY 1996

**PROJECT NO.: 09-5004-07
CONTRACT NO.: DACA51-94-D-0014**

PREPARED FOR:

**UNITED STATES ARMY, FORT MONMOUTH, NEW JERSEY
DIRECTORATE OF PUBLIC WORKS
BUILDING 167
FORT MONMOUTH, NJ 07703**

PREPARED BY:

**SMITH ENVIRONMENTAL TECHNOLOGIES CORPORATION
BROMLEY CORPORATE CENTER
THREE TERRI LANE
BURLINGTON, NEW JERSEY 08016**

296.DOC



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APPENDICES

Appendix A	NJDEP-BUST Closure Approval
Appendix B	Certifications
Appendix C	Waste Manifest
Appendix D	UST Disposal Certificate
Appendix E	Soil Analytical Data Package

EXECUTIVE SUMMARY

UST Closure

On November 16, 1993, a steel underground storage tank (UST) was closed by removal in accordance with the New Jersey Department of Environmental Protection (NJDEP) Closure Approval No. C-93-3917 at U.S. Army Fort Monmouth, Fort Monmouth, New Jersey. The UST, NJDEP Registration No. 081533-69, was located immediately adjacent to Building 296 in the Main Post area of U.S. Army, Fort Monmouth. UST No. 081533-69 was a 550-gallon No. 2 diesel UST. The UST fill port was located directly above the tank. The tank closure was performed by Cleaning Up The Environment Inc. (CUTE).

Site Assessment

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E) and the NJDEP *Field Sampling Procedures Manual*. Soils surrounding the tank were screened visually and with air monitoring instruments for evidence of contamination. Following removal, the UST was inspected for corrosion holes. No holes were noted in the UST, however, potentially contaminated soils were observed in the northeast corner of the excavation. Old copper fuel lines were discovered in this area while removing potentially contaminated soils by hand. It is believed that a previous UST existed but had been replaced by UST No. 081533-69. When the old UST was replaced, the old copper lines were abandoned in place with product still remaining in them. When UST No. 081533-69 was installed, new fuel/return lines were also installed.

On November 16, 1993, following removal of the UST, approximately 8 cubic yards of potentially contaminated soils were removed from the excavation. Post-excavation soil samples (A and B) were collected from two (2) locations along the base of the excavation. Post-excavation soil samples C and E were also collected from the new piping portion of the excavation, which was approximately 12 feet. Post-excavation samples D and F were collected from the old piping portion, which was approximately 20 feet in length. All samples were analyzed for total petroleum hydrocarbons (TPHC).

Findings

All post-excavation soil samples collected from the UST excavation and from below piping associated with the former UST at Building 296 contained TPHC concentrations below the NJDEP residential direct contact total organic contaminants soil cleanup criteria of 10,000 milligrams per kilogram (mg/kg) (N.J.A.C. 7:26E and revisions dated February 3, 1994). The samples collected on November 16, 1993 (A, B, C, D, E, and F) contained TPHC concentrations ranging from 8.81 mg/kg to 178.0 mg/kg.



Site Restoration

Following receipt of all post-excavation soil sampling results, the excavation was backfilled to grade with a combination of uncontaminated excavated soil and certified clean fill. The excavation site was then restored to its original condition.

Site Assessment Quality Assurance

The sampling and laboratory analysis conducted during the site assessment were performed in accordance with Section 7:26E-2.1 of the *Technical Requirements*.

Conclusions and Recommendations

Based on the post-excavation soil sampling results, soils with TPHC concentrations exceeding the NJDEP soil cleanup criteria for total organic contaminants of 10,000 mg/kg do not remain in the former location of the UST or associated piping.

No further action is proposed in regard to the closure and site assessment of UST No. 081533-69 at Building 296.



1.0 UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES

1.1 OVERVIEW

One underground storage tank (UST), New Jersey Department of Environmental Protection (NJDEP) Registration No. 081533-69, was closed at Building 296 at U.S. Army Fort Monmouth, Fort Monmouth, New Jersey on November 16, 1993. Refer to site location map on Figure 1. This report presents the results of the DPW's implementation of the UST Decommissioning/Closure Plan submitted to the NJDEP on July 28, 1993. The plan was approved on September 7, 1993 and assigned TMS No. C-93-3917. The UST was a steel, 550-gallon tank containing No. 2 diesel.

Decommissioning activities for UST No. 081533-69 complied with all applicable federal, state and local laws and ordinances in effect at the date of decommissioning. These laws included but were not limited to: N.J.A.C. 7:14B-1 et seq., N.J.A.C. 5:23-1 et seq., and Occupational Safety and Health Administration (OSHA) 1910.146 & 1910.120. All permits including but not limited to the NJDEP-approved Decommissioning/Closure Plan were posted onsite for inspection. CUTE Inc., the contractor that conducted the decommissioning activities, is registered and certified by the NJDEP for performing UST closure activities. Closure of UST No. 081533-69 proceeded under the approval of the NJDEP Bureau of Underground Storage Tanks (NJDEP-BUST). The NJDEP-BUST closure approval and the signed certifications for UST No. 081533-69 are included in Appendices A and B, respectively.

Based on an inspection of the UST, field screening of subsurface soils and analytical results of collected soil samples, the DPW has concluded that no significant historical discharges are associated with the UST or associated piping.

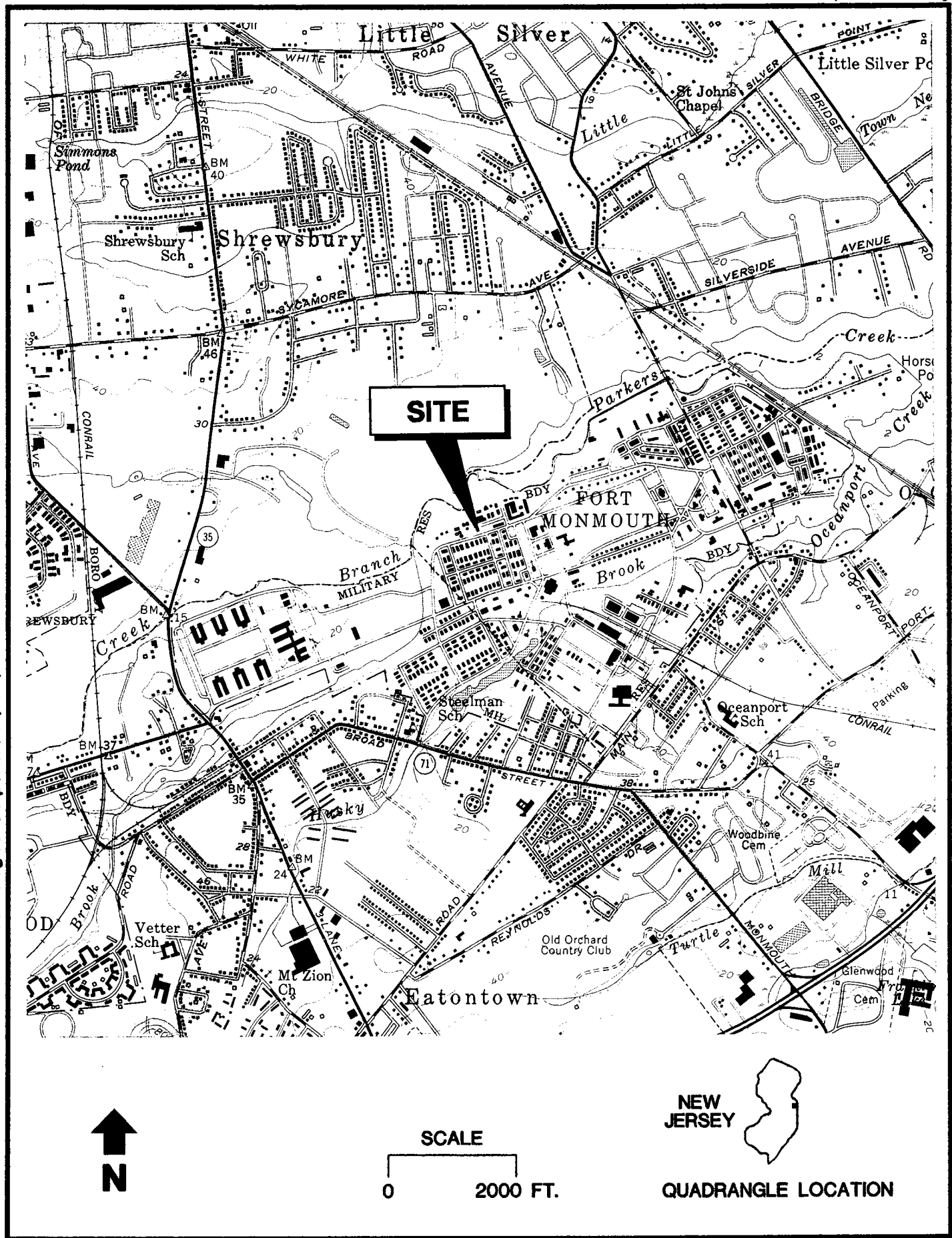
This UST Closure and Site Investigation Report has been prepared by Smith Environmental Technologies Corporation to assist the United States Army Directorate of Public Works (DPW) in complying with the NJDEP Bureau of Underground Storage Tanks (NJDEP-BUST) regulations. The applicable NJDEP-BUST regulations at the date of closure were the *Interim Closure Requirements for Underground Storage Tank Systems* (N.J.A.C. 7:14B-1 et seq. September 1990 and revisions dated November 1, 1991).

This report was prepared using information required at the time of closure. Section 1 of this UST Closure and Site Investigation Report provides a summary of the UST decommissioning activities. Section 2 of this report describes the site investigation activities. Conclusions and recommendations, including the results of the soil sampling investigation, are presented in the final section of this report.

SMITH

U.S. Army
Department of Public Works
Fort Monmouth, New Jersey

Source: BCM/Smith Environmental Technologies Corporation (028)



Project No. 09-5004-07

Figure 1
Site Location Map

1.2 SITE DESCRIPTION

Building 296 is located in the northwestern portion of the Main Post area of Fort Monmouth, as shown on Figure 1. UST No. 081533-69 was located south of Building 296 and the old copper piping ran approximately 20 feet south to the previous fill port area. The new piping ran approximately 12 feet south to the former fill port area. A site map is provided on Figure 2. The former fill port area was located directly above the tank adjacent to the A/C slab. The area surrounding Building 296 was assessed for old USTs using past maps and metal locating devices. None were found.

1.2.1 Geological/Hydrogeological Setting

The following is a description of the geological/hydrogeological setting of the area surrounding Building 296. Included is a description of the regional geology of the area surrounding Fort Monmouth as well as descriptions of the local geology and hydrogeology of the Main Post area.

Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The Main Post, Charles Wood, and the Evans areas are located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands.

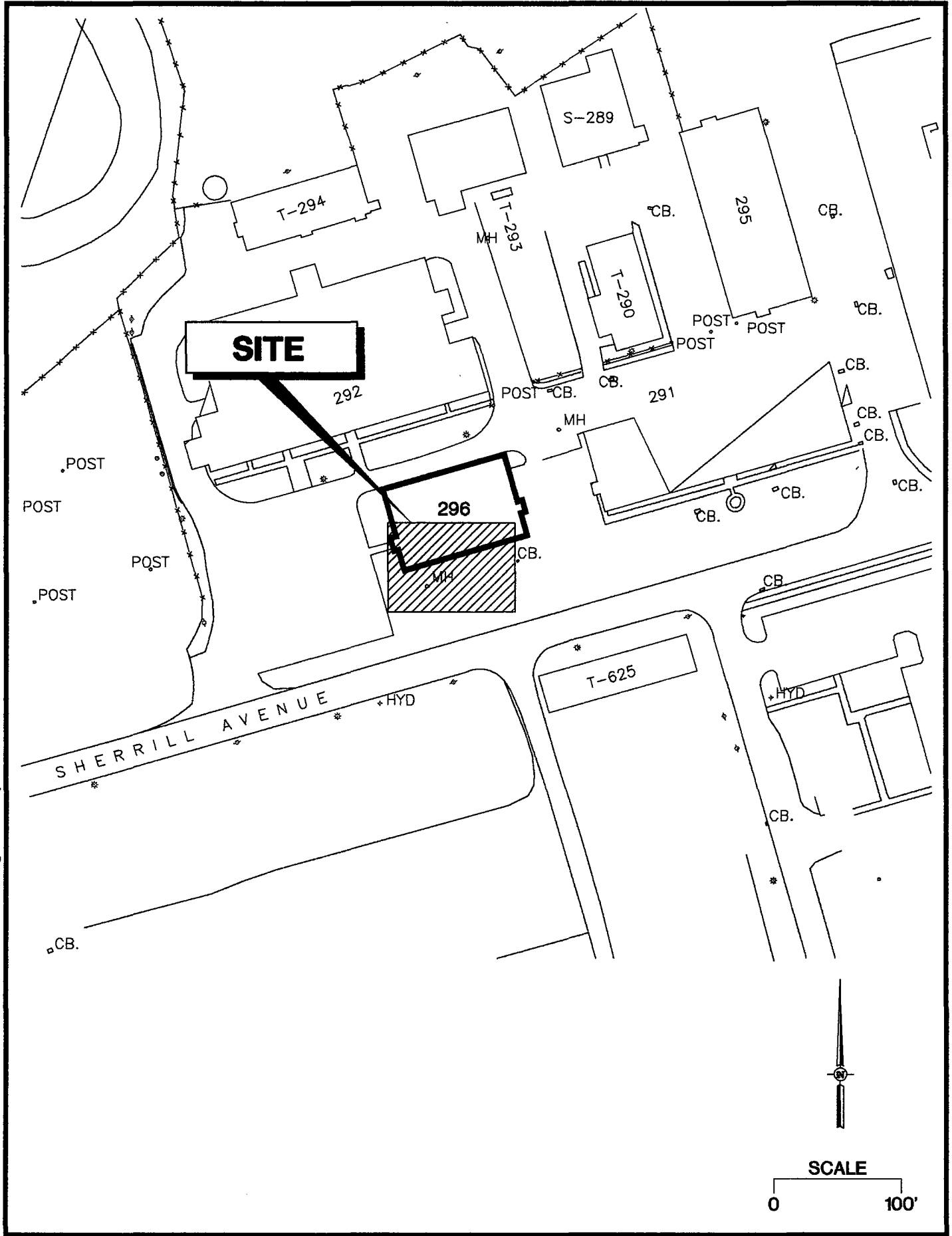
In general, New Jersey Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapeczka, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units which are generally thicker to the southeast and reflect a deeper water environment. Over 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand) while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, and Navesink Formations). The individual thicknesses for these units vary greatly (i.e., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line to greater than 6,500 feet in Cape May County (Brown and Zapeczka, 1990).

Local Geology

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post area. The Red Bank sand conformably overlies the

Source: BCM/Smith Environmental Technologies Corporation (044)



Project No. 09-5004-07

Figure 2
**Building 296
Site Map**

Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank sand is a yellowish-gray to reddish brown clayey, medium- to coarse-grained sand that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark gray to black, medium-to-fine grained sand with abundant clay, mica, and glauconite.

The Tinton sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse grained feldspathic quartz and glauconite sand to a glauconitic coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard).

Hydrogeology

The water table aquifer in the Main Post area is identified as part of the "composite confining units", or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation.

Based on records of wells drilled in the Main Post area, water is typically encountered at depths of 2 to 9 feet below ground surface (BGS). According to Jablonski, wells drilled in the Red Bank and Tinton Sands may produce 2 to 25 gallons per minute (gpm). Some well owners have reported acidic water that requires treatment to remove iron.

Due to the proximity of the Atlantic Ocean to Fort Monmouth, shallow groundwater may be tidally influenced and may flow toward creeks and brooks as the tide goes out, and away from creeks and brooks as the tide comes in. However, an abundance of clay lenses and sand deposits were noted in borings installed throughout Fort Monmouth. Therefore the direction of shallow groundwater should be determined on a case by case basis.

Shallow groundwater is locally influenced within the Main Post area by the following factors:

- tidal influence (based on proximity to the Atlantic Ocean, rivers and tributaries)
- topography
- nature of the fill material within the Main Post area
- presence of clay and silt lenses in the natural overburden deposits
- local groundwater recharge areas (e.g., streams, lakes)

Due to the fluvial nature of the overburden deposits (e.g., sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. This is consistent with

lithologies observed in borings installed within the Main Post area, which primarily consisted of fine-to-medium grained sands, with occasional lenses or laminations of gravel silt and/or clay.

1.3 HEALTH AND SAFETY

Before, during, and after all decommissioning activities, hazards at the work site which may have posed a threat to the Health and Safety of all personnel who were involved with, or were affected by, the decommissioning of the UST system were minimized. All areas which posed, or may have been suspected to pose a vapor hazard were monitored by a qualified individual utilizing an organic vapor analyzer (OVA). The individual ascertained if the area was properly vented to render the area safe, as defined by OSHA.

1.4 REMOVAL OF UNDERGROUND STORAGE TANK

1.4.1 General Procedures

- All underground obstructions (utilities, etc.) were marked out by the contractor performing the closure prior to excavation activities.
- All activities were carried out with the greatest regard to safety and health and the safeguarding of the environment.
- All excavated soils were visually examined and screened with an OVA for evidence of contamination. Potentially contaminated soils were identified and logged during closure activities.
- Surface materials (i.e., asphalt, concrete, etc.) were excavated and staged separately from all soil and recycled in accordance with all applicable regulations and laws.
- A Sub-Surface Evaluator from the DPW was present during all closure activities.

1.4.2 Underground Storage Tank Excavation and Cleaning

Prior to UST decommissioning activities, surficial soil was removed to expose the UST and associated piping. All free product present in the piping was drained into the UST, and the UST was purged to remove vapors prior to cutting and removal of the piping. After removal of the associated piping, a manway was made in the UST to allow for proper cleaning. The UST was completely emptied of all liquids prior to removal from the ground. Approximately 10 gallons of liquid were transported by Freehold Cartage Inc. to Lionetti Oil Recovery Co. Inc., a NJDEP-



approved petroleum recycling and disposal facility located in Old Bridge, New Jersey. Refer to Appendix C for waste manifest (No. NJA-1603207).

The UST was cleaned prior to removal from the excavation in accordance with the NJDEP-BUST regulations. After the UST was removed from the excavation, it was staged on polyethylene sheeting and examined for holes. No holes or punctures were observed during the inspection by the Sub-Surface Evaluator. Soils surrounding the UST were screened visually and with an OVA for evidence of contamination. All sites appeared to be clean except for possible contamination in sample area D (old piping trench), where OVA readings were over 200 parts per million (ppm).

Soil screening was also performed along the USTs new piping. No contamination was observed anywhere along the piping length.

1.5 UNDERGROUND STORAGE TANK TRANSPORTATION AND DISPOSAL

The tank was transported by CUTE Inc., to Mazza and Sons Inc. for disposal in compliance with all applicable regulations and laws. Refer to Appendix D for UST disposal certificate.

The Subsurface Evaluator labeled the UST prior to transport with the following information:

- site of origin
- contact person
- NJDEP UST Facility ID number
- name of transporter/contact person
- destination site/contact person

1.6 MANAGEMENT OF EXCAVATED SOILS

Based on OVA air monitoring and visual observations, approximately 8 cubic yards of potentially contaminated soils were excavated from sample location D on November 16, 1993. All potentially contaminated soils were stockpiled separately from other excavated material and were placed on and covered with polyethylene sheets. Potentially contaminated soils were transported to the Main Post ID 27 Soil Staging Area (T-80) prior to ultimate disposal at Soil Remediation of Philadelphia. Soils that did not exhibit signs of contamination were used as backfill following removal of the UST.



2.0 SITE INVESTIGATION ACTIVITIES

2.1 OVERVIEW

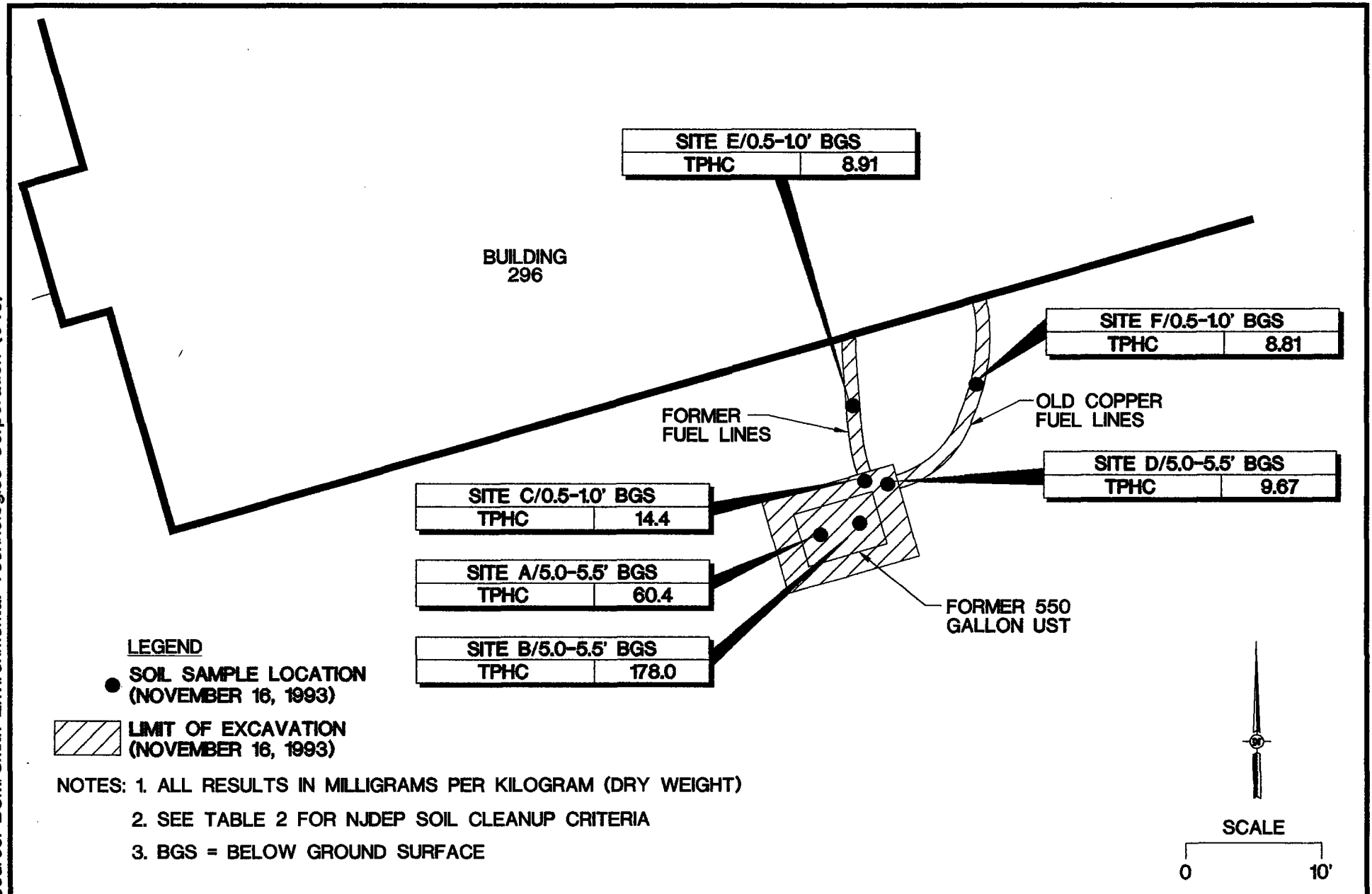
The Site Investigation was managed and carried out by U.S. Army DPW personnel. All analyses were performed and reported by U.S. Army Fort Monmouth Environmental Laboratory, a NJDEP-certified testing laboratory. All sampling was performed under the direct supervision of a NJDEP Certified Sub-Surface Evaluator according to the methods described in the NJDEP Field Sampling Procedures Manual (1992). Sampling frequency and parameters analyzed complied with the NJDEP-BUST document *Interim Closure Requirements for Underground Storage Tank Systems* (September 1990 and revisions dated November 1, 1991) which was the applicable regulation at the date of the closure. All records of the Site Investigation activities are maintained by the Fort Monmouth DPW Environmental Office.

The following Parties participated in Closure and Site Investigation Activities.

- Closure Contractor: Cleaning Up The Environment Inc. (CUTE)
Contact Person: Nancy Williams
Phone Number: (201)427-2881
NJDEP Company Certification No.: 0200128
- Subsurface Evaluator: Charles M. Appleby
Employer: U.S. Army, Fort Monmouth
Phone Number: (908) 532-6224
NJDEP Certification No.: 002966
- Analytical Laboratory: U.S. Army Fort Monmouth Environmental Laboratory
Contact Person: Brian K. McKee
Phone Number: (908)532-4359
NJDEP Company Certification No.: 13461
- Hazardous Waste Hauler: Freehold Cartage, Inc.
Contact Person: Barry Olsen
Phone Number: (908)462-1001
NJDEP Hazardous Waste Hauler No.: 2265

2.2 FIELD SCREENING/MONITORING

Field screening was performed by a NJDEP certified Sub-Surface Evaluator using an OVA and visual observations to identify potentially contaminated material. Soils were removed from the old piping trench (sample location D) until no evidence of contamination remained.



2.3 SOIL SAMPLING

On November 16, 1993, following removal of approximately 8 cubic yards of potentially contaminated soils, post-excavation soil samples A, B, C, D, E, and F were collected from a total of six (6) locations along the base of the UST excavation and piping trenches. Samples C, and E were collected from the new piping trench and samples D, and F were collected from the old piping trench. Refer to soil sampling location map on Figure 3. All samples were analyzed for TPHC. Because none of the soil samples exhibited a concentration exceeding 1,000 milligrams per kilograms (mg/kg), none were analyzed for volatile organic compounds with a forward library search for 10 tentatively identified compounds (VO+10).

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements* and the NJDEP *Field Sampling Procedures Manual*. A summary of sampling activities including parameters analyzed is provided on Table 1. The post-excavation soil samples were collected using polystyrene scoops. Actual soil TPHC values may be higher than reported, due to sample utensil absorbency. If absorbency resulted in reducing the actual soil TPHC concentration by 50 %, the highest soil contaminant would have been 356.0 mg/kg, still below the applicable NJDEP soil cleanup standard for total organic contaminants of 10,000 mg/kg. Following soil sampling activities, the samples were chilled and delivered to U.S. Army, Fort Monmouth Environmental Laboratory located in Fort Monmouth, New Jersey for analysis.

TABLE 1

SUMMARY OF SAMPLING ACTIVITIES
BUILDING 296, MAIN POST
FORT MONMOUTH, NEW JERSEY

Sample ID	Date of Collection	Matrix	Sample Type	Analytical Parameters (and USEPA Methods) *	Sampling Method
A	11-16-93	Soil	Post-Excavation	TPHC	Polystyrene Scoop
B	11-16-93	Soil	Post-Excavation	TPHC	Polystyrene Scoop
C	11-16-93	Soil	Post-Excavation	TPHC	Polystyrene Scoop
D	11-16-93	Soil	Post-Excavation	TPHC	Polystyrene Scoop
E	11-16-93	Soil	Post-Excavation	TPHC	Polystyrene Scoop
F	11-16-93	Soil	Post-Excavation	TPHC	Polystyrene Scoop

*Note: TPHC Total Petroleum Hydrocarbons (Method 418.1 / soil and aqueous)

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 SOIL SAMPLING RESULTS

To evaluate soil conditions following removal of the UST and associated piping, post-excavation soil samples were collected from a total of six (6) locations on November 16, 1993. All samples were analyzed for TPHC. The post-excavation soil sample results were compared to the NJDEP residential direct contact total organic contaminants soil cleanup criteria of 10,000 mg/kg (N.J.A.C. 7:26D and revisions dated February 3, 1994). A summary of the analytical results and comparison to the NJDEP soil cleanup criteria is provided on Table 2 and the soil sampling results are shown on Figure 3. The analytical data package is provided in Appendix E. The full data package, including associated quality control data, is on file at the U.S. Army Fort Monmouth, DPW.

All post-excavation soil samples collected on November 16, 1993, from the UST excavation and from below piping associated with the UST contained concentrations of TPHC below the NJDEP soil cleanup criteria. Post-excavation samples A, B, C, D, E, and F contained TPHC concentrations ranging from 8.81 mg/kg to 178.0 mg/kg.

3.2 CONCLUSIONS AND RECOMMENDATIONS

The analytical results for all post-excavation soil samples collected from the UST closure excavation at Building 296 were below the NJDEP soil cleanup criteria for total organic contaminants.

Based on the post-excavation soil sampling results, soils with TPHC concentrations exceeding the NJDEP soil cleanup criteria for total organic contaminants of 10,000 mg/kg do not remain in the former location of the UST or associated piping.

No further action is proposed in regard to the closure and site assessment of UST No. 081533-69 at Building 296.

TABLE 2

POST-EXCAVATION SOIL SAMPLING RESULTS
 BUILDING 296
 FT. MONMOUTH, NEW JERSEY

PAGE 1 OF 1

Sample ID/Depth	Sample Laboratory ID	Sample Date	Analysis Date	Compound Name	Sample Quantitation Limit (mg/kg)	Compound of Concern	Result (mg/kg)	NJDEP Soil Cleanup Criteria * (mg/kg)	Exceeds Cleanup Criteria
A/5.0-5.5'	1333.1	11/16/93	11/17/93	Total Solid	--	--	85 %	--	--
				TPHC	3.3	yes	60.4	10,000	--
B/5.0-5.5'	1333.2	11/16/93	11/17/93	Total Solid	--	--	88 %	--	--
				TPHC	3.3	yes	178.0	10,000	--
C/0.5-1.0'	1333.3	11/16/93	11/17/93	Total Solid	--	--	74 %	--	--
				TPHC	3.3	yes	14.4	10,000	--
D/5.0-5.5'	1333.4	11/16/93	11/17/93	Total Solid	--	--	82 %	--	--
				TPHC	3.3	yes	9.67	10,000	--
E/0.5-1.0'	1333.5	11/16/93	11/17/93	Total Solid	--	--	89 %	--	--
				TPHC	3.3	yes	8.91	10,000	--
F/0.5-1.0'	1333.6	11/16/93	11/17/93	Total Solid	--	--	90 %	--	--
				TPHC	3.3	yes	8.81	10,000	--

Notes:

* Cleanup criteria for total organics

-- Not applicable / does not exceed criteria

TPHC Total Petroleum Hydrocarbons

Smith Environmental Technologies Corporation (Project No. 09-5004-07)

soil296.doc

SMITH

APPENDIX A

NJDEP BUST CLOSURE APPROVAL

UNDERGROUND STORAGE TANK SYSTEM CLOSURE APPROVAL

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL
PROTECTION AND ENERGY

DIVISION OF RESPONSIBLE PARTY SITE REMEDIATION
BUREAU OF UNDERGROUND STORAGE TANKS
CN-029, TRENTON, NJ 08625-0029

TMS #

UST #

C-93-3917

0081533

US Army
BLDG. 296
Ft. Monmouth, NJ

Monmouth

THE ABOVE LISTED FACILITY IS HEREBY GRANTED APPROVAL TO PERFORM
THE FOLLOWING ACTIVITY IN ACCORDANCE WITH N.J.A.C. 7:14B-1 et seq.:

Removal of: one 550 gallon #2 diesel UST(s) and appurtenant
piping.

SITE ASSESSMENT: Soil samples will be taken every five (5) feet
along the center line of each tank and one (1) soil sample for
every 15 feet along all associated piping. Two (2) additional
samples will be taken from around the tank and biased to the areas
of highest field screened readings. Samples will be analyzed for
TPHC. If sample results are greater than 1,000ppm than 25% of the
samples will be analyzed for VO+10.

ON-SITE MANAGER: C. Appleby

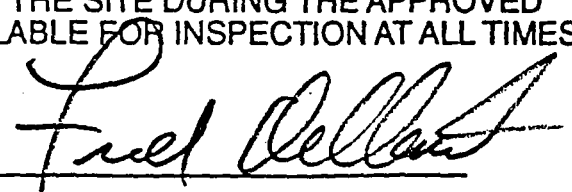
TELEPHONE: 908-532-1475

OWNER:

TELEPHONE:

EFFECTIVE DATE: SEP 07 1993

THIS FORM MUST BE DISPLAYED AT THE SITE DURING THE APPROVED
ACTIVITY AND MUST BE MADE AVAILABLE FOR INSPECTION AT ALL TIMES.


KEVIN F. KRATINA, BUREAU CHIEF
BUREAU OF UNDERGROUND STORAGE TANKS

SMITH

APPENDIX B
CERTIFICATIONS



UST # _____
Date Rec'd _____
TMS # _____
Staff _____

State of New Jersey
Department of Environmental Protection and Energy
Division of Responsible Party Site Remediation

CN 029
Trenton, NJ 08625-0029
Tel. # 609-984-3156
Fax. # 609-292-5604

Scott A. Weiner
Commissioner

Karl J. Delaney
Director

**UNDERGROUND STORAGE TANK
SITE ASSESSMENT SUMMARY**

*Under the provisions of the Underground Storage
of Hazardous Substances Act
in accordance with N.J.A.C. 7:14B*

This Summary form shall be used by all owners and operators of Underground Storage Tank Systems (USTS) who have either reported a release and are subject to the site assessment requirements of N.J.A.C. 7:14B-8.2 or who have closed USTS pursuant to N.J.A.C. 7:14B-9.1 et seq. and are subject to the site assessment requirements of N.J.A.C. 7:14B-9.2 and 9.3.

INSTRUCTIONS:

- Please print legibly or type.
- Fill in all applicable blanks. This form will require various attachments in order to complete the Summary. The technical guidance document, Interim Closure Requirements for USTs, explains the regulatory (and technical) requirements for closure and the Scope of Work, Investigation and Corrective Action Requirements for Discharges from Underground Storage Tanks and Piping Systems explains the regulatory (and technical) requirements for corrective action.
- Return one original of the form and all required attachments to the above address.
- Attach a scaled site diagram of the subject facility which shows the information specified in Item IV B of this form.
- Explain any "No" or "N/A" response on a separate sheet.

Date of Submission _____

Bldg. 296

081533-69

FACILITY REGISTRATION #

I. FACILITY NAME AND ADDRESS

U.S. Army, Fort Monmouth, New Jersey
Directorate of Engineering and Housing, Building 167
Fort Monmouth, New Jersey County Monmouth
Telephone No. (908) 532-6224

OWNER'S NAME AND ADDRESS, if different from above

Telephone No. _____

II. DISCHARGE REPORTING REQUIREMENTS

A. Was contamination found? ☐ Yes ☒ No If Yes, Case No. _____
(Note: All discharges must be reported to the Environmental Action Hotline (609) 292-7172)

B. The substance(s) discharged was(were) N/A

C. Have any vapor hazards been mitigated? ☐ Yes ☐ No ☒ N/A

III. DECOMMISSIONING OF TANK SYSTEMS

Closure Approval No. C-93-3917

The site assessment requirements associated with tank decommissioning are explained in the Technical Guidance Document, Interim Closure Requirements for UST's, Section V. A-D. Attach complete documentation of the methods used and the results obtained for each of the steps of tank decommissioning used. Please include a site map which shows the locations of all samples and borings, the location of all tanks and piping runs at the facility at the beginning of the tank closure operation and annotated to differentiate the status of all tanks and piping (e.g., removed, abandoned, temporarily closed, etc.). The same site map can be used to document other parts of the site assessment requirements, if it is properly and legibly annotated.

IV. SITE ASSESSMENT REQUIREMENTS

A. Excavated Soil

Any evidence of contamination in excavated soil will require that the soil be classified as either Hazardous Waste or Non-Hazardous Waste. Please include all required documentation of compliance with the requirements for handling contaminated excavated soil (if any was present) as explained in the technical guidance documents for closure and corrective action. Describe amount of soil removed, its classification, and disposal location.

B. Scaled Site Diagrams

1. Scaled site diagrams must be attached which include the following information:

- North arrow and scale
- The locations of the ground water monitoring wells
- Location and depth of each soil sample and boring
- All major surface and sub-surface structures and utilities
- Approximate property boundaries
- All existing or closed underground storage tank systems, including appurtenant piping
- A cross-sectional view indicating depth of tank, stratigraphy and location of water table
- Locations of surface water bodies

C. Soil samples and borings (check appropriate answer)

- Were soil samples taken from the excavation as prescribed? ☒ Yes ☐ No ☐ N/A
- Were soil borings taken at the tank system closure site as prescribed? ☐ Yes ☐ No ☒ N/A
- Attach the analytical results in tabular form and include the following information about each sample:
 - Customer sample number (keyed to the site map)
 - The depth of the soil sample
 - Soil boring logs
 - Method detection limit of the method used
 - QA/QC Information as required

D. Ground Water Monitoring

1. Number of ground water monitoring wells installed 0
2. Attach the analytical results of the ground water samples in tabular form. Include the following information for each sample from each well:
 - a. Site diagram number for each well installed
 - b. Depth of ground water surface
 - c. Depth of screened interval
 - d. Method detection limit of the method used
 - e. Well logs
 - f. Well permit numbers
 - g. QA/QC Information as required

V. SOIL CONTAMINATION

- A. Was soil contamination found? Yes ☒ No ☒
If "Yes", please answer Question B-E
If "No", please answer Question B
- B. The highest soil contamination still remaining in the ground has been determined to be:
1. N/A ppb total BTEX, N/A ppb total non-targeted VOC
 2. N/A ppb total B/N, N/A ppb total non-targeted B/N
 3. 178.0 ppm TPHC
 4. N/A ppb _____ (for non-petroleum substance)
- C. Remediation of free product contaminated soils
1. All free product contaminated soil on the property boundaries and above the water table are believed to have been removed from the subsurface Yes ☒ No ☐
 2. Free product contaminated soils are suspected to exist below the water table Yes ☐ No ☒
 3. Free product contaminated soils are suspected to exist off the property boundaries. Yes ☐ No ☒
- D. Was the vertical and horizontal extent of contamination determined? Yes ☐ No ☐ N/A ☒
- E. Does soil contamination intersect ground water? Yes ☐ No ☐ N/A ☒

VI. GROUND WATER CONTAMINATION N/A

- A. Was ground water contamination found? Yes ☐ No ☐
If "Yes", please answer Questions B-G.
If "No", please answer only Question B.
- B. The highest ground water contamination at any 1 sampling location and at any 1 sampling event to date has been determined to be:
1. _____ ppb total BTEX, _____ ppb total non-targeted VOC
 2. _____ ppb total B/N, _____ ppb total non-targeted B/N
 3. _____ ppb total MTBE, _____ ppb total TBA
 4. _____ ppb _____ (for non-petroleum substance)
 5. greatest thickness of separate phase product found _____
 6. separate phase product has been delineated Yes ☐ No ☐ N/A ☐
- C. Result(s) of well search
1. A well search (including a review of manual well records) indicates that private, municipal or commercial wells do exist within the distances specified in the Scope of Work. Yes ☐ No ☐ N/A ☐
 2. The number of these wells identified is _____.

D. Proximity of wells and contaminant plume

1. The shallowest depth of any well noted in the well search which may be in the horizontal or vertical potential path(s) of the contaminant plume(s) is _____ feet below grade (consideration has been given for the effects of pumping, subsurface structures, etc. on the direction(s) of contaminant migration). This well is _____ feet from the source and its screening begins at a depth of _____ feet.
2. The shallowest depth to the top of the well screen for any well in the potential path of the plume(s) (as described in D1 above) is _____ feet below grade. This well is located _____ feet from the source.
3. The closest horizontal distance of a private, commercial or municipal well in the potential path of the plume (as determined in D1) is _____ feet from the source. This well is _____ feet deep and screening begins at a depth of _____ feet.

E. A plan for separate phase product recovery has been included. ____ Yes ____ No ____ N/A

F. A ground water contour map has been submitted which includes the ground water elevations for each well.
____ Yes ____ No ____ N/A

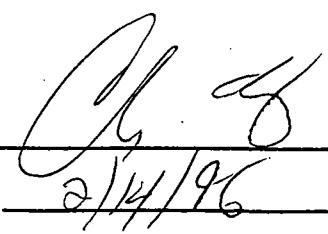
G. Delineation of contamination

1. The ground water contaminants have been delineated to MCLs or lower values at the property boundaries. ____ Yes ____ No
2. The plume is suspected to continue off the property at concentrations greater than MCLs.
____ Yes ____ No
3. Off property access (circle one): is being sought has been approved has been denied

VII. SITE ASSESSMENT CERTIFICATION [preparer of site assessment plan - N.J.A.C. 7:14B-8.3(b) & 9.5(a)3]

The person signing this certification as the "Qualified Ground Water Consultant" (as defined in N.J.A.C. 7:14B-1.6) responsible for the design and implementation of the site assessment plan as specified in N.J.A.C. 7:14B-8.3(a) & 9.2(b)2, must supply the name of the certifying organization and certification number.

"I certify under penalty of law that the information provided in this document is true, accurate, and complete and was obtained by procedures in compliance with N.J.A.C. 7:14B-8 and 9. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) Charles M. Appleby SIGNATURE 

COMPANY NAME U.S. Army, Fort Monmouth DATE 2/14/96
(Preparer of Site Assessment Plan)

CERTIFYING ORGANIZATION NJDEP CERTIFICATION NUMBER 2056

VIII. TANK DECOMMISSIONING CERTIFICATION [person performing tank decommissioning portion of closure plan - N.J.A.C. 7:14B-9.5(a)4]

"I certify under penalty of law that tank decommissioning activities were performed in compliance with N.J.A.C. 7:14B-9.2(b)3. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

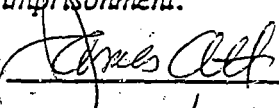
NAME (Print or Type) _____ SIGNATURE _____

COMPANY NAME _____ DATE _____
(Performer of Tank Decommissioning)

IX. CERTIFICATIONS BY THE RESPONSIBLE PARTY(IES) OF THE FACILITY

A. The following certification shall be signed by the highest ranking individual with overall responsibility for that facility [N.J.A.C. 7:14B-2.3(c)1].

"I certify under penalty of law that the information provided in this document is true, accurate, and complete. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) James Ott _____ SIGNATURE  _____

COMPANY NAME U.S. Army, Fort Monmouth _____ DATE 2/14/96 _____

B. The following certification shall be signed as follows [according to the requirements of N.J.A.C. 7:14B-2.3(C)2]:

1. For a corporation, by a principal executive officer of at least the level of vice president.
2. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
3. For a municipality, State, Federal or other public agency by either the principal executive officer or ranking elected official.
4. In cases where the highest ranking corporate partnership, governmental officer or official at the facility as required in A above is the same person as the official required to certify in B, only the certification in A need to be made. In all other cases, the certifications of A and B shall be made.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) _____ SIGNATURE _____

COMPANY NAME _____ DATE _____

GENERATOR CERTIFICATION

I hereby certify that the waste described on Hazardous Waste Manifest No. NTA-1603207 dated: 11/17/93 is generated by one or more of the following processes, and does not contain more than 2 ppm polychlorinated biphenyls (PCBs) and does not display any characteristic or contain any hazardous constituents other than for which waste oils are listed in New Jersey.

X721: Waste automotive crankcase and lubricating oils from automotive service and gasoline stations, truck terminals, and garages.

X722: Waste oil and bottom sludge generated from tank cleanouts from residential/commercial fuel oil tanks.

X723: Waste oil and bottom sludge generated by gasoline stations when gasoline and oil tanks are tested, cleaned or replaced.

X724: Waste petroleum oil generated when tank trucks or other vehicles or mobile vessels are cleaned, including, but not limited to, oil ballast water from product transport units of boats, barges, ships or other vessels.

X725: Oil spill cleanup residue which: A. is contaminated beyond saturation; or B. the generator fails to demonstrate that the spill material was not one of the listed hazardous waste oils.

X726: The following used and unused waste oils: metal working oils; turbine lubricating oils; diesel lubricating oils; and quenching oils.

X728: Bottom sludge generated from the processing, blending, and treatment of waste oil in waste oil processing facilities.

I am duly authorized to sign said certification.

40 JAM

Generator US ARMY COMMUNICATIONS ELECTRONICS COMMAND STARGH:

Generator's EPA ID No. NT3210020597

Address FARMINGTON, N.J. / MAIN POST

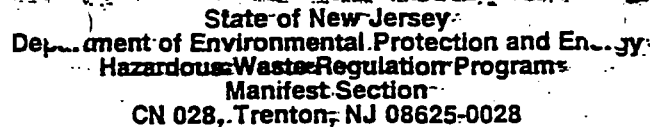
Print Name Charles M. Appleby Signature Ch Appleby

Title Enviro Protection Specialist DPW

Date Nov. 17, 1993

SMITH

APPENDIX C
WASTE MANIFEST



Form Approved. OMB No. 2050-0039 Expires 8-30-94

HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. NJ000005977		Manifest Document No. 00101		2. Page 1 of 1		Information in the shaded areas is not required for Federal use	
3. Generator's Name and Mailing Address US Army Communications Electronics Command, c/o James Shirghio, Bldg. 2504, ATTN: SELFM-DL-EM Fort Monmouth, NJ 07703				A. State Manifest Document Number MS# NJA 116082072		B. State Generator's ID MANIFEST# 116082072		C. State Facility's ID FAC# 2153369	
4. Generator's Phone (908-) 532-6224		6. US EPA ID Number NJ 1J ID 10 15 14 11 12 16 11 16 14		D. Transporter's Phone (908-) 450-1988		E. State Trans. ID 116082072		F. Transporter's Phone ()	
5. Transporter 1 Company Name Freehold Cartage Inc.		8. US EPA ID Number		G. State Facility's ID		H. Facility's Phone (908-) 721-0900			
7. Transporter 2 Company Name		10. US EPA ID Number							
9. Designated Facility Name and Site Address Lionetti Oil Recovery Co., Inc. Runyon & Cheesequake Rds. Old Bridge, NJ 08857				11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number) K Petroleum Oil NOS Class 3 (Petroleum Oil) X Combustible Liquid UN 1270 PG III		12. Containers 13. Total Quantity		14. Unit Wt/Vol	
						15. I		Waste No.	
						16. Unit		Wt/Vol	
						17. Unit		Wt/Vol	
						18. Unit		Wt/Vol	
						19. Unit		Wt/Vol	
						20. Unit		Wt/Vol	
						21. Unit		Wt/Vol	
						22. Unit		Wt/Vol	
						23. Unit		Wt/Vol	
						24. Unit		Wt/Vol	
						25. Unit		Wt/Vol	
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						28. Unit		Wt/Vol	
						29. Unit		Wt/Vol	
						30. Unit		Wt/Vol	
						31. Unit		Wt/Vol	
						32. Unit		Wt/Vol	
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						38. Unit		Wt/Vol	
						39. Unit		Wt/Vol	
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						44. Unit		Wt/Vol	
						45. Unit		Wt/Vol	
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						73. Unit		Wt/Vol	
						74. Unit		Wt/Vol	
						75. Unit		Wt/Vol	
						76. Unit		Wt/Vol	
						77. Unit		Wt/Vol	
						78. Unit		Wt/Vol	

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES



FREEHOLD CARRIAGE INC.

MANIFEST

P.O. BOX 5010
FREEHOLD, NJ 07728-5010
PHONE: (908) 462-1001
FAX: (908) 308-0924

175 BARTON MUNIAIRPORT
BARTON, NJ 08504
PHONE: (613) 533-4500
FAX: (613) 533-1613

108 MONMOUTH AVENUE
DUNMORE, PA 15122
PHONE: (717) 342-7222
FAX: (717) 342-7357

FCI REF ID NO.
NJDEPES 2265-55429
G17451

STATE MANIFEST NO. 1603008 1603007

(X) HM	PROPER U.S. DOT SHIPPING NAME	U.S. DOT HAZARDOUS CLASS	PACKING GROUP	NA UN NO.	FORM	NET WT.	UNIT MEASURE
X	1 PETROLEUM OIL - N.O.S. (PET. OIL)	COMBUSTIBLE LIQUID	III	1070	L	543	G.
	2						
	3						

SPECIAL HANDLING INSTRUCTIONS INCLUDING CONTAINER EXEMPTION (I.E., IDENTIFICATION SHIPMENT OF A NON-HAZARDOUS NATURE WHICH DOES NOT HAVE TO BE MANIFESTED).

NJDEPES # - 2265-55429

GENERATOR NAME/ADDRESS U.S. ARMY COMMUNICATIONS ELECTRONICS COMMAND FORT MONMOUTH, N.J. MAIN POST		PHONE (908) 533-6224 (AREA CODE) 533-6224	GENERATOR EPA ID NO. NJ136110001015917	
TRACTOR 438		TRAILER NA	TIME AT GENERATOR (MILITARY TIME ONLY) 0700 ARRIVAL TIME DEPARTURE TIME	
FCI REP. LOADING (PRINT)	PROCEDURE	BOX SPOTTED	BOX REMOVED	EQUIPMENT USED
ADVANTAGE TO	VAC	NA	NA	1-VACUUM TRUCK
COMMENTS OR DELAYS AT GENERATOR #208-11/9/93 #209-11/8/93 #210-556405 #207: 296 11/16/93 684-A-3 8406-A 600 3406 #296 11/5/93 81533-69 10 GAL A-60: 13-132 196 GAL				
GENERATOR'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the State. The wastes described above were consigned to the Transporter named. The Transporter, Storage or Disposal Facility can and will accept the shipment of hazardous waste, and has a valid permit to do so. I certify that the foregoing is true and correct to the best of my knowledge. Payment to the contractor for waste removal does not constitute payment to the carrier and if the contractor does not pay the carrier, the generator is obligated to pay the agreed rate offered to the contractor.				
GENERATOR'S SIGNATURE X		PLEASE PRINT NAME/TITLE		DATE LOADED: 11/17/93 MO. DAY YR.
I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT.				

TSDF NAME/ADDRESS LIONETTI OIL RECOVERY RUNYON + CHEESEBROOK OLD BRIDGE, N.J.		PHONE (908) 721-0900 (AREA CODE) 721-0900	TSDF EPA ID NO. NJ1000410141064	
TRACTOR 438		TRAILER NA	TIME AT TSDF (MILITARY TIME ONLY) ARRIVAL TIME DEPARTURE TIME	
FCI REP. UNLOADING (PRINT)	PROCEDURE	BOX SPOTTED	BOX REMOVED	EQUIPMENT USED
	NA	NA	NA	
COMMENTS OR DELAYS AT TSDF				
TSDF SIGNATURE X		PLEASE PRINT NAME/TITLE		DATE UNLOADED: 11/17/93 MO. DAY YR.
I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT.				

AR H-0257 PC 944	ME ME-HWT-47 ME-WOT-47	MO H-1490 ND WH-429	NOVA SCOTIA, CANADA NSC 000 147	QUEBEC, CANADA QC-6ML-047
CT CT-HW-307	MD HWT-167 91-OP-1765	NH TNH-0047	OH 333-HW	RI RI-535
DE DE-HW-203 DE-SW-203	MA MA-294	NJ S-2265 15939	OK 3358	TX 40705
IL SWH-1540	MN 61572	NY JA-113	ONTARIO, CANADA A 840943	WI 11602
			PA PA-AH-0067	

Original - FCI Office Copy
Yellow - FCI Office Copy
Blue - FCI Office Copy/ Customer
Green - Retained by TSDF

G17451



APPENDIX D

UST DISPOSAL CERTIFICATE

MAZZA & SONS, INC.

Metal Recyclers
Auto and Truck
3230 Shafto Rd.
Tinton Falls, NJ
(908) 822-8292

NO. _____

DATE 17 Nov 93

Customer's Name C. Te Inc

Address _____

Make of
Autos

Tires

ank

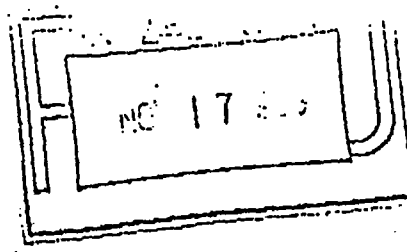
rice:

2910 #69

30500 LB 6

30960

4/60



Weight Price

Cast Iron		
Steel	<u>9.30</u>	
Lt. Iron		
Copper #1		
Copper #2		
Lt. Copper		
Brass		
Alum Clean		
Lead		
Stainless		
Radiators		
Battery		
TOTAL AMOUNT:		

Weighter _____ Customer Don Ellis

SMITH

APPENDIX E

SOIL ANALYTICAL DATA PACKAGE

Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEPE Certification # 13461

Client: U.S. Army
DEH, SELFM-EH-EV
Bldg. 167
Ft. Monmouth, NJ 07703

Lab. ID #: 1333.1-.6
Sample Rec'd: 11/16/93
Analysis Start: 11/17/93
Analysis Comp: 11/17/93

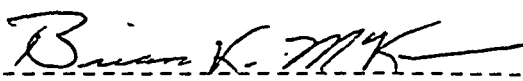
Analysis: 418.1 (TPH)
Matrix: Soil
Analyst: S. Hubbard
Ext. Meth: Sonc.

NJDEPE UST Reg.#: 81533-69
TMS #:
NJDEPE Case #:
Location #: 296

Lab ID.	Description	%Solid	Result (mg/Kg)	MDL
1333.1	Site A, 5 - 5.5' ova=ND	85	60.4	3.3
1333.2	Site B, 5 - 5.5' ova=ND *	88	178.	3.3
1333.3	Site C, 0.5 - 1' ova=ND	74	14.4	3.3
1333.4	Site D, 5 - 5.5' ova= 1.	82	9.67	3.3
1333.5	Site E, 0.5 - 1' ova=ND	89	8.91	3.3
1333.6	Site F, 0.5 - 1' ova=ND	90	8.81	3.3
M. Bl.	Method Blank	100	ND	3.3

Notes: ND = Not Detected, MDL = Method Detection Limit
* = Silica Gel Added

1333.1 Dup.= 97% 1333.1 Spike=88%, 1333.1 Spike Dup.=87%, RPD=99%



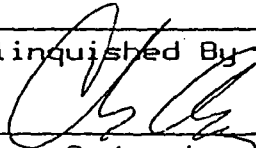
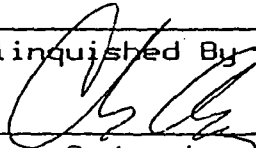
Brian K. McKee
Laboratory Director

P.O. #: PLW-007

Chain of Custody

Project #: <u>093-3917</u>		Sampler: <u>Cite Inc.</u>		Date / Time: <u>11/16/93</u> <u>1315</u>		Analysis Parameters				Start:	
Customer: <u>C. Appleby DPW</u>		Site Name: <u>Bldg. 296</u> <u>Unit # 81533-69</u> <u>093-3917</u> <u>Tms # - from file Call -</u>				TPH/C g/o Solids Mnuel DVA Reading				Finish:	
Phone: <u>X 26224</u>										Preservation Method	

Lab Sample ID Number	Date/Time	Customer Sample Location/ID Number	Sample Matrix	# of Bottles	TPH/C	g/o Solids	Mnuel	DVA Reading	Remarks
	11/16/93 1450	Site A - 5-5.5'	Soil	1	X	X	X	ND	
	1448	Site B - 5-5.5'	↓	1	X	X	X	ND	
	1456	Site C - .5-1'	↓	1	X	X	X	ND	
	1530	Site D - 5-5.5'	↓	1	X	X	X	1.0	Sample kept 24°C
	1520	Site E - .5-1'	↓	1	X	X	X	ND	
	1525	Site F - .5-1'	↓	1	X	X	X	10.0	
									DVA-SN-A52114
									Calibrated to 95ppm
									methane 1320hrs 11/16/93
									CA - Read - 102 ppm
									- OK -

Relinquished By (signature): 	Date / Time: <u>11/16/93 1545</u>	Received By (signature): <u>B. M. K.</u>	Shipped By: <u>Babynal - 2ppm - 4/20/02</u>
Relinquished By (signature): 	Date / Time: <u>11/16/93 1545</u>	Received for Lab by (signature): <u>B. M. K.</u>	Date / Time: <u>11/16/93 1545</u>

Note: A drawing depicting sample location should be attached or drawn on the reverse side of this chain of custody.

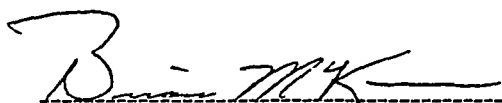
Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEPE Certification # 13461

Client: U.S. Army
DEH, SELFM-EH-EV
Bldg. 167
Ft. Monmouth, NJ 07703

Lab. ID #: 1333.1-.6
Sample Rec'd: 11/16/93
Analysis Start: 11/17/93
Analysis Comp: 11/17/93

Analysis: Munsel

Lab ID#	Soil Color
1333.1	2.5Y 4/1 Dark Gray
1333.2	2.5Y 4/1 Dark Gray
1333.3	2.5Y 3/3 Dark Olive Brown
1333.4	2.5Y 3/3 Dark Olive Brown
1333.5	2.5Y 4/4 Olive Brown
1333.6	2.5Y 4/4 Olive Brown



Brian K. McKee
Laboratory Director

11/19/93 3:42 PM

1551

November 17, 1993

1205

Sarah J. Hubbard

Blank 0 MV

33.75 81 MV

67.5 167

135 332 MV

Bldg 801

1332.1 file 167 268 MV

1332.2 65 MV

1332.3 33 MV

Bldg, 296

1333.1 36 MV

1333.1 Dup 35 MV

1333.1 Spk 118

1333.1 Spk Dup 117 MV

1333.2 114 MV

1333.3 6 MV

1333.4 4 MV

1333.5 4 MV

1333.6 4 MV

105-6070-00

No Yes

- ✓



-

- N/A

- ✓

-

Laboratory Authentication Statement


Brian K. McKee
Laboratory Manager

ATTACHMENT E

UST 296B Report

Appendices omitted for brevity

United States Army
Fort Monmouth, New Jersey

**Underground Storage Tank
Closure and Site Investigation
Report**

***Building 296
Main Post-West Area***

**NJDEP UST Registration No. 81533-213 thru 223
DICAR No. 93-11-02-1200-13**

May 2001

**UNDERGROUND STORAGE TANK
CLOSURE AND SITE INVESTIGATION REPORT**

BUILDING 296

**MAIN POST-WEST AREA
NJDEP UST REGISTRATION NO. 81533-213 THRU 223**

MAY 2001

PREPARED FOR:

**UNITED STATES ARMY, FORT MONMOUTH, NEW JERSEY
DIRECTORATE OF PUBLIC WORKS
BUILDING 167
FORT MONMOUTH, NJ 07703**

PREPARED BY:

***Versar* INC.**

**2558 PEARL BUCK ROAD
SUITE 1
BRISTOL, PA 19007**

PROJECT NO. 4936-127

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Figure 1	Site Location Map
Figure 2	Site Map
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Appendix A	NJDEP Standard Reporting Form
Appendix B	Site Assessment Summary
Appendix C	Waste Manifest
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Appendix E	Soil Analytical Data Package
Appendix F	Groundwater Analytical Data Package
Appendix G	Well Permits

EXECUTIVE SUMMARY

UST Closure

Between November 2, 1993, and November 4, 1993, eleven steel underground storage tanks (USTs) were closed by removal in accordance with New Jersey Department of Environmental Protection (NJDEP) closure procedures at the Main Post-West Area of the U.S. Army Fort Monmouth, Fort Monmouth, New Jersey. The USTs, NJDEP Registration Nos. 0081533-213 thru 223 (Fort Monmouth ID No. 296), were located south of Building 296. UST Nos. 081515-213 through 221 were all 1,000-2,000 gallon tanks containing gasoline. UST Nos. 081515-222 and 223 were both 1,000-gallon tanks containing diesel.

Site Assessment-Soil

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E) and the NJDEP *Field Sampling Procedures Manual*. The sampling and laboratory analyses conducted during the site assessment were performed in accordance with Section 7:26E-2.1 of the *Technical Requirements for Site Remediation*. Soils surrounding the tanks were screened visually and with air monitoring equipment for evidence of contamination. Following removal, the USTs were inspected for corrosion holes. Numerous holes were noted in the USTs. Soils at the location of the holes were dark in color and appeared to be contaminated. Based on the inspection of the USTs, Directorate of Public Works (DPW) concluded that a discharge of petroleum products was associated with the USTs. The NJDEP hotline was notified and the case was assigned DICAR No. 93-11-02-1200-13. Groundwater was encountered at 6.0 feet below ground surface and sheen was observed on groundwater.

- On November 5, 1993, following the removal of the USTs and 130 feet of piping, approximately 16 cubic yards of potentially contaminated soil were removed from the excavation and from the piping trench due to visible contamination. Post-excavation soil samples A thru JJ were collected from thirty-four (34) locations within the UST excavation area and from the piping trench. Each of the samples was analyzed for total petroleum hydrocarbons (TPHC), total solids, lead, and Volatile Organic Compounds (VOCs).
- On November 23, 1993, following the removal of approximately 283 feet of piping, post-excavation soil samples BA thru BV were collected from twenty-two (22) locations along the former piping length of the excavation. Each of the samples was analyzed for TPHC, total solids, lead, and VOCs.
- On December 9, 1993, following the removal of approximately 99 feet of piping, post-excavation soil samples CA thru CJ were collected from nine (9) locations along the former piping length of the excavation. Each of the samples was analyzed for TPHC, total solids, lead, and VOCs.

- On December 29, 1993, following the removal of approximately 70 feet of piping, post-excavation soil samples A thru P were collected from fourteen (14) locations within the piping excavation. Each of the samples was analyzed for lead and VOCs.
- On January 5, 1994, following the removal of approximately 35 feet of piping, post-excavation soil samples Q, R, S, V, W, and X were collected from six (6) locations within the piping excavation. Each of the samples was analyzed for lead and VOCs.

Site Assessment-Findings

Analytical results of post-excavation soil samples collected between November 5, 1993, and January 5, 1994, contained either non-detectable concentrations of contaminants or concentrations of contaminants below the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC).

Site Assessment-Groundwater

In response to the observation of potentially contaminated soil near the shallow water table, seven shallow overburden monitoring wells were installed at the Building 296 area.

- Between November 8, 1994, and August 18, 2000, monitoring wells MW-7 and MW-8 were sampled on a quarterly basis. Both wells were analyzed for VOCs calibrated for xylene plus 15 TICs, SVOCs plus 15 TICs, pesticide/PCB, and TAL metals.
- Between November 22, 1995, and August 18, 2000, monitoring wells MW-2, MW-3, and MW-4 were sampled on a quarterly basis. All wells were analyzed for VOCs calibrated for xylene plus 15 TICs, SVOCs plus 15 TICs, pesticide/PCB, and TAL metals.
- Between November 29, 1994, and August 18, 2000, monitoring wells MW-1 and MW-6 were sampled on a quarterly basis. Both wells were analyzed for VOCs calibrated for xylene plus 15 TICs, SVOCs plus 15 TICs, pesticide/PCB, and TAL metals.

The seven wells were constructed in accordance with NJDEP's well construction protocols outlined in its May 1992 *Field Sampling Procedures Manual*. The NJDEP well permits and well construction logs are presented in Appendix G.

Findings-Groundwater

A review of the historical groundwater analytical results indicates that concentrations of benzene, methylene chloride, bis (2-ethylhexyl phthalate), aluminum, iron, lead, manganese, silver, chromium, and sodium have been detected during these sampling events at concentrations that exceed the respective NJDEP GWQS. The methylene chloride and bis (2-ethylhexyl phthalate) detected in the samples are attributed to sampling and analytical interference.

Discrepancies

The removal contractor collected soil samples using polystyrene scoops instead of NJDEP approved stainless steel scoops. The results of the soil samples were therefore evaluated at 50% of the actual value to compensate for any potential loss due to absorbency of the polystyrene scoop.

Conclusion and Recommendations

Based on the analytical results of the post-excavation soil samples collected between November 5, 1993, and January 5, 1994, soil quality at the Building 296 UST closure site does not exceed the NJDEP RDCSCC. Therefore, no further action is warranted.

Based on the analytical results of the groundwater samples collected from the seven monitoring wells, groundwater quality at the Building 296 UST closure site exceeds the New Jersey Groundwater Quality Standard for benzene, aluminum, iron, lead, manganese, silver, chromium, and sodium. Future work to address groundwater quality conditions at Building 296 will be addressed in a Remedial Action Work Plan (RAWP).

1.0 UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES

1.1 OVERVIEW

Eleven underground storage tanks (USTs), New Jersey Department of Environmental Protection (NJDEP) Registration No. 81533-213 thru 223, were closed at Building 296 at the Main Post-West area of U.S. Army Fort Monmouth, Fort Monmouth, New Jersey between November 2, 1993, and November 4, 1993. Refer to the Site Location Map, Figure 1. This report presents the results of the Department of Public Works' (DPW) implementation of the UST Decommissioning/Closure Plan approved by the NJDEP.

Decommissioning activities for UST Nos. 81533-213 thru 223 complied with all applicable Federal, State, and Local laws and ordinances in effect at the date of decommissioning. These laws included but were not limited to N.J.A.C. 7:14B-1 et seq., N.J.A.C. 5:23-1 et seq., and Occupational Safety and Health Administration (OSHA) 1910.146 and 1910.120. All permits including but not limited to the NJDEP-approved Decommissioning/Closure Plan were posted onsite for inspection. The decommissioning activities were conducted by DPW personnel who are registered and certified by the NJDEP for performing UST closure activities. Closure of UST Nos. 81533-213 thru 223 proceeded under the approval of the NJDEP Bureau of Federal Case Management (NJDEP-BFCM). The Standard Reporting Form and signed Site Assessment Summary form for UST Nos. 81533-213 thru 223 are included in Appendices A and B, respectively.

This UST Closure and Site Investigation Report has been prepared by Versar, to assist the U.S. Army DPW in complying with the NJDEP regulations. The applicable NJDEP regulations at the date of closure were the *Interim Closure Requirements for Underground Storage Tank Systems* (N.J.A.C. 7:14B-1 et seq. October 1990 and revisions dated November 1, 1991).

This report was prepared using information collected at the time of closure. Section 1 of this UST Closure and Site Investigation Report provides a summary of the UST decommissioning activities. Section 2 of this report describes the site investigation activities. Conclusions and recommendations, including the results of the soil sampling and groundwater investigation, are presented in the final section of this report.

1.2 SITE DESCRIPTION

Building 296 is located in the Main Post-West area of the Fort Monmouth Army Base. UST Nos. 0081533-213 thru 223 were located south of Building 296. A Site Map is provided as Figure 2.

1.2.1 Geological/Hydrogeological Setting

The following is a description of the geological/hydrogeological setting of the area surrounding Building 296. Included is a description of the regional geology of the area surrounding Fort Monmouth as well as descriptions of the local geology and hydrogeology of the Main Post area.

Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The Main Post, Charles Wood, and the Evans areas are located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands.

In general, New Jersey Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapeczka, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units which are generally thicker to the southeast and reflect a deeper water environment. More than 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand) while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, and Navesink Formations). The individual thicknesses for these units vary greatly (i.e., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line to greater than 6,500 feet in Cape May County (Brown and Zapeczka, 1990).

Local Geology

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post area. The Red Bank sand conformably overlies the Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank sand is a yellowish-gray to reddish brown clayey, medium-to-coarse-grained sand that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark gray to black, medium-to-fine grained sand with abundant clay, mica, and glauconite.

The Tinton sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse-grained feldspathic quartz and glauconite sand to glauconitic coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard).

Hydrogeology

The water table aquifer in the Main Post area is identified as part of the "composite confining units," or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation.

Based on records of wells drilled in the Main Post area, water is typically encountered at depths of 2 to 9 feet below ground surface (bgs). According to Jablonski, wells drilled in the Red Bank and Tinton Sands may produce 2 to 25 gallons per minute (gpm). Some well owners have reported acidic water that requires treatment to remove iron.

Due to the proximity of the Atlantic Ocean to Fort Monmouth, shallow groundwater may be tidally influenced and may flow toward creeks and brooks as the tide goes out, and away from creeks and brooks as the tide comes in. However, an abundance of clay lenses and sand deposits were noted in borings installed throughout Fort Monmouth. Therefore, the direction of shallow groundwater should be determined on a case-by-case basis.

Shallow groundwater is locally influenced within the Main Post area by the following factors:

- tidal influence (based on proximity to the Atlantic Ocean, rivers, and tributaries)
- topography
- nature of the fill material within the Main Post area
- presence of clay and silt lenses in the natural overburden deposits
- local groundwater recharge areas (i.e., streams, lakes)

Due to the fluvial nature of the overburden deposits (i.e., sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. This is consistent with lithologies observed in borings installed within the Main Post area, which primarily consisted of fine-to-medium grained sands, with occasional lenses or laminations of gravel silt and/or clay.

Building 296 is located approximately 600 feet south of Parkers Creek, the nearest surface water. Based on the Main Post topography, the groundwater flow in the area of Building 296 is anticipated to be to the north.

1.3 HEALTH AND SAFETY

Before, during, and after all decommissioning activities, hazards at the work site which may have posed a threat to the Health and Safety of all personnel who were involved with, or were affected by, the decommissioning of the UST system were minimized. All areas which posed or may have been suspected to pose a vapor hazard were monitored by a qualified individual utilizing an organic vapor analyzer (OVA). The individual ascertained if the area was properly vented to render the area safe, as defined by OSHA.

1.4 REMOVAL OF UNDERGROUND STORAGE TANK

1.4.1 General Procedures

- The contractor performing the closure prior to excavation activities identified all underground obstructions (utilities, etc.).
- All activities were carried out with the greatest regard to safety and health and the safeguarding of the environment.
- All excavated soils were visually examined and screened with an Organic Vapor Analyzer (OVA) for evidence of contamination. Potentially contaminated soils were identified and documented during closure activities.
- Surface materials (i.e., asphalt, concrete, etc.) were excavated and staged separately from all soil and recycled in accordance with applicable regulations and laws.
- An NJDEP certified Subsurface Evaluator from the DPW was present during all site assessment activities.

1.4.2 Underground Storage Tank Excavation and Cleaning

Prior to UST decommissioning activities, surficial soil was removed to expose the USTs and associated piping. The USTs were then completely emptied of all liquids and cleaned prior to removal from the excavation. Approximately 10,500 gallons of liquid from the UST and associated piping were transported by Freehold Cartage to the Lionetti Oil Recovery Co., Inc. facility, a NJDEP-approved petroleum recycling and disposal company located in Old Bridge, New Jersey. Refer to Appendix C for the waste manifest.

The USTs were cleaned prior to removal from the excavation in accordance with the NJDEP regulations. After the USTs were removed from the excavation, it was staged on polyethylene sheeting and examined for holes. Numerous holes were observed during the inspection by the Subsurface Evaluator. Soils surrounding the USTs were screened visually and with an OVA for evidence of contamination. Soils were stained and appeared to be contaminated. Groundwater was encountered at 6.0 feet below ground surface and sheen was observed on groundwater.

1.5 UNDERGROUND STORAGE TANK TRANSPORTATION AND DISPOSAL

The tank was transported in compliance with all applicable regulations and laws to Mazza & Sons, Inc. Refer to Appendix D for the UST Disposal Certificate.

The UST was labeled prior to transport with the following information:

- Site of origin

- Contact person
- NJDEP UST Facility ID number
- Former contents
- Destination site
- Date

1.6 MANAGEMENT OF EXCAVATED SOILS

All potentially contaminated soils were stockpiled separately from other excavated material and were placed on and covered with polyethylene sheets. Potentially contaminated soils were transported to the soil staging area. Soils that did not exhibit signs of contamination were used as backfill following the removal of the UST. Groundwater was encountered at 6.0 feet below ground surface and sheen was observed on groundwater.

2.0 SITE INVESTIGATION ACTIVITIES

2.1 OVERVIEW

The Site Investigation was managed and carried out by U.S. Army DPW personnel. All analyses were performed and reported by U.S. Army Fort Monmouth Environmental Laboratory, a NJDEP-certified testing laboratory. All sampling was performed under the direct supervision of a NJDEP Certified Subsurface Evaluator according to the methods described in the NJDEP *Field Sampling Procedures Manual* (1992). Sampling frequency and parameters analyzed complied with the NJDEP document, *Interim Closure Requirements for Underground Storage Tank Systems* (October 1990 and revisions dated November 1, 1991), which was the applicable regulation at the date of the closure. The Fort Monmouth DPW Environmental Office maintains all records of the Site Investigation activities.

The following Parties participated in Closure and Site Investigation Activities:

- Subsurface Evaluator: Charles Appleby
Employer: U.S. Army, Fort Monmouth
Phone Number: (732) 532-0989
NJDEP Certification No.: 002056
- Analytical Laboratory: U.S. Army Fort Monmouth Environmental laboratory
Contact Person: Brian McKee
Phone Number: (908) 532-4359
NJDEP Company Certification No.: 13461
- Hazardous Waste Hauler: Freehold Cartage
Contact Person: David Smith
Phone Number: (908) 462-1001

2.2 FIELD SCREENING/MONITORING

Field screening was performed by a NJDEP Certified Sub-Surface Evaluator using an OVA and visual observations to identify potentially contaminated material. Groundwater was encountered at 6.0 feet below ground surface and sheen was observed on groundwater.

2.3 SOIL SAMPLING

U.S. Army personnel performed the site assessment in accordance with the NJDEP Technical Requirements and the NJDEP Field Sampling Procedures Manual. A summary of sampling activities including parameters analyzed is provided in Table 1. The post-excavation soil samples were collected using NJDEP *Field Sampling Procedures Manual* (1992) standard sampling procedures. Following soil sampling activities, the samples were chilled and delivered to U.S. Army Fort Monmouth Environmental Laboratory located in Fort Monmouth, New Jersey, for analysis. The following soil samples were collected:

- On November 5, 1993, following the removal of the USTs and 130 feet of piping, approximately 16 cubic yards of potentially contaminated soil were removed from the excavation and from the piping trench due to visible contamination. Post-excavation soil samples A thru JJ were collected from thirty-four (34) locations within the UST excavation area and from the piping trench. Each of the samples was analyzed for total petroleum hydrocarbons (TPHC), total solids, lead, and Volatile Organic Compounds (VOCs).
- On November 23, 1993, following the removal of approximately 283 feet of piping, post-excavation soil samples BA thru BV were collected from twenty-two (22) locations along the former piping length of the excavation. Each of the samples was analyzed for TPHC, total solids, lead, and VOCs.
- On December 9, 1993, following the removal of approximately 99 feet of piping, post-excavation soil samples CA thru CJ were collected from nine (9) locations along the former piping length of the excavation. Each of the samples was analyzed for TPHC, total solids, lead, and VOCs.
- On December 29, 1993, following the removal of approximately 70 feet of piping, post-excavation soil samples A thru P were collected from fourteen (14) locations within the piping excavation. Each of the samples was analyzed for lead and VOCs.
- On January 5, 1994, following the removal of approximately 35 feet of piping, post-excavation soil samples Q, R, S, V, W, and X were collected from six (6) locations within the piping excavation. Each of the samples was analyzed for lead and VOCs.

2.4 MONITORING WELL SAMPLING

Groundwater sampling and analysis were performed in accordance with the NJDEP *Field Sampling Procedures Manual*, and the *Technical Requirements for Site Remediation*, N.J.A.C. 7:26E (*Technical Requirements*). The following groundwater samples were collected from monitoring wells at the site (see Table 1).

- Between November 8, 1994, and August 18, 2000, monitoring wells MW-7 and MW-8 were sampled on a quarterly basis. Both wells were analyzed for VOCs calibrated for xylene plus 15 TICs, SVOCs plus 15 TICs, pesticide/PCB, and TAL metals.
- Between November 22, 1995, and August 18, 2000, monitoring wells MW-2, MW-3, and MW-4 were sampled on a quarterly basis. The samples from these wells were analyzed for VOCs calibrated for xylene plus 15 TICs, SVOCs plus 15 TICs, pesticide/PCB, and TAL metals.
- Between November 29, 1994, and August 18, 2000, monitoring wells MW-1 and MW-6 were sampled on a quarterly basis. Both wells were analyzed for VOCs calibrated for xylene plus 15 TICs, SVOCs plus 15 TICs, pesticide/PCB, and TAL metals.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 SOIL SAMPLING RESULTS

To evaluate soil conditions following removal of the USTs and associated piping, eighty-five (85) post-excavation sample results were compared to NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) and Impact to Groundwater Soil Cleanup Criteria (IGWSCC) (N.J.A.C. 7:26D and revisions dated May 12, 1999). Summaries of analytical results for soils are presented in Tables 2 to 4 and the associated soil sampling locations are shown on Figure 3. The analytical data package is provided in Appendix E.

Excavation of potentially contaminated soil from the area surrounding the UST was performed between November 5, 1993, and January 5, 1994. All potentially contaminated soils were stockpiled separately from other excavated material and were placed on and covered with polyethylene sheets. Potentially contaminated soils were transported to the soil staging area.

Analytical results of post-excavation soil samples collected between November 5, 1993, and January 5, 1994, contained either non-detectable concentrations of contaminants or concentrations of contaminants below the NJDEP RDCSCC.

3.2 GROUNDWATER SAMPLING RESULTS

A review of the historical groundwater analytical results indicates that concentrations of benzene, methylene chloride, bis (2-ethylhexyl phthalate), aluminum, iron, lead, manganese, silver, chromium, and sodium have been detected during these sampling events at concentrations that exceed the respective NJDEP GWQS. The methylene chloride and bis (2-ethylhexyl phthalate) detected in the samples are most likely due to laboratory contamination. The groundwater analytical data is summarized in Table 5. The groundwater sampling locations are shown on Figure 4. Refer to Appendix F for the groundwater analytical data package.

3.3 CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results of the post-excavation soil samples collected between November 5, 1993, and January 5, 1994, soil quality at the Building 296 UST closure site does not exceed the NJDEP RDCSCC. Therefore, no further action is warranted.

Based on the analytical results of the groundwater samples collected from the seven monitoring wells, groundwater quality at the Building 296 UST closure site exceeds the New Jersey Groundwater Quality Standard for benzene, aluminum, iron, lead, manganese, silver, chromium, and sodium. Future work to address groundwater quality conditions at Building 296 will be addressed in a Remedial Action Work Plan (RAWP). The RAWP will be recommending long term monitoring natural attenuation.

TABLES

TABLE 1a
SUMMARY OF SAMPLING ACTIVITIES
NOVEMBER 5, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification /Sample Depths	Analytical Parameters	Sample Type	Date Collected
Site A/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site B/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site C/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site D/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site E/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site F/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site G/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site H/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site I/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site J/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site K/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site L/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site M/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site N/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site O/7-7.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site P/7-7.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site Q/7-7.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site R/7-7.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site S/7-7.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site T/7-7.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site U/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site V/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site W/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site X/6-6.5'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site AA/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site BB/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site CC/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site DD/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site EE/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site FF/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site GG/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site HH/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site II/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93
Site JJ/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	11/05/93

Notes:

TPHC- Total Petroleum Hydrocarbons

VOCs- Volatile Organic Compounds

296Table1_complete.xls

TABLE 1b
SUMMARY OF SAMPLING ACTIVITIES
NOVEBER 23, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification /Sample Depths	Analytical Parameters	Sample Type	Date Collected
BA/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BB/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BC/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BD/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BE/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BF/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BG/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BH/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BI/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BJ/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BK/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BL/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BM/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BN/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BO/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BP/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BQ/2.5-3'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BR/2-2.5'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BS/2-2.5'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BT/2-2.5'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BU/2-2.5'	TPHC, VOCs, Lead	Post-Excavation	11/23/93
BV/2-2.5'	TPHC, VOCs, Lead	Post-Excavation	11/23/93

Notes:

TPHC- Total Petroleum Hydrocarbons
VOCs- Volatile Organic Compounds

TABLE 1c
SUMMARY OF SAMPLING ACTIVITIES
DECEMBER 9, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	Analytical Parameters	Sample Type	Date Collected
CA/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CB/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CC/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CD/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CE/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CF/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CG/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CH/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CI/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93
CJ/2.5-3'	TPHC,VOCs,Lead	Post-Excavation	12/09/93

Notes:

TPHC- Total Petroleum Hydrocarbons
VOCs- Volatile Organic Compounds

TABLE 1d
SUMMARY OF SAMPLING ACTIVITIES
DECEMBER 29, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification /Sample Depths	Analytical Parameters	Sample Type	Date Collected
A/3.5-4'	VOCs,Lead	Post-Excavation	12/29/93
B/3.5-4'	VOCs,Lead	Post-Excavation	12/29/93
C/2-2.5'	VOCs,Lead	Post-Excavation	12/29/93
F/3.5-4'	VOCs,Lead	Post-Excavation	12/29/93
G/3.5-4'	VOCs,Lead	Post-Excavation	12/29/93
H/3.5-4'	VOCs,Lead	Post-Excavation	12/29/93
I/3-4'	VOCs,Lead	Post-Excavation	12/29/93
J/1-1.5'	VOCs,Lead	Post-Excavation	12/29/93
K/8"-10"	VOCs,Lead	Post-Excavation	12/29/93
L/8"-10"	VOCs,Lead	Post-Excavation	12/29/93
M/8"-10"	VOCs,Lead	Post-Excavation	12/29/93
N/3-3.5'	VOCs,Lead	Post-Excavation	12/29/93
O/3-3.8'	VOCs,Lead	Post-Excavation	12/29/93
P/3-3.5'	VOCs,Lead	Post-Excavation	12/29/93

Notes:

TPHC- Total Petroleum Hydrocarbons
VOCs- Volatile Organic Compounds

TABLE 1e
SUMMARY OF SAMPLING ACTIVITIES
JANUARY 5, 1994
Fort Monmouth, Main Post
Site 296

Sample Identification /Sample Depths	Analytical Parameters	Sample Type	Date Collected
Q/2.5-3'	VOCs,Lead	Post-Excavation	01/05/94
R/2.5-3'	VOCs,Lead	Post-Excavation	01/05/94
S/2.5-3'	VOCs,Lead	Post-Excavation	01/05/94
V/2.5-3'	VOCs,Lead	Post-Excavation	01/05/94
W/2.5-3'	VOCs,Lead	Post-Excavation	01/05/94
X/2.5-3'	VOCs,Lead	Post-Excavation	01/05/94

Notes:

TPHC- Total Petroleum Hydrocarbons
VOCs- Volatile Organic Compounds

TABLE 2a
SOIL ANALYTICAL RESULTS FOR TPHC
NOVEBER 5, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	TPHC	Total Solid	NJDEP Cleanup Criteria for TPHC (mg/kg)	Date Collected
Site A	9.58	84	10,000	11/05/93
Site B	4.78	83	10,000	11/05/93
Site C	9.25	87	10,000	11/05/93
Site D	12.4	87	10,000	11/05/93
Site E	7.2	74	10,000	11/05/93
Site F	8.46	79	10,000	11/05/93
Site G	10.9	86	10,000	11/05/93
Site H	10.9	86	10,000	11/05/93
Site I	7.5	71	10,000	11/05/93
Site J	11.2	84	10,000	11/05/93
Site K	9.93	81	10,000	11/05/93
Site L	10.4	90	10,000	11/05/93
Site M	ND	84	10,000	11/05/93
Site N	7.96	84	10,000	11/05/93
Site O	18.8	86	10,000	11/05/93
Site P	6.34	84	10,000	11/05/93
Site Q	ND	76	10,000	11/05/93
Site R	6.2	86	10,000	11/05/93
Site S	11.2	84	10,000	11/05/93
Site T	7.96	84	10,000	11/05/93
Site U	32.2	84	10,000	11/05/93
Site V	9.46	85	10,000	11/05/93
Site W	7.77	86	10,000	11/05/93
Site X	9.3	86	10,000	11/05/93
Site AA	64.8	87	10,000	11/05/93
Site BB	43.2	91	10,000	11/05/93
Site CC	201	87	10,000	11/05/93
Site DD	8.46	79	10,000	11/05/93
Site EE	21.7	87	10,000	11/05/93
Site FF	47.7	88	10,000	11/05/93
Site GG	27.7	88	10,000	11/05/93
Site HH	39.6	82	10,000	11/05/93
Site II	20.4	86	10,000	11/05/93
Site JJ	39.8	85	10,000	11/05/93

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

TPHC- Total Petroleum Hydrocarbons

ND- Not detected

TABLE 2b
SOIL ANALYTICAL RESULTS FOR TPHC
NOVEMBER 23, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	TPHC	Total Solid	NJDEP Cleanup Criteria for TPHC (mg/kg)	Date Collected
BA	7.7	92	10,000	11/23/93
BB	ND	92	10,000	11/23/93
BC	8.83	83	10,000	11/23/93
BD	64.8	84	10,000	11/23/93
BE	23.9	88	10,000	11/23/93
BF	ND	91	10,000	11/23/93
BG	ND	88	10,000	11/23/93
BH	ND	87	10,000	11/23/93
BI	31.8	93	10,000	11/23/93
BJ	79.4	90	10,000	11/23/93
BK	ND	93	10,000	11/23/93
BL	ND	93	10,000	11/23/93
BM	ND	96	10,000	11/23/93
BN	ND	89	10,000	11/23/93
BO	21	90	10,000	11/23/93
BP	41.6	99	10,000	11/23/93
BQ	ND	97	10,000	11/23/93
BR	3.65	97	10,000	11/23/93
BS	195	98	10,000	11/23/93
BT	ND	98	10,000	11/23/93
BU	ND	98	10,000	11/23/93
BV	354	98	10,000	11/23/93

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

TPHC- Total Petroleum Hydrocarbons

ND- Not detected

TABLE 2c
SOIL ANALYTICAL RESULTS FOR TPHC
DECEMBER 9, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	TPHC	Total Solid	NJDEP Cleanup Criteria for TPHC (mg/kg)	Date Collected
CA	18.1	98	10,000	12/09/93
CB	97.5	98	10,000	12/09/93
CC	31.7	97	10,000	12/09/93
CD	7.61	97	10,000	12/09/93
CE	11.6	97	10,000	12/09/93
CF	317	98	10,000	12/09/93
CG	166	96	10,000	12/09/93
CH	53.4	94	10,000	12/09/93
CI	3,340	96	10,000	12/09/93
CJ	686	96	10,000	12/09/93

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

TPHC- Total Petroleum Hydrocarbons

ND- Not detected

TABLE 3a
SOIL ANALYTICAL RESULTS FOR DETECTED VOLATILES ORGANIC COMPOUNDS
NOVEMBER 5, 1993
Fort Monmouth, Main Post
Site 296

Detected Volatile Organic Compounds	Site C	Site G	Site H	Site I	Site K	NJDEP RDCSCC
Acetone	ND	0.0087 J	0.0089 J	0.04	0.026	1,000
# of TICs	6	0	0	0	0	1,000
TIC Concentration (total)	0.035	ND	ND	ND	ND	

Detected Volatile Organic Compounds	Site M	Site O	Site P	Site Q	Site U	NJDEP RDCSCC
Acetone	0.10 J	0.2	0.10 J	0.26 B	0.016	1,000
2-Butanone	ND	0.029	ND	0.034 J	ND	1,000
# of TICs	0	8	0	0	0	1,000
TIC Concentration (total)	ND	0.082	ND	ND	ND	

Detected Volatile Organic Compounds	Site AA	Site BB	Site CC	Site DD	Site JJ	NJDEP RDCSCC
Benzene	0.11	ND	ND	ND	ND	3
Toluene	0.36	ND	ND	ND	ND	1,000
Ethylbenzene	0.16	ND	ND	ND	ND	1,000
Xylenes (total)	0.5	ND	ND	ND	ND	410
Acetone	ND	0.075	0.11	0.062	0.0059 JB	1,000
2-Butanone	ND	ND	0.018	0.0086 J	ND	1,000
# of TICs	20	0	0	5	0	1,000
TIC Concentration (total)	7.18	ND	ND	0.049	ND	

Notes:

- All results reported in milligrams per kilogram (mg/kg).
- NJDEP- New Jersey Department of Environmental Protection
RDCSCC- Residential Direct Contact Soil Cleanup Criteria
IGWSCC- Impact to Ground water Soil Cleanup Criteria
TIC- Tentatively identified compound
J- Estimated concentration
B- Compound detected in blank
ND- Not detected
NA- Not applicable

TABLE 3b
SOIL ANALYTICAL RESULTS FOR DETECTED VOLATILES ORGANIC COMPOUNDS
NOVEMBER 23,1993
Fort Monmouth, Main Post
Site 296

Detected Volatile Organic Compounds	BA	BB	BC	BD	BE	NJDEP RDCSCC
Acetone	0.095	0.14	0.034	0.054	0.11	1,000
2-Butanone	0.013 J	0.015	0.066 J	0.098 J	0.022	1,000
Xylenes (total)	0.37	ND	ND	ND	ND	410
# of TICs	20	0	0	0	0	1,000
TIC Concentration (total)	2.872	ND	ND	ND	ND	

Detected Volatile Organic Compounds	BF	BG	BH	BI	BJ	NJDEP RDCSCC
Acetone	0.11	0.14	0.11	0.081	0.13	1,000
2-Butanone	0.018	0.017	0.017	0.0069 J	0.016	1,000
# of TICs	0	0	0	0	0	1,000
TIC Concentration (total)	ND	ND	ND	ND	ND	

Detected Volatile Organic Compounds	BK	BL	BM	BN	BO	NJDEP RDCSCC
Acetone	0.096	0.1	0.081	0.029	0.0026 J	1,000
2-Butanone	0.022	0.015	0.017	ND	ND	1,000
# of TICs	0	0	0	0	0	1,000
TIC Concentration (total)	ND	ND	ND	ND	ND	

Detected Volatile Organic Compounds	BP	BQ	BR	BS	BT	NJDEP RDCSCC
Acetone	0.15	0.3	0.2	0.094	0.075	1,000
2-Butanone	0.036	0.023	0.026	0.0083 J	0.0072 J	1,000
# of TICs	0	0	0	0	0	1,000
TIC Concentration (total)	ND	ND	ND	ND	ND	

Detected Volatile Organic Compounds	BU	BV	NJDEP RDCSCC	NJDEP IGWSCC
Acetone	0.2	0.24	1,000	100
2-Butanone	0.016	0.038	1,000	50
# of TICs	0	5	1,000	1,000
TIC Concentration (total)	ND	0.042		

Notes:

- All results reported in milligrams per kilogram (mg/kg).
- NJDEP- New Jersey Department of Environmental Protection
RDCSCC- Residential Direct Contact Soil Cleanup Criteria
IGWSCC- Impact to Ground water Soil Cleanup Criteria
TIC- Tentatively identified compound
J- Estimated concentration
ND- Not detected
NA- Not applicable

TABLE 3c
SOIL ANALYTICAL RESULTS FOR DETECTED VOLATILES ORGANIC COMPOUNDS
DECEMBER 9, 1993
Fort Monmouth, Main Post
Site 296

Detected Volatile Organic Compounds	CA	CB	CC	CD	CE	NJDEP RDCSCC
Acetone	0.016 B	0.015 B	0.010 JB	0.012 B	0.013 B	1,000
Toluene	ND	ND	ND	ND	0.0043 J	1,000
Xylenes (total)	ND	ND	ND	ND	0.002 J	410
# of TICs	0	0	0	0	0	1,000
TIC Concentration (total)	ND	0.437	ND	ND	ND	

Detected Volatile Organic Compounds	CF	CG	CH	CI	CJ	NJDEP RDCSCC
Acetone	0.020 B	0.014 B	0.015 B	0.76 JB	ND	1,000
Xylenes (total)	0.0031	ND	0.014 J	0.48 J	2.1	410
# of TICs	20	12	19	20	20	1,000
TIC Concentration (total)	0.174	0.113	1.218	170.1	187.4	

Notes:

- All results reported in milligrams per kilogram (mg/kg).
- NJDEP- New Jersey Department of Environmental Protection
RDCSCC- Residential Direct Contact Soil Cleanup Criteria
IGWSCC- Impact to Ground water Soil Cleanup Criteria
TIC- Tentatively identified compound
J- Estimated concentration
B- Compound detected in blank
ND- Not detected
NA- Not applicable

TABLE 3e
SOIL ANALYTICAL RESULTS FOR DETECTED VOLATILES ORGANIC COMPOUNDS
JANUARY 5, 1994
Fort Monmouth, Main Post
Site 296

Detected Volatile Organic Compounds	Q	R	S	NJDEP RDCSCC	NJDEP IGWSCC
Acetone	0	ND	ND	1,000	100
Methylene Chloride	0.003 J	0	0	49	1
Xylenes (total)	ND	0.0026 J	ND	410	10
# of TICs	0	0	0	1,000	1,000
TIC Concentration (total)	ND	ND	ND		

Detected Volatile Organic Compounds	V	W	X	NJDEP RDCSCC	NJDEP IGWSCC
Acetone	0.060 B	0.046 B	0.28 B	1,000	100
Methylene Chloride	0	0	0	49	1
# of TICs	0	0	0	1,000	1,000
TIC Concentration (total)	ND	ND	ND		

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

NJDEP- New Jersey Department of Environmental Protection

RDCSCC- Residential Direct Contact Soil Cleanup Criteria

IGWSCC- Impact to Ground water Soil Cleanup Criteria

TIC- Tentatively identified compound

J- Estimated concentration

B- Compound detected in blank

ND- Not detected

NA- Not applicable

TABLE 4a
SOIL ANALYTICAL RESULTS FOR LEAD
NOVEMBER 5, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	Total Lead	NJDEP RDCSCC (mg/kg)	Date Collected
Site A	28.3	400	11/05/93
Site B	14.1	400	11/05/93
Site C	33.3	400	11/05/93
Site D	60.7	400	11/05/93
Site E	ND	400	11/05/93
Site F	ND	400	11/05/93
Site G	ND	400	11/05/93
Site H	22.4	400	11/05/93
Site I	ND	400	11/05/93
Site J	20.7	400	11/05/93
Site K	ND	400	11/05/93
Site L	33.6	400	11/05/93
Site M	ND	400	11/05/93
Site N	15.9	400	11/05/93
Site O	14.9	400	11/05/93
Site P	13.5	400	11/05/93
Site Q	25.0	400	11/05/93
Site R	21.2	400	11/05/93
Site S	17.5	400	11/05/93
Site T	33.8	400	11/05/93
Site U	23.4	400	11/05/93
Site V	56.4	400	11/05/93
Site W	28.6	400	11/05/93
Site X	32.1	400	11/05/93
Site AA	13.0	400	11/05/93
Site BB	ND	400	11/05/93
Site CC	78.0	400	11/05/93
Site DD	61.1	400	11/05/93
Site EE	42.9	400	11/05/93
Site FF	89.3	400	11/05/93
Site GG	22.4	400	11/05/93
Site HH	29.5	400	11/05/93
Site II	21.2	400	11/05/93
Site JJ	46.7	400	11/05/93

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

RDCSCC- Residential Direct Contact Soil Cleanup Criteria.

ND- Not detected

TABLE 4b
SOIL ANALYTICAL RESULTS FOR LEAD
NOVEMBER 23, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	Total Lead	NJDEP RDCSCC (mg/kg)	Date Collected
BA	20.5	400	11/23/93
BB	ND	400	11/23/93
BC	16.4	400	11/23/93
BD	30.2	400	11/23/93
BE	21.2	400	11/23/93
BF	ND	400	11/23/93
BG	21.4	400	11/23/93
BH	27.4	400	11/23/93
BI	15.3	400	11/23/93
BJ	15.7	400	11/23/93
BK	20.5	400	11/23/93
BL	ND	400	11/23/93
BM	ND	400	11/23/93
BN	20.1	400	11/23/93
BO	22.8	400	11/23/93
BP	108.0	400	11/23/93
BQ	25.0	400	11/23/93
BR	26.2	400	11/23/93
BS	22.8	400	11/23/93
BT	34.4	400	11/23/93
BU	ND	400	11/23/93
BV	57.0	400	11/23/93

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

RDCSCC- Residential Direct Contact Soil Cleanup Criteria.

ND- Not detected

TABLE 4d
SOIL ANALYTICAL RESULTS FOR LEAD
DECEMBER 29, 1993
Fort Monmouth, Main Post
Site 296

Sample Identification	Total Lead	NJDEP RDCSCC (mg/kg)	Date Collected
A	ND	400	12/29/93
B	ND	400	12/29/93
C	ND	400	12/29/93
F	ND	400	12/29/93
G	ND	400	12/29/93
H	ND	400	12/29/93
I	ND	400	12/29/93
J	ND	400	12/29/93
K	ND	400	12/29/93
L	237.0	400	12/29/93
M	87.0	400	12/29/93
N	26.9	400	12/29/93
O	16.1	400	12/29/93
P	ND	400	12/29/93

Notes:

1. All results reported in milligrams per kilogram (mg/kg).

RDCSCC- Residential Direct Contact Soil Cleanup Criteria.

ND- Not detected

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Acetone	Lead	Methylene Chloride	di-n-Butyl phthalate	Butyl benzyl phthalate	bis(2-Ethyl hexyl phthalate)	Aluminum	Iron	Manganese	Chromium	Silver	Sodium
UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA:		700	10	2	900	100	30	200	300	50	100	20	50000
296MW01	11/29/94	ND	26.5	--	--	--	--	--	--	--	--	--	--
296MW01	06/16/97	ND	ND	ND	82.7	27.8	5.12	758	4570	163	ND	27	23640
296MW01	08/18/97	ND	ND	5.18	ND	ND	ND	543	20850	144	13	ND	22160
296MW01	11/17/97	ND	12	ND	ND	ND	ND	466	3079	107	1.0	ND	17700
296MW01	02/27/98	ND	ND	ND	ND	ND	ND	1388	16820	138	3.3	ND	20150
296MW01	05/18/98	ND	2.5	ND	ND	ND	ND	913	13690	146	ND	ND	22780
296MW01	08/21/98	ND	2.92	ND	ND	ND	ND	940	17900	125	3.29	ND	16600
296MW01	12/02/98	ND	2.42	ND	ND	ND	ND	1050	8910	117	5.65	ND	16700
296MW01	02/19/99	ND	2.99	ND	ND	ND	ND	587	6640	142	3.26	ND	23000
296MW01	06/25/99	ND	ND	ND	ND	ND	ND	786	6030	179	2.81	ND	24700
296MW01	09/20/99	ND	7.72	ND	ND	ND	ND	445	4810	166	2.37	ND	17500
296MW01	12/27/99	ND	ND	ND	ND	ND	ND	642	6660	140	1.35	ND	23100
296MW01	03/23/00	ND	ND	ND	ND	ND	ND	441	3210	154	1.07	ND	17100
296MW01	06/28/00	ND	20.5	ND	ND	ND	ND	601	4560	198	4.02	ND	21900
296MW01	08/18/00	ND	4.43	ND	ND	ND	ND	412	7730	172	1.32	ND	15900
296MW01	08/18/00 D	13.71	3.69	ND	ND	ND	ND	428	7880	178	1.56	ND	16100

Note:

Gray shading indicates exceedance of New Jersey Ground Water Quality Criteria (GWQC) defined in NJAC 7:9-6.

Abbreviations:

MW: Monitoring Well.
 ND: Not Detected.
 ug/L: Micrograms per liter.
 D: Value from dilution.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Acetone	2-Butanone	Lead	di-n-Butyl phthalate	Butyl benzyl phthalate	bis(2-Ethyl hexyl phthalate)	Fluorene	Fluoranthene	Pyrene	Benzo (a) anthracene	Chrysene	Benzo (b) fluoranthene	Benzo (k) fluoranthene
UNITS		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA		700	300	10	900	100	30	300	300	200	20	20	10	2
296MW02	11/22/95	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	06/16/97	ND	ND	ND	11.4	5.8	8.5	ND	ND	ND	ND	ND	ND	ND
296MW02	08/18/97	ND	ND	27	ND	ND	19.98	1.88	3.53	5.34	1.82	2.02	1.18	1.42
296MW02	11/17/97	ND	ND	30	1.53	ND	2.12	ND	ND	ND	ND	ND	ND	ND
296MW02	02/27/98	ND	ND	836	ND	ND	16.57	ND	2.29	5.14	1.49	2.88	1.00	1.09
296MW02	05/18/98	ND	ND	16.5	ND	ND	1.37	ND	ND	ND	ND	ND	ND	ND
296MW02	08/21/98	11.21	1.9	31.8	ND	ND	3.37	ND	ND	1.49	ND	ND	ND	ND
296MW02	12/02/98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	02/19/99	ND	ND	4.72	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	06/25/99	ND	ND	16.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	09/20/99	ND	ND	12.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	12/27/99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	03/23/00	ND	ND	6.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	06/28/00	ND	ND	28.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	6/28/00 D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
296MW02	08/18/00	22.86	ND	7.74	ND	ND	3.72	ND	ND	ND	ND	ND	ND	ND

Note:

Gray shading indicates exceedance of New Jersey
Ground Water Quality Criteria (GWQC) defined in NJAC
7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.
D: Value from dilution.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Benzo (a) pyrene	Aluminum	Iron	Manganese	Chromium	Silver	Sodium
UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA:		20	200	300	50	100	20	50000
296MW02	11/22/95	ND	-	-	-	-	--	--
296MW02	06/16/97	ND	560	2690	93	ND	27	29600
296MW02	08/18/97	2.22	564	17530	155	27	ND	37170
296MW02	11/17/97	ND	3690	12920	44	46	ND	12750
296MW02	02/27/98	1.59	171900	4166	682	1344	ND	22710
296MW02	05/18/98	ND	16740	33910	107	112	ND	38310
296MW02	08/21/98	ND	27400	54900	75.8	236	ND	4960
296MW02	12/02/98	ND	9440	20100	26.4	82.7	ND	544
296MW02	02/19/99	ND	2110	6970	256	18	ND	84500
296MW02	06/25/99	ND	18500	38500	63.3	146	ND	19100
296MW02	09/20/99	ND	10600	31900	42.5	119	ND	9990
296MW02	12/27/99	ND	2780	12100	75.1	22.5	ND	29200
296MW02	03/23/00	ND	5270	11800	166	30.8	ND	121000
296MW02	06/28/00	ND	1250	13000	192	10.4	ND	179000
296MW02	6/28/00 D	ND	464	8990	113	5.53	ND	8180
296MW02	08/18/00	ND	4550	13100	46.8	42.1	ND	10900

Note:

Gray shading indicates exceedance of New Jersey
Ground Water Quality Criteria (GWQC) defined in
NJAC 7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.
D: Value from dilution.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Acetone	2-Butanone	Lead	di-n-Butyl phthalate	bis(2-Ethyl hexyl phthalate)	Aluminum	Iron	Manganese	Chromium	Silver	Sodium
UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA:		700	300	10	900	30	200	300	50	100	20	50000
0296MW03	11/22/95	ND	ND	ND	ND	ND	-	-	-	-	-	-
0296MW03	6/16/97	ND	ND	ND	1.26	ND	14	12500	19	ND	27	34000
0296MW03	8/19/97	ND	ND	2.2	ND	ND	643	5160	38	119	ND	37000
0296MW03	11/18/97	ND	ND	9.0	3.63	ND	1583	5446	20	13.7	ND	25170
0296MW03	2/26/98	ND	ND	15	1.15	1.16	1458	14030	121	13.7	ND	134400
0296MW03	5/18/98	ND	ND	6.0	ND	ND	6698	12940	25.1	28.4	ND	16650
0296MW03	8/21/98	6.18	ND	2.80	ND	ND	4550	16600	25.4	42.6	ND	21100
0296MW03	12/2/98	ND	ND	ND	ND	ND	828	4070	15.3	10.4	ND	20700
0296MW03	2/19/99	ND	ND	2.75	ND	ND	876	2810	17.4	8.65	ND	15800
0296MW03	6/25/99	ND	4.92	ND	ND	ND	1700	6680	32.0	17.9	ND	23200
0296MW03	9/20/99	ND	ND	ND	ND	ND	1390	3610	16.5	9.63	ND	18600
0296MW03	12/27/99	ND	ND	ND	ND	ND	503	2180	20.4	5.91	ND	19300
0296MW03	3/23/00	ND	ND	ND	ND	ND	352	450	29.4	ND	ND	10400
0296MW03	6/28/00	ND	ND	2.39	ND	ND	244	452	40.3	2.83	ND	32600
0296MW03	8/18/00	7.65	ND	2.37	ND	ND	336	162	84.6	0.747	ND	19600

Note:

Gray shading indicates exceedance of New Jersey
Ground Water Quality Criteria (GWQC) defined in
NJAC 7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Acetone	Lead	Benzene	Toluene	di-n-Butyl phthalate	Aluminum	Iron	Manganese	Chromium	Silver	Sodium
UNITS		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA		700	10	1	1000	900	200	300	50	100	20	50000
0296MW04	11/22/95	ND	5.7	2.5	2.3	ND	-	-	-	-	-	-
0296MW04	6/16/97	ND	ND	3.06	1.27	3.51	66	9400	85	ND	34	187000
0296MW04	8/19/97	ND	10.5	ND	2.76	1.17	499	79700	2384	112	8	204000
0296MW04	11/18/97	ND	11	ND	ND	1.92	309	18160	384	2.9	ND	598900
0296MW04	2/26/98	ND	ND	ND	ND	2.95	1294	3816	27.8	9.4	ND	36550
0296MW04	5/18/98	ND	8.5	ND	ND	ND	1065	16120	259	4.0	ND	53300
0296MW04	8/21/98	13.32	ND	ND	ND	ND	386	39700	630	5.23	ND	1310000
0296MW04	12/2/98	3.21	8.94	3.34	ND	ND	339	31200	961	16.1	ND	682000
0296MW04	2/19/99	ND	10.4	ND	ND	ND	1080	21300	261	17.6	ND	786000
0296MW04	6/25/99	7.63	3.60	2.36	1.19	ND	352	27500	637	8.19	ND	1560000
0296MW04	9/20/99	ND	3.74	ND	ND	ND	325	42000	1160	9.82	ND	2840000
0296MW04	12/27/99	ND	11.8	ND	ND	ND	925	22800	126	15.0	ND	402000
0296MW04	3/23/00	ND	6.75	ND	ND	ND	2040	22800	256	26.3	ND	218000
0296MW04	6/28/00	ND	5.37	ND	ND	ND	627	8490	75.1	14.1	ND	174000
0296MW04	8/18/00	11.79	2.70	3.28	ND	ND	57.8	9180	184	9.25	ND	315000

Note:

Gray shading indicates exceedance of New Jersey Ground Water Quality Criteria (GWQC) defined in NJAC 7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Acenaphthene	Acetone	Lead	Benzene	Toluene	Pyridine	di-n-Butyl phthalate	Butyl benzyl phthalate	bis(2-Ethyl hexyl phthalate)	Naphthalene
UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA:		NLE	700	10	1	1000	NLE	900	100	30	NLE
0296MW06	11/29/94	ND	ND	5.1	12	ND	ND	ND	ND	ND	ND
0296MW06	11/22/95	ND	ND	-	24	1.1	ND	-	-	-	-
0296MW06	6/16/97	ND	ND	ND	ND	ND	ND	31	4.3	ND	19
0296MW06	8/19/97	ND	ND	1.5	ND	ND	ND	ND	ND	ND	6.83
0296MW06	11/18/97	ND	ND	8.0	ND	ND	189	2.85	ND	ND	96.26
0296MW06	2/26/98	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.95
0296MW06	5/18/98	ND	ND	ND	29.18	ND	ND	ND	ND	2.56	7.79
0296MW06	8/21/98	ND	10.51	ND	ND	ND	ND	ND	ND	ND	4.92
0296MW06	12/2/98	ND	ND	ND	9.45	ND	ND	ND	ND	ND	ND
0296MW06	2/19/99	ND	ND	2.47	ND	ND	ND	ND	ND	ND	ND
0296MW06	6/25/99	1.46	ND	ND	ND	ND	ND	ND	ND	ND	1.59
0296MW06	9/20/99	2.12	ND	ND	ND	ND	ND	ND	ND	ND	ND
0296MW06	12/27/99	2.50	ND	ND	1.40	ND	ND	ND	ND	ND	ND
0296MW06	3/23/00	1.62	ND	ND	ND	ND	ND	ND	ND	ND	12.01
0296MW06	6/28/00	2.50	ND	12.8	ND	ND	ND	ND	ND	ND	ND
0296MW06	8/18/00	3.83	7.68	2.10	ND	ND	ND	ND	ND	ND	ND

Note:

Gray shading indicates exceedance of New Jersey
Ground Water Quality Criteria (GWQC) defined in
NJAC 7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.
NLE: No limit established.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	2-Methyl naphthalene	Dibenzofuran	Fluorene	Phenanthrene	Fluoranthene	Pyrene	Benzo (a) anthracene	4- Nitrophenol	Anthracene	Chrysene
UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA:		NLE	NLE	300	NLE	300	200	20	NLE	2000	20
0296MW06	11/29/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
0296MW06	11/22/95	-	-	-	-	-	-	-	-	-	-
0296MW06	6/16/97	12	8.1	10	12	3.4	2.9	1.0	ND	ND	1.4
0296MW06	8/19/97	5.67	8.32	10.58	7.73	4.96	2.31	ND	15.64	2.48	ND
0296MW06	11/18/97	62.29	26.84	29.40	30.89	4.69	2.96	ND	ND	30.02	ND
0296MW06	2/26/98	2.06	1.03	1.24	1.29	ND	ND	ND	ND	ND	ND
0296MW06	5/18/98	ND	4.57	5.57	6.95	2.09	1.36	ND	ND	1.43	ND
0296MW06	8/21/98	ND	4.47	ND	ND	ND	ND	ND	ND	ND	ND
0296MW06	12/2/98	ND	5.38	5.49	5.96	1.90	1.22	ND	ND	ND	ND
0296MW06	2/19/99	ND	2.20	3.18	3.61	3.24	1.93	ND	ND	1.24	ND
0296MW06	6/25/99	1.26	2.38	2.62	2.89	1.19	ND	ND	ND	ND	ND
0296MW06	9/20/99	ND	2.94	3.49	2.24	ND	ND	ND	ND	ND	ND
0296MW06	12/27/99	ND	3.47	3.78	1.53	ND	ND	ND	ND	ND	ND
0296MW06	3/23/00	ND	1.60	1.83	ND	ND	ND	ND	ND	ND	ND
0296MW06	6/28/00	ND	3.85	4.63	1.61	ND	ND	ND	ND	ND	ND
0296MW06	8/18/00	ND	4.36	6.58	4.53	2.17	1.56	ND	ND	ND	ND

Note:

Gray shading indicates exceedance of New Jersey
Ground Water Quality Criteria (GWQC) defined in NJAC
7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.
NLE: No limit established.

TABLE 5

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
BUILDING NO. 296
FORT MONMOUTH, NEW JERSEY

Well	Sample Date	Acetone	Lead	Methylene Chloride	di-n-Butyl phthalate	Butyl benzyl phthalate	bis(2-Ethyl hexyl phthalate)	Aluminum	Iron	Manganese	Chromium	Silver	Sodium
UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
NJDEP CRITERIA:		700	10	2	900	100	30	200	300	50	100	20	50000
0296MW08	11/8/94	ND	7.3	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
0296MW08	11/22/95	ND	ND	0.6	83	28	5.1	758	4570	163	ND	27	23600
0296MW08	11/22/95	ND	ND	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
0296MW08	6/16/97	ND	ND	ND	44	3.0	ND	1400	16000	88	ND	28	38000
0296MW08	8/18/97	ND	ND	ND	ND	ND	ND	255	17560	83	41	ND	41020
0296MW08	11/17/97	ND	18	ND	1.17	ND	ND	10260	9311	66	3.9	ND	31720
0296MW08	2/27/98	ND	37	ND	ND	ND	3.42	11740	30280	107	36	ND	25340
0296MW08	5/18/98	ND	6.8	ND	ND	ND	ND	7276	26310	75.4	ND	ND	24130
0296MW08	8/21/98	5.96	15.9	ND	ND	ND	ND	17800	56500	89.2	31.2	ND	20300
0296MW08	12/2/98	ND	4.78	ND	ND	ND	ND	1770	24100	75.3	1.89	ND	33900
0296MW08	2/19/99	ND	7.01	ND	ND	ND	ND	1900	12800	85.6	6.00	ND	35400
0296MW08	6/25/99	ND	2.95	ND	ND	ND	ND	1580	17200	51.5	5.29	ND	20500
0296MW08	9/20/99	ND	2.93	ND	ND	ND	ND	682	3260	31.4	2.81	ND	26000
0296MW08	12/27/99	ND	2.35	ND	ND	ND	ND	1270	9940	65.9	2.91	ND	34400
0296MW08	3/23/00	ND	ND	ND	ND	ND	ND	1080	11900	72.3	3.93	ND	28400
0296MW08	6/28/00	ND	17.7	ND	ND	ND	ND	1540	26000	77.6	6.57	ND	30600
0296MW08	8/18/00	8.56	15.9	ND	ND	ND	ND	2100	18000	59.6	3.42	ND	15800

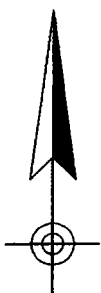
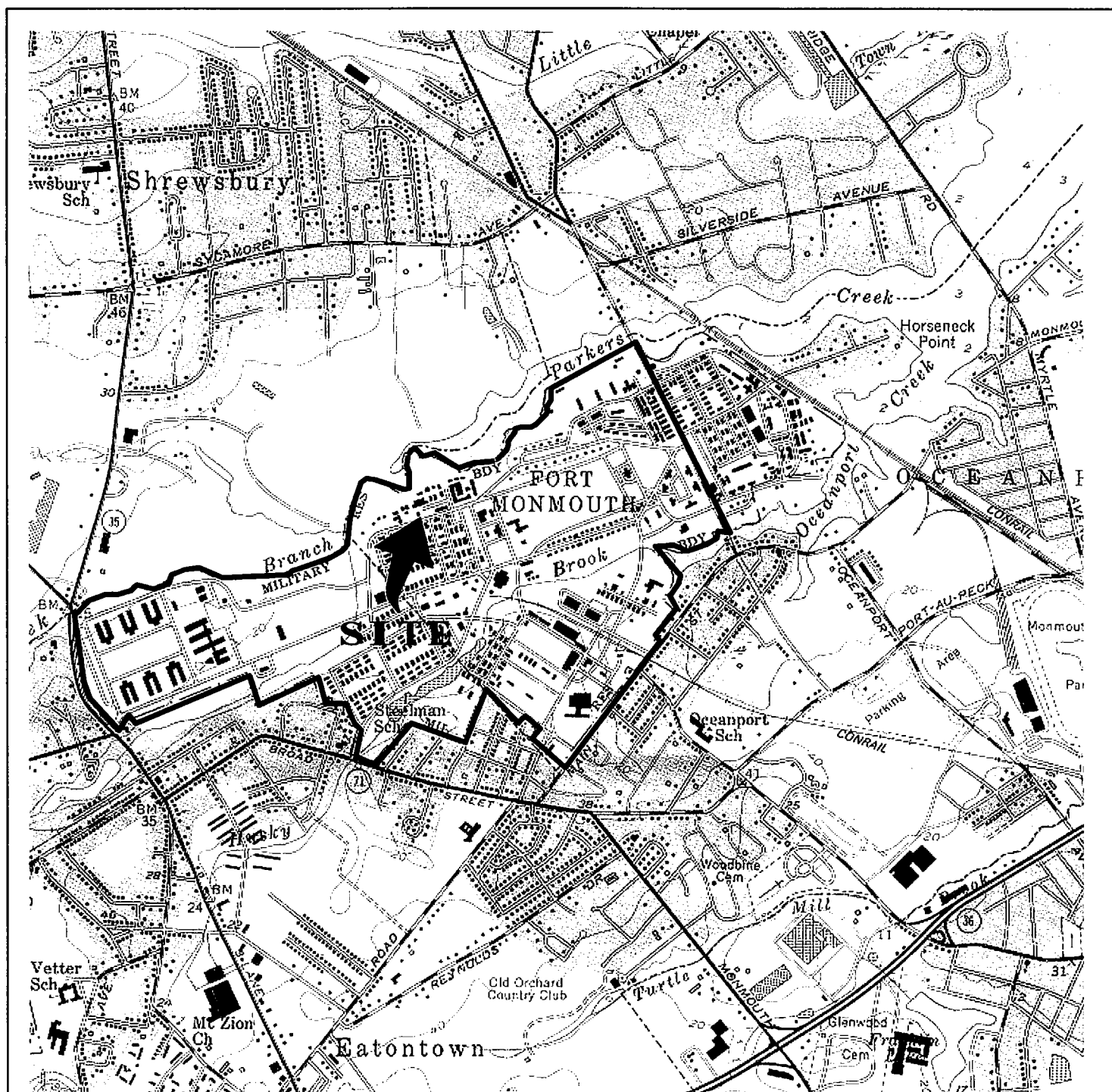
Note:

Gray shading indicates exceedance of New Jersey Ground Water Quality Criteria (GWQC) defined in NJAC 7:9-6.

Abbreviations:

MW: Monitoring Well.
ND: Not Detected.
ug/L: Micrograms per liter.

FIGURES



LONG BRANCH, N. J.
40073-C8-TF-024

1954
PHOTOREVISED 1981
DMA 6164 I SE-SERIES V822



QUADRANGLE LOCATION

FIGURE 1

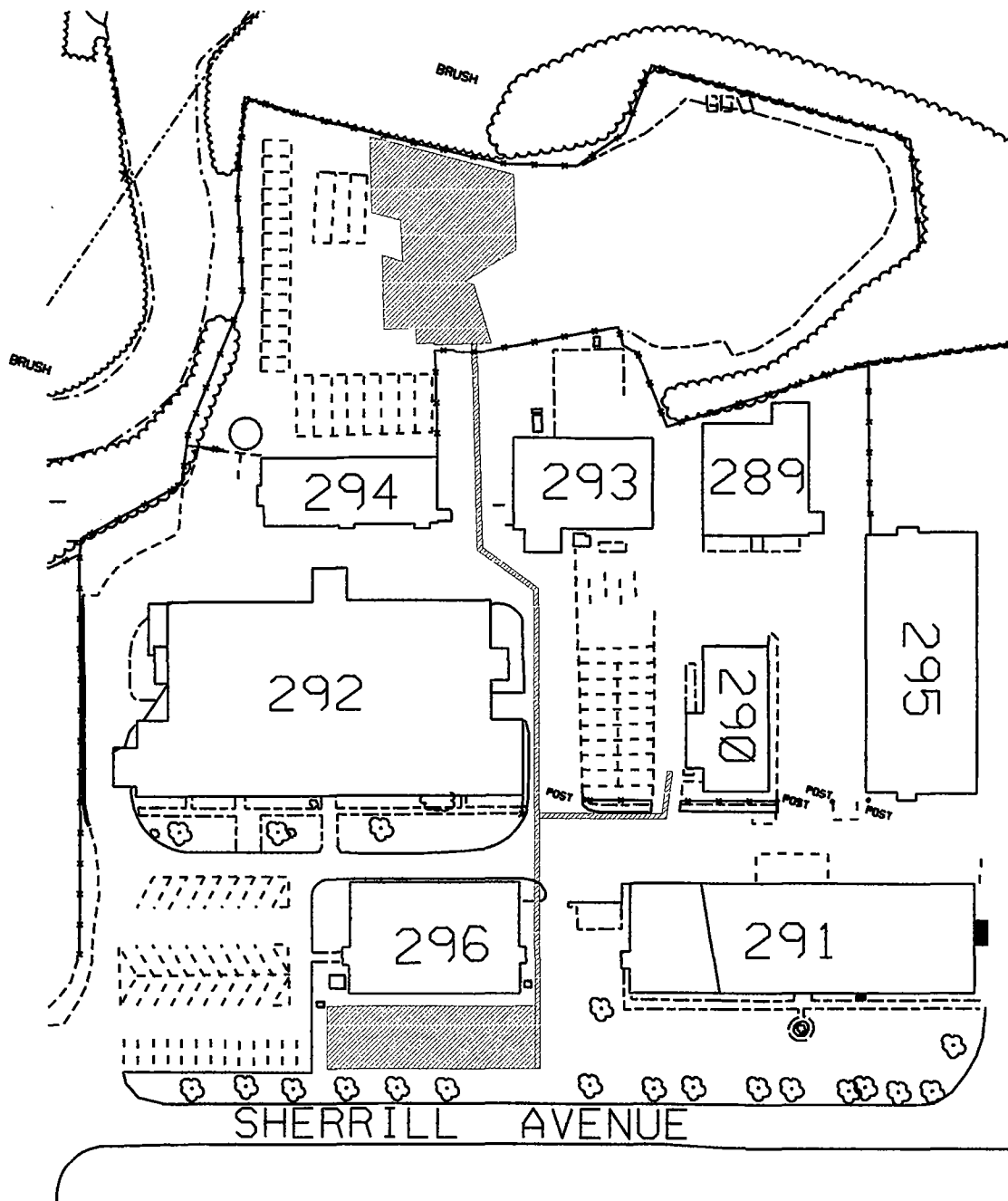
LOCATION MAP
Building 296
Main-Post West
Fort Monmouth Army Base
Monmouth County, NJ

VERSAR
Engineers, Managers, Scientists, & Planners
Bristol, PA

Scale: 1" = 2000'

Date: Nov., 1993

Mapped, edited and published by the Geological Survey



LEGEND

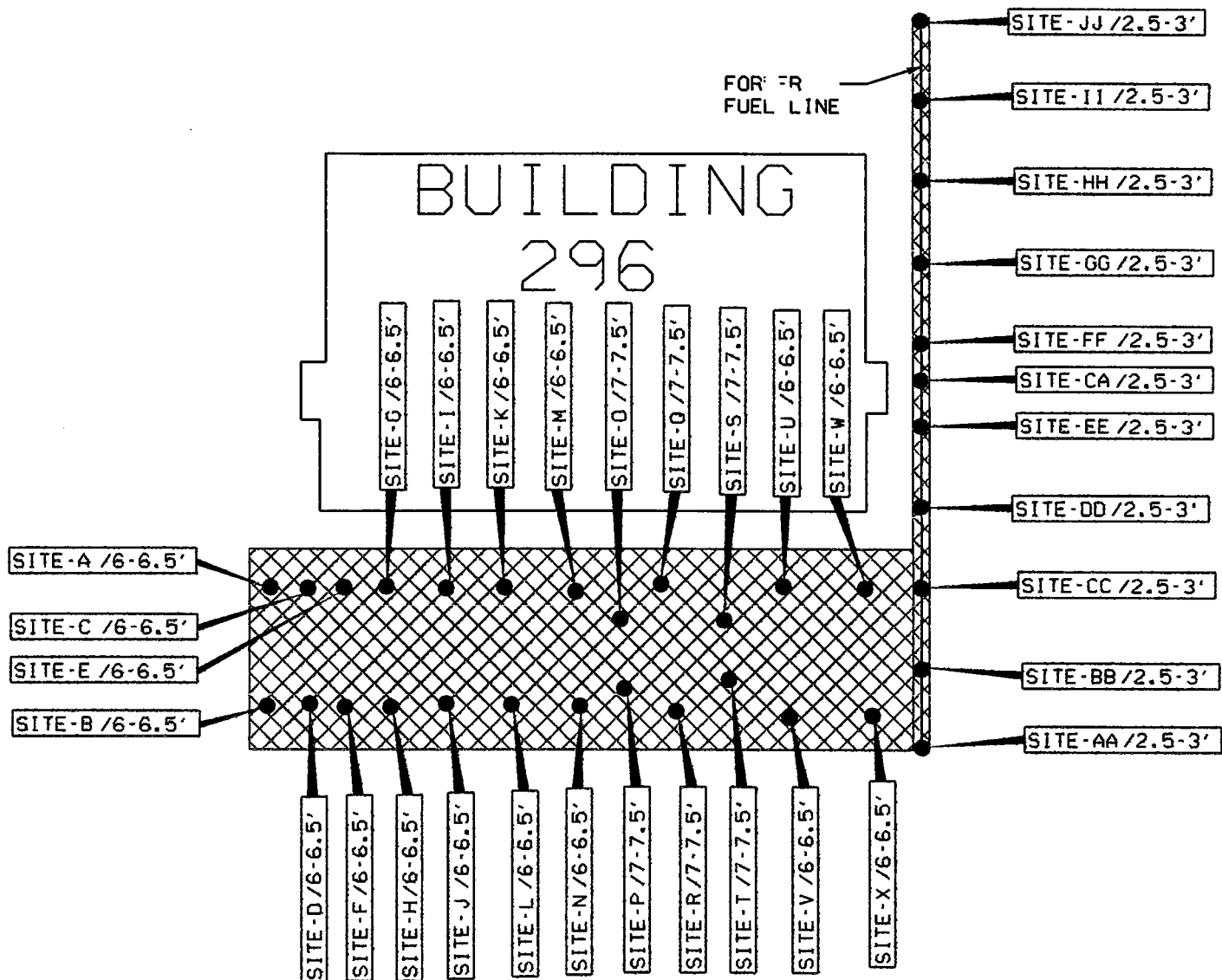
 LIMIT OF EXCAVATION

FIGURE 2
SITE MAP
BUILDING 296
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1" = 100'

DATE: NOV. 1993



LEGEND

● SOIL SAMPLE LOCATION
(NOVEMBER 5, 1993)

● SOIL SAMPLE LOCATION
(DECEMBER 9, 1993)

▨ LIMIT OF EXCAVATION
(NOVEMBER 5, 1993)

SITE-A /6-6.5' SAMPLE ID WITH DEPTH
OF SAMPLE (FEET BGS)

NOTES:

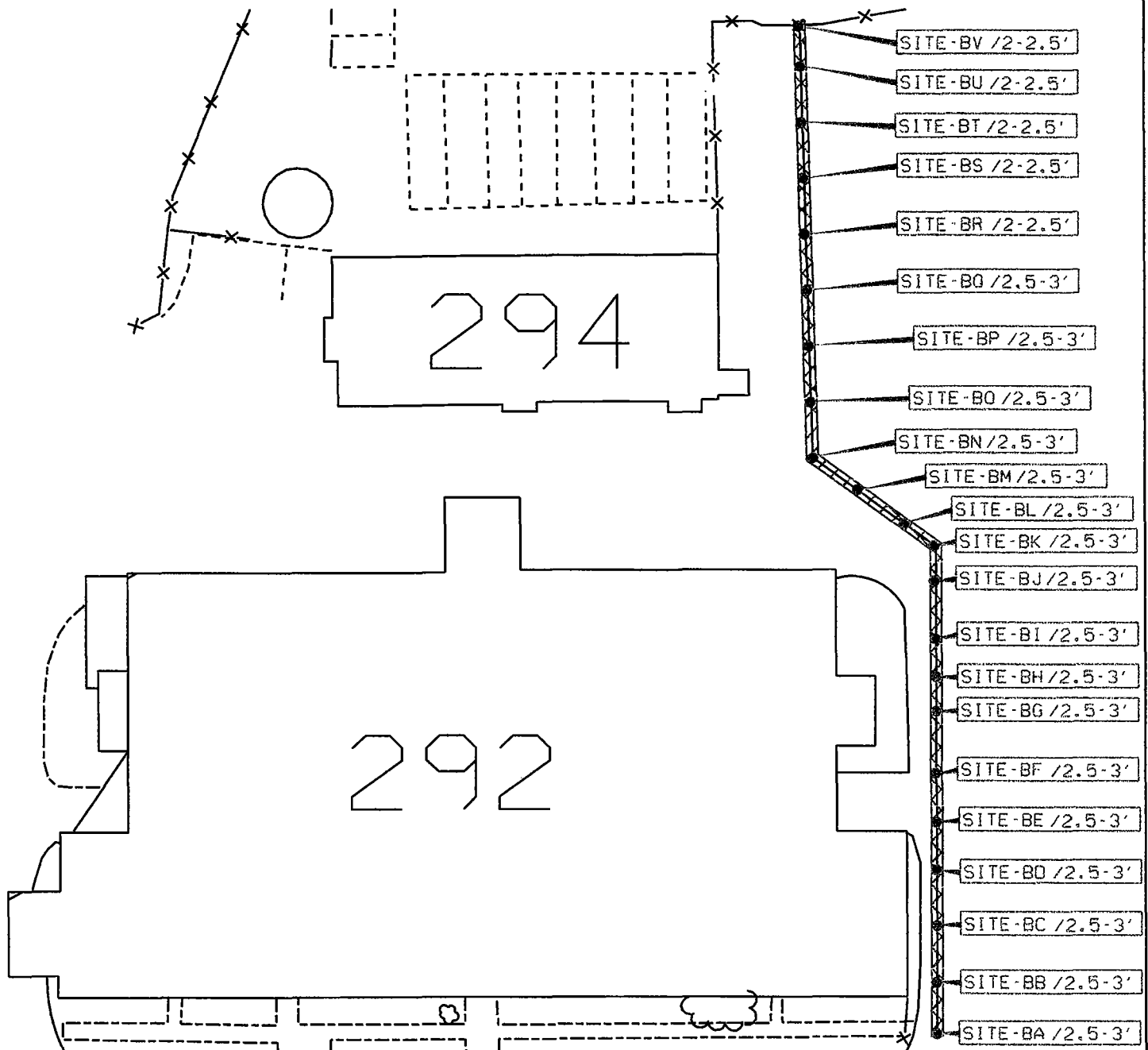
1. SEE TABLE 2 FOR THE TPHC RESULTS.
2. SEE TABLE 3 FOR THE VOC RESULTS.
3. SEE TABLE 4 FOR THE LEAD RESULTS.
4. BGS = BELOW GROUND SURFACE

FIGURE 3A
SOIL SAMPLING LOCATION MAP
BUILDING 296
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1" = 30'

DATE: NOV. 1993



LEGEND



SOIL SAMPLE LOCATION
(NOVEMBER 23, 1993)



LIMIT OF EXCAVATION
(NOVEMBER 23, 1993)

SITE-BA / 2.5-3'

SAMPLE ID WITH
DEPTH (FEET BGS)

NOTES:

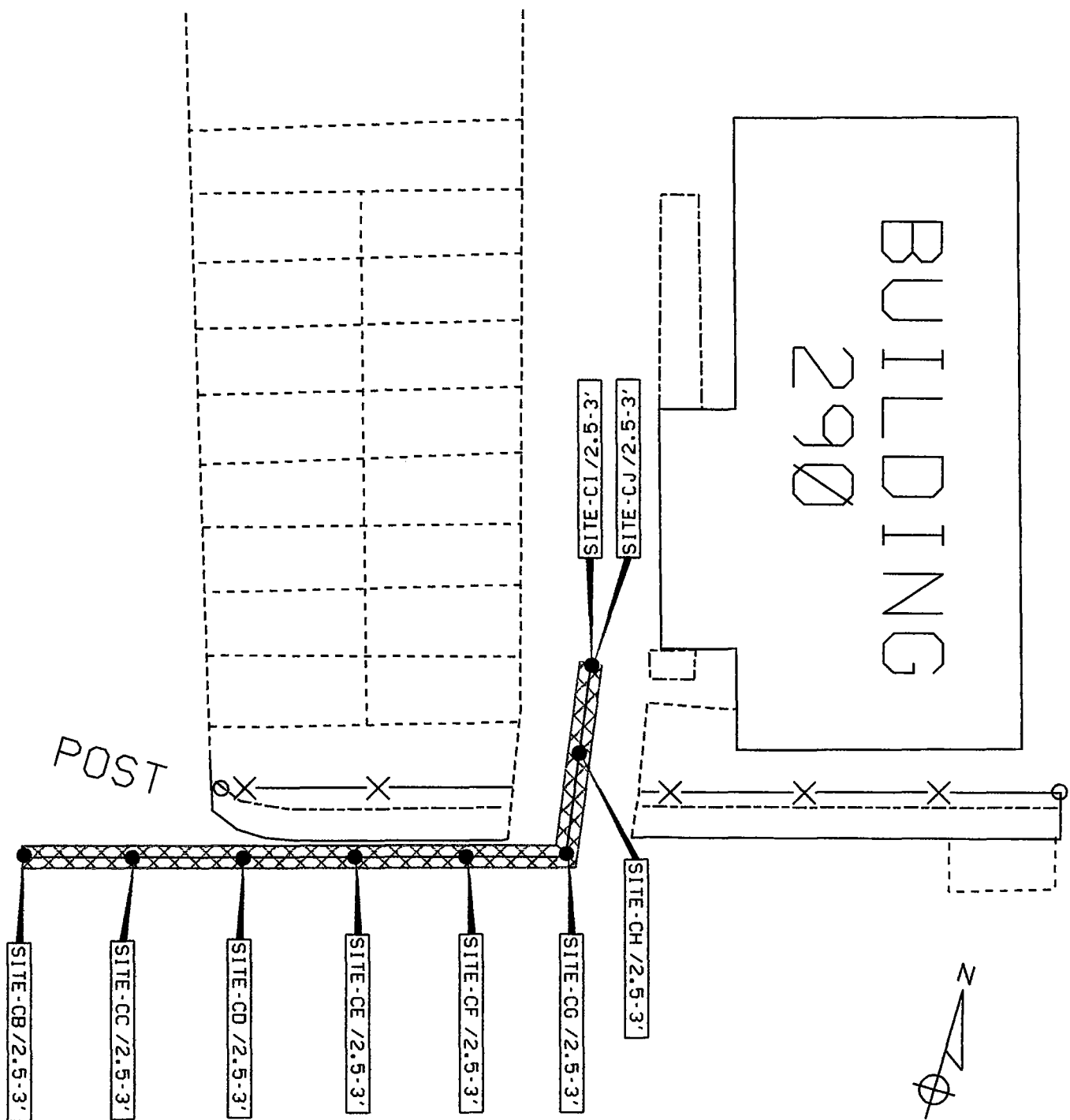
1. SEE TABLE 2 FOR THE TPHC RESULTS.
2. SEE TABLE 3 FOR THE VOC RESULTS.
3. SEE TABLE 4 FOR THE LEAD RESULTS.
4. BGS = BELOW GROUND SURFACE

FIGURE 3B
SOIL SAMPLING LOCATION MAP
BUILDING 296
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1" = 40'

DATE: NOV. 1993



LEGEND

● SOIL SAMPLE LOCATION
(DECEMBER 9, 1993)

▤ LIMIT OF EXCAVATION
(DECEMBER 9, 1993)

SITE-CB/2.5-3' SAMPLE ID WITH DEPTH
OF SAMPLE (FEET BGS)

NOTES:

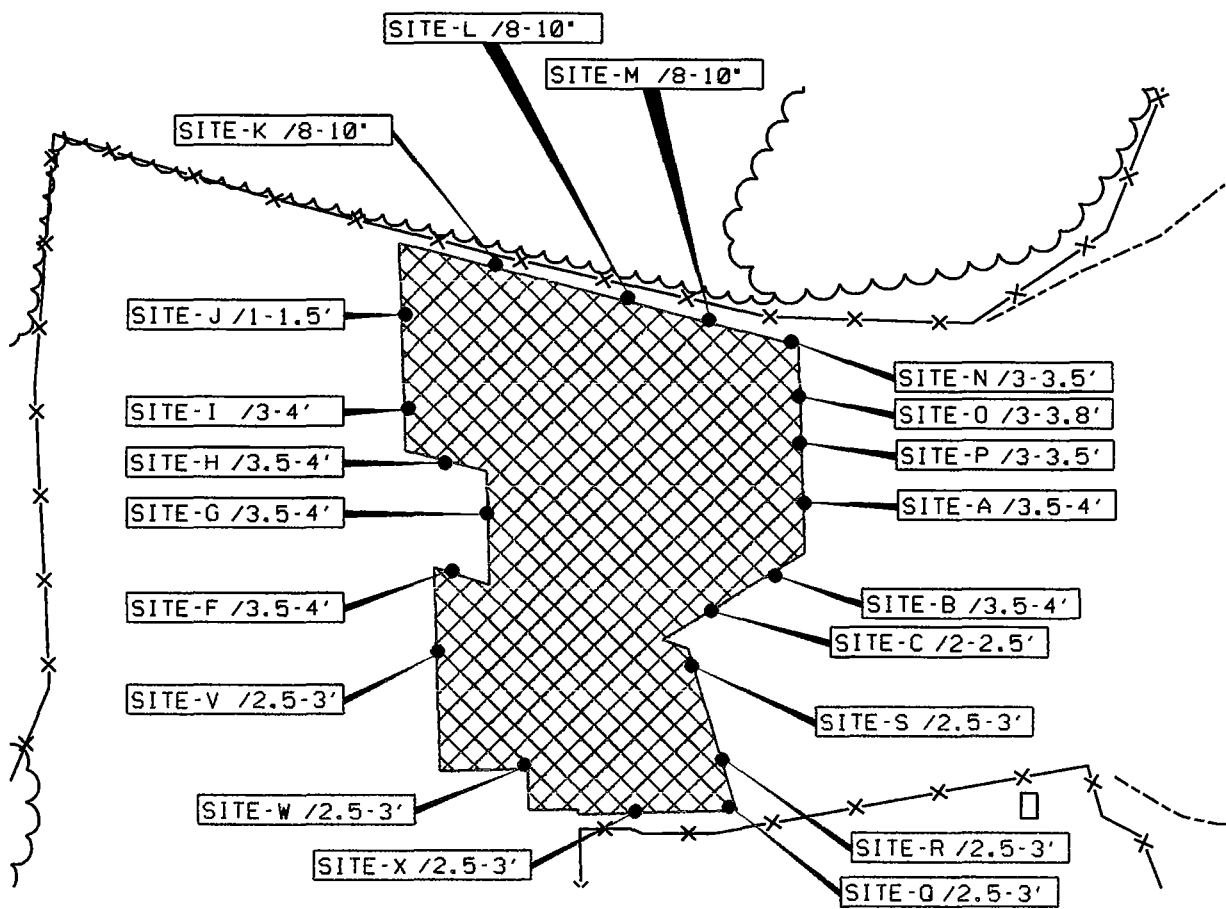
1. SEE TABLE 2 FOR THE TPHC RESULTS.
2. SEE TABLE 3 FOR THE VOC RESULTS.
3. SEE TABLE 4 FOR THE LEAD RESULTS.
4. BGS = BELOW GROUND SURFACE

FIGURE 3C
SOIL SAMPLING LOCATION MAP
BUILDING 296
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1" = 20'

DATE: NOV. 1993



LEGEND

● SOIL SAMPLE LOCATION
(DECEMBER 29, 1993)

● SOIL SAMPLE LOCATION
(JANUARY 5, 1994)

▨ LIMIT OF EXCAVATION
(JANUARY 5, 1994)

SITE-Q /2.5-3' SAMPLE ID WITH DEPTH
OF SAMPLE (FEET BGS)

NOTES:

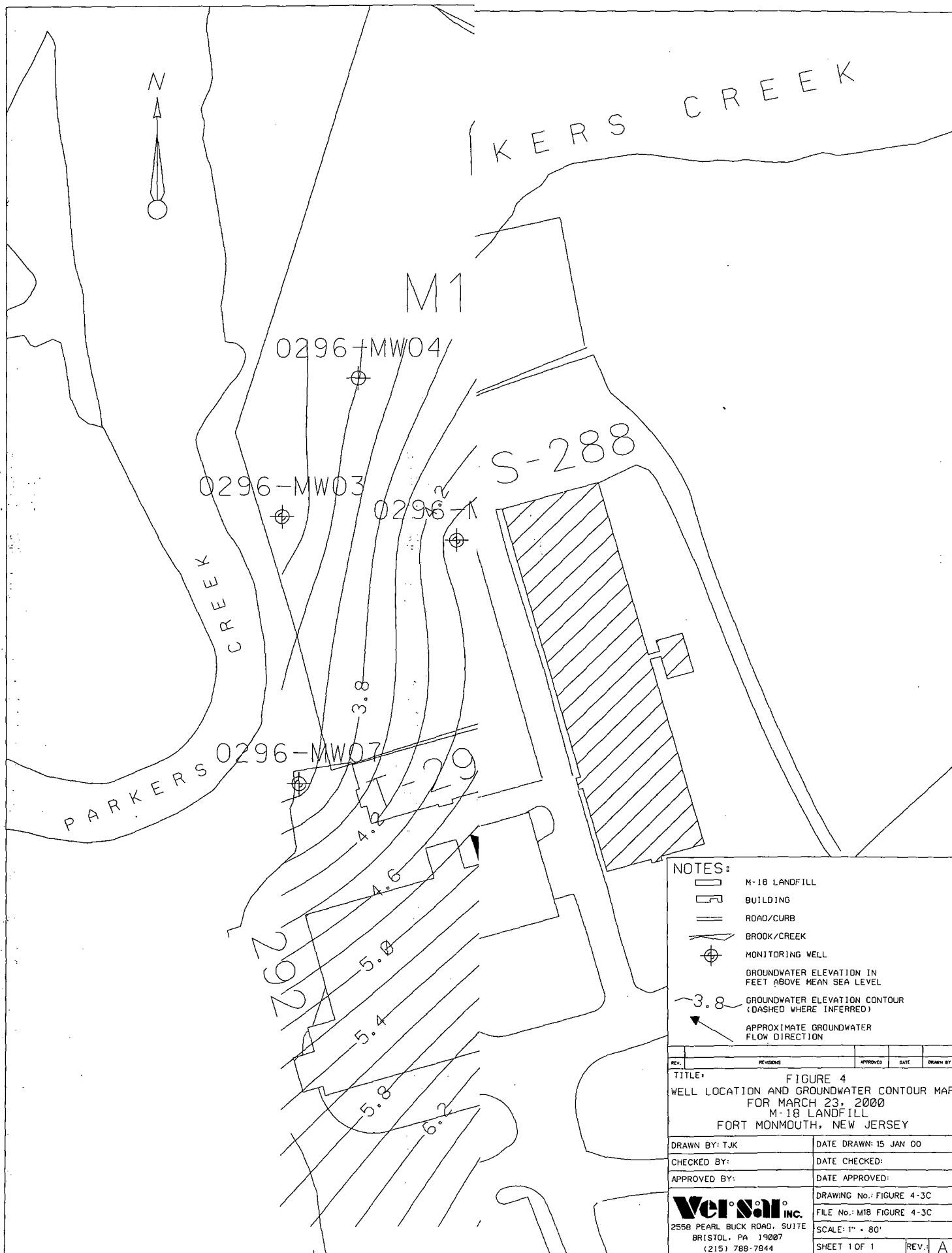
1. SEE TABLE 3 FOR THE VOC RESULTS.
2. SEE TABLE 4 FOR THE LEAD RESULTS.
3. BGS = BELOW GROUND SURFACE

FIGURE 3D
SOIL SAMPLING LOCATION MAP
BUILDING 296
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1" = 40'

DATE: NOV. 1993



ATTACHMENT F

Comparison of FTMM-54 Soil Sampling Results with Standards and Criteria

TABLE 4.1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP AND USEPA STANDARDS AND CRITERIA
SITE FTMM-54
FORT MONMOUTH, NEW JERSEY

Analyte			Volatile Organic Compounds (VOCs)									
			Acetone mg/kg	Benzene mg/kg	Ethyl benzene mg/kg	Methyl ethyl ketone mg/kg	Methylene chloride mg/kg	Toluene mg/kg	Total Xylenes mg/kg	Total TIC, Volatile mg/kg	Total Petroleum Hydrocarbons ⁽⁵⁾⁽⁶⁾ mg/kg	Lead mg/kg
Standards and Screening Criteria												
NJDEP Residential Direct Contact Soil Remediation Standards ⁽¹⁾			70000	2	7800	3100	34	6300	12000	NLE	5100	400
NJDEP Non-Residential Direct Contact Soil Remediation Standards			NLE	5	110000	44000	97	91000	170000	NLE	54000	800
NJDEP Impact to Ground Water Screening Level ⁽²⁾			19	0.005	13	0.9	0.01	7	19	NLE	NLE	90
USEPA RSL Residential ⁽³⁾			6100	1.1	5.4	2800	36	500	63	NLE	NLE	400
USEPA RSL Industrial			63000	5.4	27	20000	310	4500	270	NLE	NLE	800
USEPA RSL Groundwater Protection (Risk-based)			0.24	0.0002	0.0015	0.1	0.0022	0.059	0.019	NLE	NLE	NLE
Weston (1995) Maximum Background (Main Post) ⁽⁴⁾			NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	19.5
	Sample Depth Interval (ft bgs)											
Location		Sample Date										
A1	5-5.5	11/16/93	--	--	--	--	--	--	--	--	60.4	--
B1	5-5.5	11/16/93	--	--	--	--	--	--	--	--	178	--
C1	0.5-1	11/16/93	--	--	--	--	--	--	--	--	14.4	--
D1	5-5.5	11/16/93	--	--	--	--	--	--	--	--	9.67	--
E1	0.5-1	11/16/93	--	--	--	--	--	--	--	--	8.91	--
F1	0.5-1	11/16/93	--	--	--	--	--	--	--	--	8.81	--
G1 ⁽⁶⁾	3.5-4	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
H1 ⁽⁶⁾	3.5-4	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
I1 ⁽⁶⁾	3-4	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
J1 ⁽⁶⁾	1-1.5	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
K1 ⁽⁶⁾	0.7-0.8	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
L1 ⁽⁶⁾	0.7-0.8	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	23.7
M1 ⁽⁶⁾	0.7-0.8	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	8.7
N1 ⁽⁶⁾	3-3.5	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	26.9
O1 ⁽⁶⁾	3-3.8	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	16.1
P1 ⁽⁶⁾	3-3.5	12/29/93	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
Q1 ⁽⁶⁾	2.5-3	1/5/94	ND	ND	ND	ND	0.003 J	ND	ND	ND	--	10.0 U

TABLE 4.1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP AND USEPA STANDARDS AND CRITERIA
SITE FTMM-54
FORT MONMOUTH, NEW JERSEY

Analyte			Volatile Organic Compounds (VOCs)									
			Acetone mg/kg	Benzene mg/kg	Ethyl benzene mg/kg	Methyl ethyl ketone mg/kg	Methylene chloride mg/kg	Toluene mg/kg	Total Xylenes mg/kg	Total TIC, Volatile mg/kg	Total Petroleum Hydrocarbons ⁽⁵⁾⁽⁶⁾ mg/kg	Lead mg/kg
Standards and Screening Criteria												
NJDEP Residential Direct Contact Soil Remediation Standards ⁽¹⁾			70000	2	7800	3100	34	6300	12000	NLE	5100	400
NJDEP Non-Residential Direct Contact Soil Remediation Standards			NLE	5	110000	44000	97	91000	170000	NLE	54000	800
NJDEP Impact to Ground Water Screening Level ⁽²⁾			19	0.005	13	0.9	0.01	7	19	NLE	NLE	90
USEPA RSL Residential ⁽³⁾			6100	1.1	5.4	2800	36	500	63	NLE	NLE	400
USEPA RSL Industrial			63000	5.4	27	20000	310	4500	270	NLE	NLE	800
USEPA RSL Groundwater Protection (Risk-based)			0.24	0.0002	0.0015	0.1	0.0022	0.059	0.019	NLE	NLE	NLE
Weston (1995) Maximum Background (Main Post) ⁽⁴⁾			NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	19.5
	Sample Depth Interval (ft bgs)											
Location		Sample Date										
R1 ⁽⁶⁾	2.5-3	1/5/94	ND	ND	ND	ND	ND	ND	0.0026 J	ND	--	10.0 U
S1 ⁽⁶⁾	2.5-3	1/5/94	ND	ND	ND	ND	ND	ND	ND	ND	--	10.0 U
A2	6-6.5	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	9.58	28.3
AA	2.5-3	11/5/93	0.059 U	0.11	0.16	0.059 U	0.010 J	0.36	0.5	7.18	64.8	13
B2	6-6.5	11/5/93	0.013 U	0.006 U	0.006 U	0.013 U	0.006 U	0.006 U	0.012 U	ND	4.78	14.1
BA	2.5-3	11/23/93	0.095	0.028 U	0.028 U	0.013 J	0.010 J	0.028 U	0.37	2.872	7.7	20.5
BB	2.5-3	11/5/93	0.075	0.006 U	0.006 U	0.011 U	0.006 U	0.006 U	0.012 U	ND	43.2	10.0 U
BC	2.5-3	11/23/93	0.034	0.006 U	0.006 U	0.0066 J	0.002 J	0.006 U	0.012 U	ND	8.83	16.4
BD	2.5-3	11/23/93	0.052	0.006 U	0.006 U	0.098 J	0.002 J	0.006 U	0.012 U	ND	64.8	30.2
BE	2.5-3	11/23/93	0.11	0.006 U	0.006 U	0.022	0.006 U	0.006 U	0.012 U	ND	23.9	21.2
BF	2.5-3	11/23/93	0.11	0.006 U	0.006 U	0.018	0.006 U	0.006 U	0.012 U	ND	ND	10.0 U
BG	2.5-3	11/23/93	0.14	0.006 U	0.006 U	0.017	0.006 U	0.006 U	0.012 U	ND	ND	21.4
BH	2.5-3	11/23/93	0.11	0.006 U	0.006 U	0.017	0.006 U	0.006 U	0.012 U	ND	ND	27.4
BI	2.5-3	11/23/93	0.081	0.005 U	0.005 U	0.0069 J	0.005 U	0.005 U	0.01 U	ND	31.8	15.3
BJ	2.5-3	11/23/93	0.13	0.006 U	0.006 U	0.016	0.006 U	0.006 U	0.012 U	ND	79.4	15.7
BK	2.5-3	11/23/93	0.096	0.005 U	0.005 U	0.022	0.005 U	0.005 U	0.01 U	ND	ND	20.5
BL	2.5-3	11/23/93	0.1	0.005 U	0.005 U	0.015	0.005 U	0.005 U	0.01 U	ND	ND	10.0 U
BM	2.5-3	11/23/93	0.081	0.005 U	0.005 U	0.017	0.005 U	0.005 U	0.01 U	ND	ND	10.0 U

TABLE 4.1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP AND USEPA STANDARDS AND CRITERIA
SITE FTMM-54
FORT MONMOUTH, NEW JERSEY

Analyte			Volatile Organic Compounds (VOCs)									
			Acetone mg/kg	Benzene mg/kg	Ethyl benzene mg/kg	Methyl ethyl ketone mg/kg	Methylene chloride mg/kg	Toluene mg/kg	Total Xylenes mg/kg	Total TIC, Volatile mg/kg	Total Petroleum Hydrocarbons ⁽⁵⁾⁽⁶⁾ mg/kg	Lead mg/kg
Standards and Screening Criteria												
NJDEP Residential Direct Contact Soil Remediation Standards ⁽¹⁾			70000	2	7800	3100	34	6300	12000	NLE	5100	400
NJDEP Non-Residential Direct Contact Soil Remediation Standards			NLE	5	110000	44000	97	91000	170000	NLE	54000	800
NJDEP Impact to Ground Water Screening Level ⁽²⁾			19	0.005	13	0.9	0.01	7	19	NLE	NLE	90
USEPA RSL Residential ⁽³⁾			6100	1.1	5.4	2800	36	500	63	NLE	NLE	400
USEPA RSL Industrial			63000	5.4	27	20000	310	4500	270	NLE	NLE	800
USEPA RSL Groundwater Protection (Risk-based)			0.24	0.0002	0.0015	0.1	0.0022	0.059	0.019	NLE	NLE	NLE
Weston (1995) Maximum Background (Main Post) ⁽⁴⁾			NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	19.5
	Sample Depth Interval											
Location	(ft bgs)	Sample Date										
BN ⁽⁶⁾	2.5-3	11/23/93	0.029	ND	ND	ND	ND	ND	ND	ND	ND	20.1
BO	2.5-3	11/23/93	0.0026 J	0.006 U	0.006 U	0.011 U	0.006 U	0.006 U	0.012 U	ND	21	22.8
BP	2.5-3	11/23/93	0.15	0.006 U	0.006 U	0.036	0.006 U	0.006 U	0.012 U	ND	41.6	108
BQ ⁽⁶⁾	2.5-3	11/23/93	0.3	ND	ND	0.023	ND	ND	ND	ND	ND	25
BR ⁽⁶⁾	2-2.5	11/23/93	0.2	ND	ND	0.026	ND	ND	ND	ND	3.65	26.2
BS	2-2.5	11/23/93	0.094	0.006 U	0.006 U	0.0083 J	0.006 U	0.006 U	0.012 U	ND	195	22.8
BT	2-2.5	11/23/93	0.075	0.006 U	0.006 U	0.0072 J	0.0022 J	0.006 U	0.012 U	ND	ND	34.4
BU	2-2.5	11/23/93	0.2	0.006 U	0.006 U	0.016	0.0025 J	0.006 U	0.012 U	ND	ND	10.0 U
BV	2-2.5	11/23/93	0.24	0.006 U	0.006 U	0.038	0.0039 J	0.006 U	0.012 U	0.042	354	57
C2	6-6.5	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	0.035	9.25	33.3
CA ⁽⁶⁾	2.5-3	12/9/93	0.016 B	ND	ND	ND	ND	ND	ND	ND	18.1	10.0 U
CB ⁽⁶⁾	2.5-3	12/9/93	0.015 B	ND	ND	ND	ND	ND	ND	0.437	97.5	10.0 U
CC	2.5-3	11/5/93	0.11	0.006 U	0.006 U	0.018	0.006 U	0.006 U	0.012 U	ND	232.7	78
CD ⁽⁶⁾	2.5-3	12/9/93	0.012 B	ND	ND	ND	ND	ND	ND	ND	7.61	10.0 U
CE ⁽⁶⁾	2.5-3	12/9/93	0.013 B	ND	ND	ND	ND	0.0043 J	0.002 J	ND	11.6	10.0 U
CF ⁽⁶⁾	2.5-3	12/9/93	0.02 B	ND	ND	ND	ND	ND	0.0031	0.174	317	10.0 U
CG ⁽⁶⁾	2.5-3	12/9/93	0.014 B	ND	ND	ND	ND	ND	ND	0.113	166	10.0 U
CH ⁽⁶⁾	2.5-3	12/9/93	0.015 B	ND	ND	ND	ND	ND	0.014 J	1.218	53.4	10.0 U

TABLE 4.1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP AND USEPA STANDARDS AND CRITERIA
SITE FTMM-54
FORT MONMOUTH, NEW JERSEY

Analyte			Volatile Organic Compounds (VOCs)									
			Acetone mg/kg	Benzene mg/kg	Ethyl benzene mg/kg	Methyl ethyl ketone mg/kg	Methylene chloride mg/kg	Toluene mg/kg	Total Xylenes mg/kg	Total TIC, Volatile mg/kg	Total Petroleum Hydrocarbons ⁽⁵⁾⁽⁶⁾ mg/kg	Lead mg/kg
Standards and Screening Criteria												
NJDEP Residential Direct Contact Soil Remediation Standards ⁽¹⁾			70000	2	7800	3100	34	6300	12000	NLE	5100	400
NJDEP Non-Residential Direct Contact Soil Remediation Standards			NLE	5	110000	44000	97	91000	170000	NLE	54000	800
NJDEP Impact to Ground Water Screening Level ⁽²⁾			19	0.005	13	0.9	0.01	7	19	NLE	NLE	90
USEPA RSL Residential ⁽³⁾			6100	1.1	5.4	2800	36	500	63	NLE	NLE	400
USEPA RSL Industrial			63000	5.4	27	20000	310	4500	270	NLE	NLE	800
USEPA RSL Groundwater Protection (Risk-based)			0.24	0.0002	0.0015	0.1	0.0022	0.059	0.019	NLE	NLE	NLE
Weston (1995) Maximum Background (Main Post) ⁽⁴⁾			NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	19.5
	Sample Depth Interval (ft bgs)	Sample Date										
Location												
CI ⁽⁶⁾	2.5-3	12/9/93	0.76 B	ND	ND	ND	ND	ND	0.48 J	170.1	3340	10.0 U
CJ ⁽⁶⁾	2.5-3	12/9/93	ND	ND	ND	ND	ND	ND	2.1	187.4	686	10.0 U
D2	6-6.5	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	12.4	60.7
DD	2.5-3	11/5/93	0.062	0.006 U	0.006 U	0.0086 J	0.006 U	0.006 U	0.012 U	0.049	8.46	61.1
E2	6-6.5	11/5/93	0.015 U	0.007 U	0.007 U	0.015 U	0.0025 J	0.007 U	0.014 U	ND	7.2	10.0 U
EE	2.5-3	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	21.7	42.9
F2	6-6.5	11/5/93	0.014 U	0.007 U	0.007 U	0.014 U	0.0018 J	0.007 U	0.014 U	ND	8.46	10.0 U
FF	2.5-3	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	47.7	89.3
G2	6-6.5	11/5/93	0.0087 J	0.007 U	0.007 U	0.014 U	0.0018 J	0.007 U	0.014 U	ND	10.9	10.0 U
GG	2.5-3	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	27.7	22.4
H2	6-6.5	11/5/93	0.0089 J	0.007 U	0.007 U	0.014 U	0.0021 J	0.007 U	0.014 U	ND	10.9	22.4
HH	2.5-3	11/5/93	0.0031 B	0.006 U	0.006 U	0.0077 J	0.0019 J	0.006 U	0.012 U	ND	39.6	29.5
I2	6-6.5	11/5/93	0.04	0.008 U	0.008 U	0.016 U	0.0020 J	0.008 U	0.016 U	ND	7.5	10.0 U
II	2.5-3	11/5/93	0.0020 J	0.006 U	0.006 U	0.012 U	0.0026 J	0.006 U	0.012 U	ND	20.4	21.2
J2	6-6.5	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	11.2	20.7
JJ	2.5-3	11/5/93	0.0059 JB	0.006 U	0.006 U	0.012 U	0.0026 J	0.006 U	0.012 U	ND	39.8	46.7
K2	6-6.5	11/5/93	0.026	0.007 U	0.007 U	0.013 U	0.0017 J	0.007 U	0.014 U	ND	9.93	10.0 U
L2	6-6.5	11/5/93	0.012 U	0.006 U	0.006 U	0.012 U	0.006 U	0.006 U	0.012 U	ND	10.4	33.6
M2	6-6.5	11/5/93	0.010 J	0.006 U	0.006 U	0.012 U	0.0016 J	0.006 U	0.012 U	ND	ND	10.0 U

TABLE 4.1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP AND USEPA STANDARDS AND CRITERIA
SITE FTMM-54
FORT MONMOUTH, NEW JERSEY

Analyte			Volatile Organic Compounds (VOCs)									
			Acetone mg/kg	Benzene mg/kg	Ethyl benzene mg/kg	Methyl ethyl ketone mg/kg	Methylene chloride mg/kg	Toluene mg/kg	Total Xylenes mg/kg	Total TIC, Volatile mg/kg	Total Petroleum Hydrocarbons ⁽⁵⁾⁽⁶⁾ mg/kg	Lead mg/kg
Standards and Screening Criteria												
NJDEP Residential Direct Contact Soil Remediation Standards ⁽¹⁾			70000	2	7800	3100	34	6300	12000	NLE	5100	400
NJDEP Non-Residential Direct Contact Soil Remediation Standards			NLE	5	110000	44000	97	91000	170000	NLE	54000	800
NJDEP Impact to Ground Water Screening Level ⁽²⁾			19	0.005	13	0.9	0.01	7	19	NLE	NLE	90
USEPA RSL Residential ⁽³⁾			6100	1.1	5.4	2800	36	500	63	NLE	NLE	400
USEPA RSL Industrial			63000	5.4	27	20000	310	4500	270	NLE	NLE	800
USEPA RSL Groundwater Protection (Risk-based)			0.24	0.0002	0.0015	0.1	0.0022	0.059	0.019	NLE	NLE	NLE
Weston (1995) Maximum Background (Main Post) ⁽⁴⁾			NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	19.5
	Sample Depth Interval (ft bgs)											
Location		Sample Date										

Notes:

(1) New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) (N.J.A.C 7:26D; amended May 7, 2012). Available at: <http://www.state.nj.us/dep/srp/regs/rs/>. NJDEP Non-residential standard is based on a risk of 1x10E⁶ and HQ = 0.1

(2) NJDEP Impact to Ground Water (NJDEP guidance document; Nov 2013).

(3) U.S. Environmental Protection Agency, Regional Screening Levels (RSLs). Residential Soil (TR=1E-06, HQ = 0.1). (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm). Revised November 2013.

(4) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

(5) The values presented for TPHC/EPH are for No. 2 fuel oil or diesel fuel.

(6) Laboratory reports were not available and information was obtained from summary tables located in the UST Closure and Site Investigation Report-Building 296, Versar, May 2001.

B = Compound detected in the sample and its associated blank sample.

J = estimated (detect or non-detect) value.

U = not detected

NLE = no limit established

ND = not detected

TABLE 4.1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP AND USEPA STANDARDS AND CRITERIA
SITE FTMM-54
FORT MONMOUTH, NEW JERSEY

Analyte			Volatile Organic Compounds (VOCs)									
			Acetone mg/kg	Benzene mg/kg	Ethyl benzene mg/kg	Methyl ethyl ketone mg/kg	Methylene chloride mg/kg	Toluene mg/kg	Total Xylenes mg/kg	Total TIC, Volatile mg/kg	Total Petroleum Hydrocarbons ⁽⁵⁾⁽⁶⁾ mg/kg	Lead mg/kg
Standards and Screening Criteria												
NJDEP Residential Direct Contact Soil Remediation Standards ⁽¹⁾			70000	2	7800	3100	34	6300	12000	NLE	5100	400
NJDEP Non-Residential Direct Contact Soil Remediation Standards			NLE	5	110000	44000	97	91000	170000	NLE	54000	800
NJDEP Impact to Ground Water Screening Level ⁽²⁾			19	0.005	13	0.9	0.01	7	19	NLE	NLE	90
USEPA RSL Residential ⁽³⁾			6100	1.1	5.4	2800	36	500	63	NLE	NLE	400
USEPA RSL Industrial			63000	5.4	27	20000	310	4500	270	NLE	NLE	800
USEPA RSL Groundwater Protection (Risk-based)			0.24	0.0002	0.0015	0.1	0.0022	0.059	0.019	NLE	NLE	NLE
Weston (1995) Maximum Background (Main Post) ⁽⁴⁾			NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	19.5
	Sample Depth Interval (ft bgs)											
Location		Sample Date										

bgs = below ground surface
ft = feet
mg/kg = milligrams per kilogram
-- = not analyzed

Detections are bolded.

- Shaded cells = concentration exceeds USEPA Protection of Groundwater (Risk-based) Criteria
- Shaded cells = concentration exceeds NJDEP Impact to Groundwater Criteria
- Shaded cells = concentration exceeds both USEPA Protection of Groundwater (Risk-based) and NJDEP Impact to Groundwater Criteria
- Shaded cells = concentration exceeds Weston (1995) Maximum Background (Main Post)

