3.4 Parcel 27 – Southwestern Corner CWA

3.4.1 Site Description

Parcel 27 is located in the southwest portion of CWA and includes the Environmental Test Facility (Bldg 2704), former Pulse Power Center (Bldg 2707), Sheet Metal Shop (Bldg 2502), Machine Shop (2503), Paint and Fabrication Facility (2506), and a Former Motor Pool (2501).

Bldg 2704 has been used as an environmental test chamber since 1965. Chemical use in this building is limited to hydraulic fluid and standard shop chemicals (i.e., petroleum-based solvents, oils, and greases). While current waste handling practices are modern, historical waste handling practices are unknown. The building has multiple floor drains which, according to engineering drawings, are connected to the storm sewer.

Bldg 2707 was used by the Electronics Technology Devices Laboratory (ETD&L) until their move to Adelphi, Maryland, as part of the BRAC 1993 realignment initiative. Previous ETD&L activities at the facility included the R&D of high power/high voltage components and sub-systems for military applications.

During personnel interviews, a possible former debris disposal area was identified in the north-central portion of the parcel at the end of Academy Road (22). Additional information pertaining to this parcel can be found in Section 3.4.1.2, Table 3-5, Section 4.3.2.2.2, Section 4.3.2.2.3, Section 4.3.2.2.4, Section 4.3.2.2.6, Section 4.4.4.2, Table 4-3, Section 5.1.1, Section 5.1.1.1, Section 5.4.1, Section 5.5.2, Section 5.5.4, Table 5-1, Table 5-7, Section 5.8, Table 5-16, Section 5.13.9, and Section 5.13.10 of the Phase I ECP (1).

3.4.2 Previous Investigations

The CW-3A landfill, approximately 2.6 acres in size, is located due north of Bldg 2707 and adjacent to Parcel 27 along Pearl Harbor Avenue. All environmental issues associated with the CW-3A landfill are addressed under the FTMM IRP. Please refer to Sections 5.2.1 and 5.9 of the Phase I ECP for additional information about landfills on FTMM property (1).

Numerous former USTs were associated with buildings throughout Parcel 27. The USTs have been removed under the FTMM UST Management Program and are summarized within the FTMM Phase I ECP Report (1).

3.4.3 Site Investigation Sampling

No previous evaluation of potential historical discharges to the stormwater system from Bldg 2704 has been conducted. A review of stormwater management plans and historical documents was conducted to evaluate potential discharge locations, and sediment sampling was conducted to evaluate the potential impact of previous Bldg 2704 activities to stormwater outfall locations associated with Bldg 2704.

Bldgs 2502, 2503, 2504, 2506, and 2507 have an extensive history of vehicle and light industrial activities. The entire area immediately surrounding these buildings is paved, and natural surface water drainage is to the northeast. A site reconnaissance was conducted in spring 2007, and sample locations for soil were selected at depositional locations northeast of these buildings to evaluate potential impact from industrial and vehicle related activities at these buildings.

Geophysical Survey Investigation

An EM survey was conducted over the area identified as a possible debris burial area during personnel interviews. **Section 2.1** summarizes the methodologies utilized during the geophysical surveys.

Surface Soil Investigation

Surface soil samples were collected in December 2007 in Parcel 27. Surface soil samples were collected from two locations via hand augering to investigate potential discharges from Bldgs 2502 through 2507 (**Figure 3.4-1**). Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval directly bgs. Surface soil samples for VO analysis were collected from the 18- to 24-inch bgs interval. No visual or olfactory evidence of soil contamination was noted.

Sediment Investigation

Sediment samples were collected in December 2007 in Parcel 27. A total of four sediment samples were collected at two locations within Shrewsbury Creek, an outfall and an additional location downstream. Two samples were collected from each location; one from the 0- to 6-inch interval, and the other from the 12- to 18-inch interval, measured from the bottom of the creek. No visual or olfactory evidence of sediment contamination was noted.

Table 3.4-1 presents a summary of field activities, and sample locations are provided on **Figure 3.4-1**. An analytical summary of the soil and sediment sampling activities, including sample IDs, collection dates, and analytical parameters, is provided in **Table 3.4-2**.

Table 3.4-1
Parcel 27 Sampling Location, Rationale and Analytical

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
120-ft x 150-ft debris burial area	A geophysical survey was conducted over the 120-ft x 150-ft potential debris burial area. The geophysical investigation consisted of an EM survey: no follow-up GPR survey was necessary as no anomalies were identified by the EM survey.		
27SS-1 and 2 (2 samples)	Surface soil	Surface soil samples were collected from the 0- to 6-inch interval (samples for VO analysis collected from the 18- to 24-inch interval) in the wooded area to the northeast of Bldg 2507. Samples were collected in areas that display evidence of surface drainage and deposition to investigate potential historic discharges from Bldg 2507.	TCL+30 (w/o pesticides), TAL Metals
27SD-1 and 2 (2 samples)	Sediment	Sediment samples were collected from the 0- to 6-inch bgs interval to investigate potential historic discharges from Bldg 2704. Sample locations are at a stormwater outfall and a downstream location.	TCL+30 (w/o pesticides), TAL Metals
27SD-1D and 2D (2 samples)	Sediment	Sediment samples were collected from a 6-inch interval between 12 to 18 inches bgs to investigate potential historic discharges from Bldg 2704.	TCL+30 (w/o pesticides), TAL Metals

3.4.4 Site Investigation Results

Geophysical Survey Results

A geophysical survey was conducted to evaluate a potential burial area at the end of Academy Road. The Parcel 27 area is small and heavily wooded, and a GPS signal could not be received within the entire area. The area was cleared of brush and scanned with the TW-6 on 5-ft line spacing. No anomalies indicative of debris burial areas were identified.

Surface Soil Investigation Results

Soil samples were analyzed for TCL+30 (minus pesticides) and TAL metals.

A total of eight B/Ns and 18 metals were detected in Parcel 27 surface soil samples. Results are presented in **Table 3.4-3**. The eight B/Ns and 18 metals were detected below NJDEP NRDCSCC.

Sediment Investigation Results

Sediment samples were analyzed for TCL+30 (minus pesticides) and TAL metals. Shrewsbury Creek is a non-tidal water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the Freshwater Sediment Screening Values-LEL.

As shown in **Table 3.4-4**, eight B/Ns and 20 metals were detected in Parcel 27 sediment samples. No B/N was detected at a concentration in excess of the LEL. Of the 20 metals detected in sediment at Parcel 27, eight (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) were detected at concentrations that exceeded the LEL. All metals detected above the LEL are presented on **Figure 3.4-1**. Copper is the only metal that was detected above the SEL.

Arsenic was detected above the LEL of 6 mg/kg and the CWBC of 5.8 mg/kg in two sediment samples collected in Parcel 27 at concentrations of 6.11 mg/kg in sample P27SD-1 and 8.00 mg/kg in sample P27SD-1D.

Cadmium was detected above the LEL of 0.6 mg/kg in all four sediment samples collected in Parcel 27 at concentrations ranging from 0.715 mg/kg in sample P27SD-2 to 4.88 mg/kg in sample P27SD-1D. The cadmium concentrations could not be compared to a CWBC because a background concentration has not been established for cadmium.

Chromium was detected above the LEL of 26 mg/kg and the CWBC of 36.9 mg/kg in all four sediment samples collected in Parcel 27 at concentrations ranging from 49.6 mg/kg in sample P27SD-2 to 68.8 mg/kg in sample P27SD-1D.

Copper was detected above the LEL of 16 mg/kg as well as the CWBC of 24.5 mg/kg and SEL of 110 mg/kg in two sediment samples collected in Parcel 27. Copper was detected at a concentration of 187 mg/kg in sample P27SD-1 and 338 mg/kg in sample P27SD-1D.

Lead was detected above the LEL of 31 mg/kg in two sediment samples collected in Parcel 27 at concentrations of 84.9 mg/kg in sample P27SD-1 and 149 mg/kg in sample P27SD-1D. The lead concentration in sample P27SD-1D also exceeded the CWBC of 142 mg/kg.

Mercury was detected above the LEL of 0.2 mg/kg in one sediment sample collected in Parcel 27 at a concentration of 0.23 mg/kg in sample P27SD-1D. The mercury concentrations could not be compared to a CWBC because a background concentration has not been established for mercury.

Nickel was detected above the LEL of 16 mg/kg and the CWBC of 11.3 mg/kg in one sediment sample collected in Parcel 27 at a concentration of 23.7 mg/kg in sample P27SD-1D.

Zinc was detected above the LEL of 120 mg/kg and the CWBC of 126 mg/kg in two sediment samples collected in Parcel 27 at concentrations of 264 mg/kg in sample P27SD-1 and 796 mg/kg in sample P27SD-1D.

All metal concentrations detected above the LEL were also in excess of their respective CWBC with the exception of the lead concentration in sample P27SD-1. Metals are identified as COCs in sediment at Parcel 27.

3.4.5 Summary and Conclusions

No constituents were identified above applicable NJDEP criteria in surface soil, and no anomalous features were identified during the geophysical survey to indicate the presence of a former debris disposal area. NFA is recommended for soil and the possible debris disposal area.

Eight metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) were detected in sediment at concentrations greater than the Freshwater Sediment Screening Values-LEL and the CWBC. Sediment at Parcel 27 is recommended for further evaluation and will be addressed as part of a facility-wide baseline ecological evaluation.

Table 3.4-2
Parcel 27 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B\N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SD	HAND AUGER	P27-SD1	12/20/07	16:00	0.0	0.5									Samples cancelled by lab. Resampled 01/08/08.
SD	HAND AUGER	P27-SD1D	12/20/07	16:10	1.0	1.5									Samples cancelled by lab. Resampled 01/08/08.
SD	HAND AUGER	P27-SD2	12/20/07	16:30	0.0	0.5									Samples cancelled by lab. Resampled 01/08/08.
SD	HAND AUGER	P27-SD2D	12/20/07	16:40	1.0	1.5									Samples cancelled by lab. Resampled 01/08/08.
SOIL	HAND AUGER	P27SS-1	12/20/07	16:50	0.0	0.5									Samples cancelled by lab. Resampled 01/08/08.
SOIL	HAND AUGER	P27SS-2	12/20/07	16:55	0.0	0.5									Samples cancelled by lab. Resampled 01/08/08.
SOIL	HAND AUGER	27SS-1	12/27/07	11:00	1.5	2		X							No field blank or duplicate collected 12/27/07.
SOIL	HAND AUGER	27SS-2	12/27/07	11:05	1.5	2		X							No field blank or duplicate collected 12/27/07.
BLANK	TRIP	TRIP BLANK	12/27/07	-	--	--		X							
BLANK	TRIP	TRIP BLANK	01/08/08	-	--	--		X							
SOIL	HAND AUGER	P27SS-1	01/08/08	11:00	0.0	0.5		X	X	X	X				VOCs not needed. 12/27 VOCs collected at correct depth.
SOIL	HAND AUGER	P27SS-2	01/08/08	11:20	0.0	0.5		X	X	X	X				VOCs not needed. 12/27 VOCs collected at correct depth.
SD	HAND AUGER	P27-SD1	01/08/08	9:05	0.0	0.5		X	X	X	X				
SD	HAND AUGER	P27-SD1D	01/08/08	9:15	1.0	1.5		X	X	X	X				
SD	HAND AUGER	P27-SD2	01/08/08	9:55	0.0	0.5		X	X	X	X				
SD	HAND AUGER	P27-SD2D	01/08/08	10:15	1.0	1.5		X	X	X	X				
BLANK	FIELD	FIELD BLANK	01/08/08	11:40	--	--		X	X	X	X				

X = Sample analyzed for the indicated analytical parameter suite

Table 3.4-3
Fort Monmouth Phase II Site Investigation, Parcel 27
Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results		
		Sample ID:	P27-SS1	P27-SS2	P27-SS2 DUP
		Lab ID:	8000707	8000708	8000702
		Date Sampled:	01/08/2008	01/08/2008	01/08/2008
		Depth (ft. bgs):	0.0-0.5	0.0-0.5	0.0-0.5
Chemical	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result
Semi-Volatiles					
Benzo[a]anthracene	4	500	**0.150 J**	**0.440 J**	**0.510 J**
Benzo[b]fluoranthene	4	50	1.200 U	**0.750 J**	**0.830 J**
bis(2-Ethylhexyl)phthalate	210	100	**0.280 J**	**0.760 J**	**0.940 J**
Chrysene	40	500	**0.220 J**	**0.580 J**	**0.700 J**
Di-n-butylphthalate	10,000	100	**0.400 JB**	**0.890 JB**	**1.100 JB**
Fluoranthene	10,000	100	**0.210 J**	**0.600 J**	**0.810 J**
Phenanthrene	NLE	NLE	**0.100 J**	**0.360 J**	**0.410 J**
Pyrene	10,000	100	**0.430 J**	**1.300 J**	**1.500**
Metals					
Aluminum	NLE	NLE	**11600 B**	**22900 B**	**18700 B**
Arsenic	20	NLE	**9.86**	**16.7**	**14.9**
Barium	47,000	NLE	**29.5 B**	**74.4 B**	**60.2 B**
Beryllium	140	NLE	**0.498**	**1.41**	**1.19**
Cadmium	100	NLE	**0.720**	**5.62**	**4.51**
Calcium	NLE	NLE	**1550 B**	**6320 B**	**5610 B**
Chromium (Total)	NLE	NLE	**60.8 B**	**142 B**	**121 B**
Cobalt	NLE	NLE	**1.49**	**5.49**	**5.33**
Copper	45,000	NLE	**17.0 B**	**59.6 B**	**54.0 B**
Iron	NLE	NLE	**20200**	**46800**	**40300**
Lead	800	NLE	**44.6**	**87.0**	**87.6**
Magnesium	NLE	NLE	**1790 B**	**6040 B**	**5230 B**
Manganese	NLE	NLE	**64.3 B**	**342 B**	**287 B**
Mercury	270	NLE	0.122 U	**0.18**	**0.17**
Nickel (Soluble Salts)	2,400	NLE	**8.59**	**25.3**	**20.2**
Potassium	NLE	NLE	**2570 B**	**7760 B**	**6430 B**
Vanadium	7,100	NLE	**67.2**	**123**	**106**
Zinc	1,500	NLE	**81.4 B**	**324 B**	**274 B**

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.4-4
Fort Monmouth Phase II Site Investigation, Parcel 27
Summary of Analytical Parameters Detected in Sediment (mg/kg)

			Analytical Results			
		Sample ID:	P27-SD1	P27-SD1D	P27-SD2	P27-SD2D
		Lab ID:	8000703	8000704	8000705	8000706
		Date Sampled:	01/08/2008	01/08/2008	01/08/2008	01/08/2008
		Depth (ft. bgs):	0.0-0.5	1.0-1.5	0.0-0.5	1.0-1.5
Chemical	LEL[1]	SEL[2]	Result	Result	Result	Result
Semi-Volatiles						
Benzo[a]anthracene	0.320	1480	1.700 U	1.600 U	**0.120 J**	1.500 U
Benzoic acid	NLE	NLE	1.700 U	1.600 U	1.500 U	**2.400**
bis(2-Ethylhexyl)phthalate	NLE	NLE	1.700 U	**0.310 J**	**0.170 J**	1.500 U
Chrysene	0.340	460	1.700 U	1.600 U	**0.150 J**	1.500 U
Di-n-butylphthalate	NLE	NLE	**0.460 JB**	**2.000 B**	**0.610 JB**	**0.860 JB**
Fluoranthene	0.750	1020	**0.130 J**	**0.130 J**	**0.250 J**	1.500 U
Phenanthrene	0.560	950	1.700 U	1.600 U	**0.082 J**	1.500 U
Pyrene	0.490	850	**0.200 J**	**0.300 J**	**0.280 J**	1.500 U
Metals						
Aluminum	NLE	NLE	**7310 B**	**8660 B**	**5560 B**	**7160 B**
Antimony	NLE	NLE	0.636 U	**1.96**	0.620 U	0.594 U
Arsenic	6	33	**6.11**	**8.00**	**3.28**	**2.86**
Barium	NLE	NLE	**34.4 B**	**38.5 B**	**26.7 B**	**60.3 B**
Beryllium	NLE	NLE	**0.817**	**0.928**	**0.768**	**1.73**
Cadmium	0.6	10	**1.76**	**4.88**	**0.715**	**0.760**
Calcium	NLE	NLE	**1210 B**	**1660 B**	**793 B**	**436 B**
Chromium (Total)	26	110	**49.8 B**	**68.8 B**	**49.6 B**	**57.2 B**
Cobalt	NLE	NLE	**3.51**	**5.52**	**2.37**	0.453 U
Copper	16	110	**187 B**	**338 B**	**15.1 B**	**5.12 B**
Iron	NLE	NLE	**12800**	**21000**	**12000**	**2250**
Lead	31	250	**84.9**	**149**	**21.9**	**7.07**
Magnesium	NLE	NLE	**1530 B**	**1650 B**	**1550 B**	**553 B**
Manganese	NLE	NLE	**56.6 B**	**73.9 B**	**18.1 B**	**29.7 B**
Mercury	0.2	2	0.149 U	**0.23**	0.146 U	0.134 U
Nickel (Soluble Salts)	16	75	**12.8**	**23.7**	**10.3**	**8.00**
Potassium	NLE	NLE	**2590 B**	**2130 B**	**3040 B**	**1090 B**
Selenium	NLE	NLE	0.940 U	0.942 U	0.915 U	**4.47 B**
Vanadium	NLE	NLE	**44.4**	**57.2**	**29.3**	**21.7**
Zinc	120	820	**264 B**	**796 B**	**79.8 B**	**44.8 B**

[1] NJDEP Freshwater Sediment Screening Values - Lowest Effect Levels, 1998.

[2] NJDEP Freshwater Sediment Screening Guidelines - Severe Effects Levels, 1998.
For non-polar organics (PAHs, organochlorine pesticides, PCBs), the SEL is caluculated from a site-specific TOC level. To calculate a site-specific SEL, TOC is multiplied by the the table SEL. However, no TOC analysis was performed on the FTMM sediment samples. Generally, TOC values range from 1% (10,000 mg/kg) to 10% (100,000 mg/kg) (USEPA, 1998). Since the table SEL is based on 100% TOC, the calculated site-specific SEL would be lower.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte detected.

Shaded = Concentration exceeds LEL.

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P27SD-2	SD	0-0.5	Cadmium	0.715	LEL/SEL	0.6/10
P27SD-2	SD	0-0.5	Chromium	49.6 B	LEL/SEL	26/110
P27SD-2D	SD	1.0-1.5	Cadmium	0.760	LEL/SEL	0.6/10
P27SD-2D	SD	1.0-1.5	Chromium	57.2 B	LEL/SEL	26/110

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P27SD-1	SD	0-0.5	Arsenic	6.11	LEL/SEL	6/33
P27SD-1	SD	0-0.5	Cadmium	1.76	LEL/SEL	0.6/10
P27SD-1	SD	0-0.5	Chromium	49.8 B	LEL/SEL	26/110
P27SD-1	SD	0-0.5	Copper	187 B	LEL/SEL	16/110
P27SD-1	SD	0-0.5	Zinc	264 B	LEL/SEL	120/820
P27SD-1D	SD	1.0-1.5	Arsenic	8.00	LEL/SEL	6/33
P27SD-1D	SD	1.0-1.5	Cadmium	4.88	LEL/SEL	0.6/10
P27SD-1D	SD	1.0-1.5	Chromium	68.8 B	LEL/SEL	26/110
P27SD-1D	SD	1.0-1.5	Copper	338 B	LEL/SEL	16/110
P27SD-1D	SD	1.0-1.5	Lead	149	LEL/SEL	31/250
P27SD-1D	SD	1.0-1.5	Mercury	0.23	LEL/SEL	0.2/2
P27SD-1D	SD	1.0-1.5	Nickel	23.7	LEL/SEL	16/75
P27SD-1D	SD	1.0-1.5	Zinc	796 B	LEL/SEL	120/820

LEGEND

- Surface and Subsurface Sample Location
- Sediment Sample Location
- Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available.
- Building
- Geophysical Investigation Area (Electromagnetic Survey Followed by Targeted Ground Pentrating Radar of Anomalies)
- IRP Site Boundary
- Installation Boundary

ECP PARCEL CATEGORY DEFINITIONS

7 Areas that are not evaluated or require additional evaluation.

* Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007).

BRAC PARCEL LABEL DEFINITIONS

8(2)PS
- CONTAMINATION DESCRIPTION
  - HS - Hazardous Substance Storage
  - HR - Hazardous Substance Release
  - PS - Petroleum Storage
  - PR - Petroleum Release
  - (P) - Possible Release or Disposal
- CATEGORY NUMBER
- PARCEL NUMBER

N

SCALE:

0 90 180 360 Feet

Base Realignment and Closure 2005

U.S. Army Corps of Engineers

Shaw® Shaw Environmental, Inc.

FIGURE 3.4-1

FORT MONMOUTH ECP SITE INVESTIGATION

PARCEL 27 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN

CHARLES WOOD AREA
FORT MONMOUTH
NEW JERSEY

ArcGIS File: CWA_Fig3_4-1_SI_P27_Exceeds_SampLoc.mxd (7/14/2008 12:12:03 PM)

3.5 Parcel 28 – Former Eatontown Laboratory

3.5.1 Site Description

Parcel 28 is located in the CWA and encompasses Bldg 2525 – the former Eatontown Laboratory complex. Bldg 2525 was constructed in 1941-1942. The Eatontown Signal Laboratory was renamed Watson Laboratories in 1945 and subsequently moved to Rome, New York in 1951 (8).

It was reported that Bldg 2525 had been a chemical laboratory known as Eatontown Labs around the 1940s. This information was confirmed by FTMM site plans showing the Eatontown Laboratory complex. Plan No. 6148/1015 dated September 3, 1941, shows the Eatontown Laboratory complex, including Bldg 2525 (numbered 1 through 6 for the six bays) and nine other buildings numbered 7 through 15 (**Appendix G**). This plan also depicts three separate septic tanks and leach fields and one underground transformer vault. The main sanitary sewer line from the building is shown to discharge to a septic tank and leach field east of the building. A review of the DPW map and engineering drawings repository indicated a 2-inch "acid proof drain" leading from Bay 1 to a dry well southeast of the building. Floor drains were shown to discharge to the brook northwest of the building (23). Building revitalization plans show all floor drains were later connected to the sanitary sewer system.

Bldg 2525 was included in the Watson Laboratory complex in the mid-1940s. Crystal growing and processing operations were conducted in the Watson Laboratory building located in the southwest portion of the CWA in the early 1950s. Operations included cleaning of crystals, quartz etching, soldering, and gold (and other metal) plating, which was conducted in Bldg 2532. These operations involved chemicals such as carbon tetrachloride, ammonium bifluoride, cadmium sulfate, and sulfuric acid. Crystal etching was also noted in Bldg 2538 using ammonium bifluoride. Other processes associated with the Watson Laboratories included machining of metals and remelting lead in Bldg 2533; growing of crystals and physical chemistry in Bldg 2534; and machining of crystals in Bldg 2538 (15,24,25). In 1951, the laboratories were moved to Rome, New York (8).

Following the 1951 Watson Laboratories move, the Aviation Research and Development Command Laboratory was moved from the Myer Center to Bldg 2525. This laboratory operation occupied the building until 1978. A 1978 IH Survey reported ozalid reproduction in Room 5101 of Bldg 2525 (26). Building revitalization plans show all floor drains connected to the sanitary sewer system (27). No sumps or floor drains were noted during the 2006 VSI. The use of the building has been strictly administrative since the late 1990s, as confirmed during the VSI.

Prior to 1997, the building was used to house electronics laboratories. No chemical usage was associated with the electronics laboratories. Geothermal well fields used for the heating of facilities within Parcel 28 are present at multiple locations throughout the parcel.

Parcel 28 also contains the CECOM laboratory and radiological testing facility housed in Bldg 2540. This building contains a gamma irradiator, Radiac calibrators, a storage room for low-level RAM with multiple radioactive sources from the demilitarization of commodities, a nuclear counting laboratory, and several health physics laboratories. A survey of the interior of Bldg 2540 will be performed as part of the radiological scoping surveys.

The 1993 Environmental Research, Inc. Aerial Photographic Site Analysis noted a fenced open storage area and possible tank pads in the northern portion of Parcel 28, to the northeast of Bldg 2525 (14). Additional information pertaining to this parcel can be found in Section 4.3.2.2.1, Section 4.3.2.2.6, Section 4.4.4.2, Section 5.4, Section 5.8, Section 5.13.3, Table 5-1, Section 5.13.7, Table 5-16, and Appendix G of the Phase I ECP (1).

3.5.2 Previous Investigations

Multiple former USTs associated with buildings throughout Parcel 27 have been removed under the FTMM UST Management Program and are summarized within the FTMM Phase I ECP Report (1). However, no investigations have been conducted to evaluate the potential impact from previous operations associated with the Eatontown and Watson Laboratory facilities (area around Bldg 2525) or the former open storage area and possible tank pads in the northern portion of the parcel.

3.5.3 Site Investigation Sampling

A review of documented septic tank locations and of historical site drawings revealed several septic tanks, leaching fields, and USTs that once existed within Parcel 28 as well as a former acid proof drain in Bldg 2525 that discharged to Shrewsbury Creek. All known USTs have been removed; however, no investigations have been conducted to evaluate the potential impact from previously operated septic systems, former open storage and possible tank pads, and the former floor drains. Further, two USTs were identified on historic figures for which no UST removal documentation was identified. Geophysical surveys were conducted in order to determine the absence/presence of formerly utilized septic tanks, associated leaching fields, and USTs. The potential for historic releases to the environment were investigated via soil sampling, sediment sampling, groundwater sampling, and test pit soil sampling throughout Parcel 28. The locations of all samples and survey areas within Parcel 28 are illustrated on **Figure 3.5-1**.

Geophysical Survey Investigation

GPR surveys were conducted in Parcel 28 to delineate the locations of former septic tanks, USTs, and drywells. One survey was conducted over an area north of Bldg 2541 to investigate the location of a former septic tank (southeast of Bldg 2525). One survey was conducted over an area adjacent to Bldg 2542 to investigate a former drywell southeast of Bldg 2525. An EM and GPR survey was also performed to investigate former USTs associated with former Bldgs T-7, T-8, and T-9. The survey was extended

north to investigate the location of a 500-gallon septic tank associated with former Bldgs T-7 and T-10.

Geoprobe® Investigation

Soil and groundwater samples were collected in December 2007 in Parcel 28 in order to investigate potential septic system discharges and former storage pads that were identified through aerial analysis. A total of three surface soil samples and three subsurface soil samples were collected from three distinct Geoprobe® borings. Two boring locations, P28-SB-1;2, were located downgradient of a former drainage field that once serviced former Bldgs 13, 14, and 15. Boring P28-SB-3 was located where former pads existed in an open field west of Bldg 2290 and Guam Lane. Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval bgs. Surface soil samples collected for VO analysis were collected from the 18- to 24-inch interval bgs. Subsurface soil samples were collected from the 6-inch interval directly above the water table. Field screening of soil boring cores was conducted using PID/FID instruments. No visual or olfactory evidence of soil contamination was noted during field operations.

A total of five groundwater samples (including one duplicate sample) were collected from four distinct temporary wells that were installed with the Geoprobe® rig. Three temporary wells, P28GW-1;2;4, were installed downgradient of former drainage fields, and one temporary well, P28GW-3, was installed downgradient of a former storage pad area located in an open field west of Bldg 2290 and Guam Lane. Temporary wells were constructed of PVC and 5 ft of factory-slotted screen.

Test Pit Soil Investigation

In order to determine if any contamination exists resulting from former septic tank discharges that once serviced Bldg 2525, four test pits were excavated in an open field east of Bldg 2525 and Heliport Drive. Test pits P28-TP1;3 were excavated within the boundaries of the former leaching field, and test pits P28TP-2;4 were excavated directly downgradient of former leaching pool structures (**Figure 3.5-1**). Top soil was observed to extend from ground surface to a depth of 0.5 ft bgs. The former leaching field was confirmed to still be in place through the observance of a 2-ft layer of sand and gravel underlain by a layer of engineered gravel 4 ft in thickness that extended to a depth of 6.5 ft bgs. Soil sample depths at P28-TP1;3, for non-VO and VO analysis, were contingent upon visual observations (i.e., depth to water table, thickness of layered engineered gravel) and field screening results. Based upon field observations at P28-TP1;3, three soil samples (including one duplicate sample) were collected at the 6-inch interval below the layer of engineered gravel, approximately 6.5 to 7.0 ft bgs. This depth coincided with the 6-inch interval directly above the water table. Soil sample depths at P28-TP2;4, for non-VO and VO analysis, were contingent upon visual observations (i.e., depth to water table, depth below leaching pool structure) and field screening results. Based upon field observations at P28-TP2, one soil sample was collected below the leaching pool structure at approximately 4.5 to 5.0 ft bgs, and one soil sample, P28-TP2-B, was collected at the 6-inch interval directly above the water table (5.5 to 6.0 ft bgs). Due to the close proximity of groundwater to the leaching pool

structure at P28TP-4, only one soil sample was collected at the 6-inch interval directly above the water table (4.5 to 5.0 ft bgs). No visual or olfactory evidence of impacted soil was noted.

Test Pit 5 (P28-TP5) was excavated within the boundaries of a former leaching field. P28-TP5 was originally planned to be located southeast of Bldg 2525 in order to investigate the location of a former drywell. This test pit was relocated upon preliminary evaluation of geophysical survey results that did not reveal any anomalous features that would represent a dry well. The test pit was relocated northeast of Bldg 2525 in order to investigate the septic system and leach field that was associated with former Bldgs T-7 and T-10 (**Figure 3.5-1**). Soil sample depths for non-VO and VO analysis were contingent upon visual observations (i.e., depth to water table, thickness of layered engineered gravel) and field screening results. Based upon field observations at P28-TP5, two soil samples (including one duplicate sample) were collected at the 6-inch interval below the layer of engineered gravel, approximately 6.0 to 6.5 ft bgs. This depth coincided with the 6-inch interval directly above the water table. No visual or olfactory evidence of impacted soil was noted.

Surface Soil Investigation

Surface soil samples were collected in December 2007 in Parcel 28. A total of two surface soil samples were collected from two distinct hand augered borings located in a former storage area in an open field west of Bldg 2290 and Guam Lane (**Figure 3.5-1**). Samples were collected in order to investigate the former storage area. Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval bgs. Surface soil samples collected for VO analysis were collected from the 18- to 24-inch interval bgs. No visual or olfactory evidence of impacted soil was noted.

Sediment Investigation

Sediment samples were collected in December 2007 in Parcel 28. A total of four sediment samples were collected from two distinct hand augered borings located along the southeast bank of Shrewsbury Creek adjacent to Bldg 2525 (**Figure 3.5-1**). Samples were collected to investigate potential discharges from former floor drains to outfalls that were associated with Bldg 2525. Samples were located directly downgradient of potential former discharge pipes observed on the southeast bank of the Creek. Two samples were collected from each location; one from the 0- to 6-inch interval, and the other from the 12- to 18-inch interval, measured from the bottom of the creek. No visual or olfactory evidence of impacted sediment was noted.

Table 3.5-1 presents a summary of all field activities, and all sample locations are provided on **Figure 3.5-1**. A summary of sampling activities, including sample IDs, collection dates, and analytical parameters, is provided in **Table 3.5-2**.

Table 3.5-1
Parcel 28 Sampling Location, Rationale and Analytical

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
Former septic tank and dry well associated with Bldg 2525	A geophysical investigation consisting of a GPR survey was conducted over a 125-ft x 125-ft area, 650 ft east of Bldg 2542 and 175 ft north of Bldg 2541, in order to investigate the location of former septic tank southeast of Bldg 2525, and a 100-ft x 100-ft area adjacent to Bldg 2542 to investigate the former drywell southeast of Bldg 2525.		
200-ft x 800-ft former shops and labs area and concrete vault	A geophysical survey was conducted over the 200-ft x 800-ft area to investigate former USTs associated with former Bldgs T-7, T-8, and T-9. The geophysical investigation area was extended to the north to investigate the location of a 500-gallon septic tank associated with Bldgs T-7 and T-10 – the associated leach field was removed during installation of the geothermal well field. The geophysical investigation consisted of both an EM and GPR survey of the entire area.		
28TP-1A/B through 28TP-4A/B (6 samples – includes 1 duplicate sample)	Subsurface soil	Soil samples were collected from test pits to investigate the location of the former septic drainage field associated with Bldg 2525. Sample collection depths were determined based upon visual observations (i.e., depth to water table, depth below engineered gravel layer, depth below leaching pool structure) and by field monitoring instrument readings.	TCL+30 (w/o pesticides), TAL Metals
28GW-1 (2 samples – includes 1 duplicate sample)	Groundwater	A groundwater sample was collected from a Geoprobe® boring to evaluate potential impact to groundwater from the former drainage field associated with Bldg 2525.	TCL+30 (w/o pesticides/PCBs), TAL Metals, ammonia, nitrate, nitrite
28SS-1 and 2 (2 samples)	Surface soil	Soil samples were collected from the 0- to 6-inch bgs interval from the Geoprobe® soil borings to investigate the location of the former drainage field from former Bldgs 13, 14, and 15.	TCL+30 (w/o pesticides), TAL Metals
28SB-1 and 2 (2 samples)	Subsurface soil	Soil samples were collected from the 6-inch interval directly above the water table (depth 4.5 to 5.0 ft bgs) from each Geoprobe® soil boring to investigate the location of the former drainage field from former Bldgs 13, 14, and 15. Field screening of the entire Geoprobe® soil core was conducted using PID and FID meters.	TCL+30 (w/o pesticides), TAL Metals
28GW-2 (1 sample)	Groundwater	A groundwater sample was collected from the specified Geoprobe® soil boring to investigate the location of the former drainage field from former Bldgs 13, 14, and 15.	TCL+30 (w/o pesticides/PCBs), TAL Metals, ammonia, nitrate, nitrite

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
28SS-3, 4, and 5 (3 samples)	Surface soil	Soil samples were collected from the 0- to 6-inch bgs interval to investigate the former fenced storage area west of Bldg 2290 (west side of Guam Lane) and the former pads immediately to the south, identified in aerial analysis.	TCL+30 (w/o pesticides), TAL Metals
28SB-3 (1 sample)	Subsurface soil	A soil sample was collected from the 6-inch interval directly above the water table (depth 5.0 to 5.5 ft bgs) from the specified Geoprobe® soil boring to investigate the former pads in the northern section of Parcel 28. Field screening of the entire Geoprobe® soil core was conducted using PID and FID meters.	TCL+30 (w/o pesticides), TAL Metals
28GW-3 (1 sample)	Groundwater	A groundwater sample was collected from the specified Geoprobe® soil boring to investigate the former pads identified in aerial analysis of the northern section of Parcel 28.	TCL+30 (w/o pesticides/PCBs), TAL Metals
28TP-5 (2 samples – includes 1 duplicate sample)	Subsurface soil	Soil sample was collected from a test pit to investigate the location of the former drainage field northeast of Bldg 2525 that serviced former Bldgs T-7, T-10. Sample collection depths were determined by visual observations (i.e., depth to water table, depth to engineered gravel layer) and by field monitoring instrument readings.	TCL+30 (w/o pesticides), TAL Metals
28GW-4 (1 sample)	Groundwater	A groundwater sample was collected from the specified Geoprobe® boring to investigate the potential impact to groundwater from the former drainage field northeast of Bldg 2525 that serviced former Bldgs T-7, T-10.	TCL+30 (w/o pesticides/PCBs), TAL Metals
28SD-1 and 2 (2 samples)	Sediment	Sediment samples were collected from the 0- to 6-inch bgs interval to investigate potential discharges from former 3-inch floor drains within Bldg 2525 that previously discharged to Shrewsbury Creek. Samples were collected directly at the former discharge point and a location downgradient.	TCL+30 (w/o pesticides), TAL Metals
28SD-1D and 2D (2 samples)	Sediment	Sediment samples were collected from the 12- to 18-inch bgs interval to investigate potential discharges from former 3-inch floor drains within Bldg 2525 that previously discharged to Shrewsbury Creek. Samples were collected directly at the former discharge point and a location downgradient.	TCL+30 (w/o pesticides), TAL Metals

3.5.4 Site Investigation Results

Geophysical Survey Results

The geophysical surveys identified a total of 23 target EM anomalies. The survey areas and results (locations of suspected USTs, suspected septic tanks, and suspected septic system distribution tanks) are presented on **Figure 3.5-2**. The results of the GPR/TW-6 follow-up scanning are listed in **Table 3.5-3**, and full results of the geophysical surveys are included in **Appendix A**. In summary, GPR scanning of the 23 targets revealed:

- Eight targets that were associated with surface metal/debris (previously unaccounted for).
- Seven targets that could not be relocated with the TW-6 because the targets were too small to be re-occupied, and therefore are most likely not a drywell, UST, or septic tank.
- Three targets with the characteristics of a utility.
- Two targets with moderate-amplitude near-surface point target/anomaly indicative of small pieces of buried debris; not indicative of a UST, drywell, or septic tank.
- One target with the high-amplitude parabolic reflections indicating a possible UST (P28-8). The location of the suspected UST matches up with former Bldg 2526. Bldg 2526 (AKA T8-H) served as a laboratory heater building, a non-housing structure, until the end of its life cycle. Supporting real property records are included in **Appendix I**.
- Two targets with a high-amplitude flat reflection indicating possible septic tanks.

Additional GPR scanning was completed within the small roughly square areas labeled **A** and **B** on **Figure 3.5-2**. These areas are thought to contain possible remnant septic system features. Several anomalies were delineated. In Area A, a roughly 4-ft x 6-ft non-metallic anomaly was delineated and may represent a former septic holding tank reported to have been in place in that area. In Area B, a high-amplitude non-metallic linear anomaly was partially delineated and is suspected to be the former supply pipe to a septic distribution box which was delineated in the EM survey. Follow-up GPR scanning showed a 10-ft x 10-ft high-amplitude flat anomaly characteristic of a box-shaped septic tank. No other features of the suspected septic systems in Areas A and B were observed.

In summary, no drywell was identified within Parcel 28; however, one possible UST (P28-8), one suspected septic holding tank, and one suspected septic distribution box and associated piping were identified.

Geoprobe® Investigation Results

Surface and subsurface soil samples were analyzed for TCL+30 (without pesticides) and TAL metals.

As presented in **Tables 3.5-4 and 3.5-5**, one VO (acetone) and 12 B/Ns were detected in Parcel 28 surface or subsurface soil samples at concentrations below the NJDEP NRDCSCC. A total of 17 metals were detected in surface and subsurface soil samples. Of the 17 metals, one (arsenic) was detected at a concentration in excess of the NJDEP NRDCSCC. Arsenic was detected at a concentration of 20.7 mg/kg in soil sample (P28-SB3-C) that exceeded the NJDEP NRDCSCC of 20 mg/kg. The arsenic concentration of P28-SB3-C did not exceed the CWBC of 31.6 mg/kg. Sample P28-SB3-C was collected at a depth of 5.0 to 5.5 ft bgs, directly above the water table. The arsenic concentration in surface soil is below the NRDCSCC, and arsenic was not detected in groundwater at this location.

There are several factors both natural and anthropogenic that can have an influence on arsenic levels in the soil at FTMM. The primary natural influence on the chemical concentrations in soil at FTMM is parent material. The parent material at FTMM is glauconitic soil of the Tinton and Red Bank sands and their fluvially- and tidally-reworked equivalents (47). Total arsenic levels in glauconite-bearing soils in New Jersey have been reported to range up to 131 mg/kg, with a median concentration of 30 mg/kg (48). Anthropogenic influences on arsenic levels in the soil include the use of pesticides and herbicides. Arsenic was a common constituent of herbicides and pesticides in the past. As a result of these natural and anthropogenic influences, arsenic is not considered a COC in the soil.

Test Pit Investigation Results

Subsurface soil samples were analyzed for TCL+30 (minus pesticides) and TAL metals.

As shown in **Table 3.5-4**, one VO and 12 B/Ns were detected in subsurface soil samples at concentrations below NJDEP NRDCSCC. A total of 17 metals were detected at concentrations below NJDEP NRDCSCC. No COCs were identified in test pit soil.

Groundwater Investigation Results

Groundwater samples P28GW-1 and 2 were analyzed for TCL+30 (without pesticides/PCBs), TAL metals, ammonia, nitrate, and nitrite. Groundwater samples P28GW-3 and 4 were analyzed for TCL+30 (without pesticides/PCBs) and TAL metals.

As presented in **Table 3.5-6**, a total of 13 metals were detected in Parcel 28 groundwater samples. Only two metals (aluminum and manganese) were detected at concentrations above the NJDEP GWQC.

Several natural and anthropogenic factors contribute to the wide range in concentrations of metals in soils, which further impact the concentration of metals in groundwater. Soils derived from glauconitic sands contain abundant aluminum, calcium, potassium, iron, magnesium, and manganese (among others), which are likely to be present at elevated concentrations in the groundwater, particularly when sediments are entrained in the collected groundwater samples. As a result of these natural influences, aluminum and manganese are not considered COCs in groundwater.

A total of three VOs, acetone, chloroform, and toluene, were detected at concentrations below the NJDEP GWQC in Parcel 28 groundwater samples. One B/N, bis(2-ethylhexyl)phthalate, was detected at concentrations below the NJDEP GWQC.

As shown in **Table 3.5-6**, nitrite and nitrate were detected at concentrations below the NJDEP GWQC in groundwater samples collected from temporary wells P28GW-1, P28GW-1-Duplicate, and P28GW-2. No COCs were identified in groundwater at Parcel 28.

Sediment Investigation Results

Sediment samples were analyzed for TCL+30 (without pesticides) and TAL metals. Shrewsbury Creek is a non-tidal water body in this portion of the facility; therefore, sediment analytical results were evaluated in relation to the Freshwater Sediment Screening Values-LEL and SEL.

As presented in **Table 3.5-7**, one VO, five B/Ns, and 17 metals were detected in Parcel 28 sediment samples. Acetone was detected at concentrations below the LEL in all four samples. All B/N concentrations were below the LEL. Only one metal (chromium) was detected at a concentration greater than the LEL.

Chromium was detected above the LEL of 26 mg/kg in all four sediment samples collected in Parcel 28 at concentrations ranging from 36.8 mg/kg in sample P28SD-2 to 50.6 mg/kg in sample P28SD-2D (**Table 3.5-7**). Three of the four chromium concentrations also exceeded the CWBC of 36.9 mg/kg. No constituents were detected at concentrations greater than the SEL. Chromium is considered a COC in sediment at Parcel 28.

3.5.5 Summary and Conclusions

The locations of a suspected UST (P28-8), suspected former septic holding tank, a suspected septic distribution box, and suspected supply piping associated with the suspected septic distribution box were identified as a result of the geophysical survey.

Soil and groundwater analytical results suggest that a release has not occurred. In light of the absence of evidence of a release to the environment, NFA for the suspected UST, suspected former septic holding tank, suspected septic distribution box, and suspected supply piping associated with the suspected septic distribution box is recommended.

Arsenic was detected at a concentration above the NJDEP NRDCSCC in the soil. However, the arsenic concentrations did not exceed the CWBC, and arsenic levels in the soil in Monmouth County are influenced by several natural and anthropogenic sources causing elevated concentrations. Thus, arsenic is not considered a COC in soil. No further evaluation is recommended for soil at Parcel 28.

One metal, chromium, was detected in sediment at concentrations greater than the Freshwater Sediment Screening Values-LEL and the CWBC and was identified as a COC. Sediment at Parcel 28 is recommended for further evaluation as part of a facility-wide baseline ecological evaluation.

Table 3.5-2
Parcel 28 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	BIN+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
BLANK	TRIP	TRIP BLANK	12/04/07	-	--	--		X							
SOIL	TEST PIT	P28-TP1	12/04/07	9:55	6.5	7.0		X	X	X					
SOIL	TEST PIT	P28-TP3	12/04/07	10:55	6.5	7.0		X	X	X					
SOIL	TEST PIT	P28-TP3 DUPLICATE	12/04/07	10:55	6.5	7.0		X	X	X					
SOIL	TEST PIT	P28-TP2-A	12/04/07	13:30	4.5	5.0		X	X	X					
SOIL	TEST PIT	P28-TP2-B	12/04/07	13:50	5.5	6.0		X	X	X					
SD	HAND AUGER	P28-SD1	12/04/07	14:40	0.0	0.5		X	X	X					
SD	HAND AUGER	P28-SD1-D	12/04/07	14:45	1.0	1.5		X	X	X					
SD	HAND AUGER	P28-SD2	12/04/07	15:00	0.0	0.5		X	X	X					
SD	HAND AUGER	P28-SD2-D	12/04/07	15:05	1.0	1.5		X	X	X					
BLANK	FIELD	FIELD BLANK	12/04/07	15:10	--	--		X	X	X					Semi-volatiles extracted for Base Neutrals only. No Acids were reported by lab.
BLANK	TRIP	TRIP BLANK	12/05/07	-	--	--		X							
SOIL	HAND AUGER	P28-SS4-A	12/05/07	7:55	0.0	0.5			X	X	X				
SOIL	HAND AUGER	P28-SS4-B	12/05/07	7:55	1.5	2.0		X							
SOIL	HAND AUGER	P28-SS5-A	12/05/07	8:10	0.0	0.5			X	X	X				
SOIL	HAND AUGER	P28-SS5-B	12/05/07	8:10	1.5	2.0		X							
SOIL	GEOPROBE	P28-SB3-A	12/05/07	9:40	0.0	0.5			X	X	X				
SOIL	GEOPROBE	P28-SB3-B	12/05/07	9:40	1.5	2.0		X							
SOIL	GEOPROBE	P28-SB3-C	12/05/07	9:50	5.0	5.5		X	X	X	X				
SOIL	TEST PIT	P28-TP4	12/05/07	10:30	4.5	5.0		X	X	X	X				
SOIL	GEOPROBE	P28-SB1-A	12/05/07	11:10	0.0	0.5			X	X	X				
SOIL	GEOPROBE	P28-SB1-B	12/05/07	11:10	1.5	2.0		X							
SOIL	GEOPROBE	P28-SB1-C	12/05/07	11:20	4.5	5.0		X	X	X	X				
SOIL	GEOPROBE	P28-SB2-A	12/05/07	11:30	0.0	0.5			X	X	X				
SOIL	GEOPROBE	P28-SB2-B	12/05/07	11:30	1.5	2.0		X							
SOIL	GEOPROBE	P28-SB2-C	12/05/07	11:35	4.5	5.0		X	X	X	X				
SOIL	TEST PIT	P28-TP5	12/05/07	14:00	6.0	6.5		X	X	X	X				

Table 3.5-2
Parcel 28 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	BIN+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SOIL	TEST PIT	P28-TP5 DUPLICATE	12/05/07	14:00	6.0	6.5		X	X	X	X				
BLANK	FIELD	FIELD BLANK	12/05/07	14:05	--	--		X	X	X	X				
BLANK	TRIP	TRIP BLANK-AQ	12/06/07	10:00	--	--		X							
BLANK	FIELD	FIELD BLANK-AQ	12/06/07	11:00	--	--		X	X		X			X	
GW	GEOPROBE	P28GW-1	12/06/07	11:30	6.0	11.0		X	X		X			X	
GW	GEOPROBE	P28GW-1 DUPLICATE	12/06/07	11:30	6.0	11.0		X	X		X			X	
GW	GEOPROBE	P28GW-2	12/06/07	12:00	2.5	7.5		X	X		X			X	
GW	GEOPROBE	P28GW-3	12/06/07	13:30	3.0	8.0		X	X		X				
GW	GEOPROBE	P28GW-4	12/06/07	14:30	5.0	10.0		X	X		X				

X = Sample analyzed for the indicated analytical parameter suite

Table 3.5-3
Parcel 28 - Ground Penetrating Radar and Metal Detection Follow-up Survey Results

Anomaly	Anomaly Type: Inphase, Conductivity, Both	Anomaly Re-Acquired by Small Area Metal Detection	Metal Detection (MD) Anomaly Size (feet)	GPR Anomaly Size (feet)	Description	Easting	Northing
P28_1	Inphase	N/A	N/A	N/A	Surface metal.	607941	532602
P28_2	Both	N/A	N/A	N/A	Surface metal.	608174	532700
P28_3	Both	Yes	< 2 x 2	< 2 x 2	Moderate-amplitude point target/anomaly, possible debris.	608179	532811
P28_4	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608194	532694
P28_5	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608199	532962
P28_6	Conductivity	Yes	N/A	N/A	Possible utility.	608212	532635
P28_7	Both	N/A	N/A	N/A	Surface metal.	608212	532987
P28_8	Both	Yes	10 x 10	7 x 7	High-amplitude parabolic anomaly characteristic of UST; also note associated linear anomaly is suspected pipe.	308212	532882
P28_9	Both	N/A	N/A	N/A	Surface metal.	608217	532610
P28_10	Conductivity	Yes	< 2 x 2	< 2 x 2	Moderate-amplitude point target/anomaly, possible debris.	608221	532844
P28_11	Both	N/A	N/A	N/A	Surface metal.	608228	532528
P28_12	Inphase	N/A	N/A	N/A	Surface metal.	608250	533240
P28_13	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608254	532992
P28_14	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608273	532658
P28_15	Conductivity	Yes	N/A	N/A	Possible utility.	608284	532567
P28_16	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608302	532624
P28_17	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608321	532687
P28_18	Conductivity	No	N/A	N/A	No MD anomaly found associated with EM anomaly.	608325	532782
P28_19	Both	Yes	N/A	N/A	Possible utility.	608352	532694
P28_20	Inphase	N/A	N/A	N/A	Surface metal.	608375	533130
P28_21	Inphase	N/A	N/A	N/A	Surface metal.	608379	533094
P28_22	Both	Yes	12 x 12	10 x 10	Suspected septic system distribution box.	608611	532714
P28_23	GPR	N/A	N/A	4 x 6	Suspected septic tank.	608272	533247

Table 3.5-4
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters in Soil (mg/kg) South of Corregidor Road

			Analytical Results					
		Sample ID:	P28-SB1-A	P28-SB1-B	P28-SB1-C	P28-SB2-A	P28-SB2-B	P28-SB2-C
		Lab ID:	7051111	7051112	7051113	7051114	7051115	7051116
		Date Sampled:	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007
		Depth (ft. bgs):	0.0-0.5'	1.5-2.0'	4.5-5.0	0.0-0.5'	1.5-2.0'	4.5-5.0
Chemical	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result	Result	Result	Result
Volatiles								
Acetone	1000	100	NT	**3.100 B**	**0.690 B**	NT	**0.650 B**	**0.360 B**
Semi-Volatiles								
Benzo[b]fluoranthene	4	50	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
Benzo[a]anthracene	4	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
Benzo[a]pyrene	0.66	100	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
Benzo[k]fluoranthene	4	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
bis(2-Ethylhexyl)phthalate	210	100	**0.160 J**	NT	1.200 U	1.000 U	NT	1.100 U
Chrysene	40	500	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
Di-n-butylphthalate	10000	100	**1.100 JB**	NT	**0.290 JB**	**0.200 JB**	NT	**0.630 JB**
Di-n-octyl phthalate	10000	100	1.100 U	NT	1.200 U	1.000 U	NT	1.100 U
Fluoranthene	10000	100	**0.095 J**	NT	1.200 U	1.000 U	NT	**0.074 J**
Phenanthrene	NLE	NLE	**0.069 J**	NT	1.200 U	1.000 U	NT	**0.081 J**
Pyrene	10000	100	**0.120 J**	NT	1.200 U	1.000 U	NT	1.100 U
Metals								
Aluminum	NLE	NLE	**7170 B**	NT	**5580 B**	**2290 B**	NT	**7200 B**
Arsenic	20	NLE	**7.16**	NT	**3.29**	**1.78**	NT	**4.17**
Barium	47000	NLE	**30.1 B**	NT	**19.2 B**	**8.30 B**	NT	**19.8 B**
Beryllium	140	NLE	**0.794**	NT	**0.295**	**0.154**	NT	**0.291**
Cadmium	100	NLE	**0.338**	NT	**0.173**	**0.147**	NT	**0.233**
Calcium	NLE	NLE	**1280 B**	NT	**491 B**	**461 B**	NT	**336 B**
Chromium (Total)	NLE	NLE	**58.6**	NT	**35.9**	**17.4**	NT	**38.9**
Cobalt	NLE	NLE	**1.15**	NT	0.334 U	**0.465**	NT	0.324 U
Copper	45000	NLE	**9.21 B**	NT	**4.53 B**	**5.27 B**	NT	**5.91 B**
Iron	NLE	NLE	**21900**	NT	**10400**	**5660**	NT	**11600**
Lead	800	NLE	**28.0**	NT	**6.79**	**27.8**	NT	**10.5**
Magnesium	NLE	NLE	**2690 B**	NT	**822 B**	**524 B**	NT	**894 B**
Manganese	NLE	NLE	**52.4**	NT	**35.0**	**24.1**	NT	**29.7**
Nickel (Soluble Salts)	2400	NLE	**6.55**	NT	**3.32**	**2.15**	NT	**3.19**
Potassium	NLE	NLE	**5250**	NT	**1310**	**770**	NT	**1400**
Vanadium	7100	NLE	**33.7**	NT	**30.6**	**16.6**	NT	**36.1**
Zinc	1500	NLE	**51.9 B**	NT	**51.4 B**	**31.1 B**	NT	**47.9 B**

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.5-4
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters in Soil (mg/kg) South of Corregidor Road

Chemical	NRDCSCC[2]	IGWSCC[3]	Sample ID: / Lab ID: / Date Sampled: / Depth (ft. bgs): P28-TP1 7050603 12/4/2007 6.5-7.0' Result	P28-TP2-A 7050605 12/4/2007 4.5-5.0' Result	P28-TP2-B 7050606 12/4/2007 5.5-6.0' Result	P28-TP3 7050604 12/4/2007 6.5-7.0 Result	P28-TP3 DUP 7050602 12/4/2007 6.5-7.0 Result	P28-TP4 7051110 12/5/2007 4.5-5.0' Result	P28-TP5 7051117 12/5/2007 6.0-6.5' Result	P28-TP5 DUP 7051102 12/5/2007 6.0-6.5' Result
Volatiles										
Acetone	1000	100	**0.350**	**0.430**	**0.320**	**0.270 J**	**0.370**	**0.520**	**0.550 B**	**0.340**
Semi-Volatiles										
Benzo[b]fluoranthene	4	50	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.130 J**	1.100 U	1.100 U
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.066 J**	1.100 U	1.100 U
Benzo[a]anthracene	4	500	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.120 J**	1.100 U	1.100 U
Benzo[a]pyrene	0.66	100	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.100 J**	1.100 U	1.100 U
Benzo[k]fluoranthene	4	500	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.062 J**	1.100 U	1.100 U
bis(2-Ethylhexyl)phthalate	210	100	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.120 J**
Chrysene	40	500	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.150 J**	1.100 U	1.100 U
Di-n-butylphthalate	10000	100	**0.140 JB**	**0.780 JB**	**0.130 JB**	**0.220 JB**	**0.530 JB**	**0.860 JB**	**1.300 B**	**1.200 B**
Di-n-octyl phthalate	10000	100	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U
Fluoranthene	10000	100	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.270 J**	1.100 U	1.100 U
Phenanthrene	NLE	NLE	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.110 J**	1.100 U	1.100 U
Pyrene	10000	100	1.100 U	1.100 U	1.100 U	1.100 U	1.100 U	**0.260 J**	1.100 U	1.100 U
Metals										
Aluminum	NLE	NLE	**10800 B**	**7980 B**	**6800 B**	**6460 B**	**6570 B**	**3920 B**	**8980 B**	**8320 B**
Arsenic	20	NLE	**5.80**	**5.29**	**4.03**	**5.12**	**4.62**	**4.00**	**4.43**	**3.97**
Barium	47000	NLE	**9.95 B**	**12.0 B**	**9.73 B**	**12.0 B**	**11.8 B**	**17.5 B**	**7.62 B**	**7.08 B**
Beryllium	140	NLE	**0.848**	**0.633**	**0.571**	**0.745**	**0.762**	**0.304**	**0.811**	**0.693**
Cadmium	100	NLE	**0.166**	**0.110**	**0.129**	**0.112**	**0.117**	**0.129**	**0.253**	**0.234**
Calcium	NLE	NLE	**327 B**	**488 B**	**404 B**	**171 B**	**173 B**	**373 B**	**685 B**	**650 B**
Chromium	NLE	NLE	**109**	**81.7**	**73.2**	**99.1**	**89.2**	**28.7**	**130**	**115**
Cobalt	NLE	NLE	**0.373**	0.338 U	0.322 U	**0.622**	**1.57**	0.320 U	0.342 U	**0.398**
Copper	45000	NLE	**4.93 B**	**3.64 B**	**2.91 B**	**4.38 B**	**4.63 B**	**4.80 B**	**4.62 B**	**4.60 B**
Iron	NLE	NLE	**23000**	**19900**	**16400**	**21200**	**20600**	**7960**	**23700**	**20900**
Lead	800	NLE	**1.49**	**0.458**	**1.12**	**5.07**	**4.25**	**9.74**	**1.16**	**1.84**
Magnesium	NLE	NLE	**2900 B**	**2040 B**	**1860 B**	**2460 B**	**2420 B**	**794 B**	**2460 B**	**2300 B**
Manganese	NLE	NLE	**11.6**	**21.9**	**14.0**	**12.3**	**20.3**	**22.1**	**11.6**	**10.0**
Nickel	2400	NLE	**4.46**	**3.48**	**2.83**	**3.72**	**3.67**	**2.87**	**3.88**	**4.09**
Potassium	NLE	NLE	**5850**	**4350**	**4010**	**5340**	**5240**	**1280**	**5450**	**4820**
Vanadium	7100	NLE	**61.7**	**48.8**	**40.6**	**45.0**	**44.4**	**24.3**	**55.1**	**49.4**
Zinc	1500	NLE	**41.1 B**	**27.6 B**	**22.6 B**	**32.0 B**	**38.6 B**	**22.6 B**	**51.0 B**	**46.0 B**

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.5-5
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters in Soil (mg/kg) North of Corregidor Road

				Analytical Results						
			Sample ID:	P28-SB3-A	P28-SB3-B	P28-SB3-C	P28-SS4-A	P28-SS4-B	P28-SS5-A	P28-SS5-B
			Lab ID:	7051107	7051108	7051109	7051103	7051104	7051105	7051106
			Date Sampled:	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007	12/5/2007
			Depth (ft. bgs):	0.0-0.5'	1.5-2.0'	5.0-5.5'	0.0-0.5'	1.5-2.0'	0.0-0.5'	1.5-2.0'
Chemical	RDCSCC[1]	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result	Result	Result	Result	Result
Volatiles										
Acetone	1000	1000	100	NT	**0.430**	**0.580**	NT	**0.430**	NT	**0.420**
Semi-Volatiles										
Benzo[b]fluoranthene	0.9	4	50	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Indeno[1,2,3-cd]pyrene	0.9	4	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Benzo[a]anthracene	0.9	4	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Benzo[a]pyrene	0.66	0.66	100	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Benzo[k]fluoranthene	0.9	4	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
bis(2-Ethylhexyl)phthalate	49	210	100	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Chrysene	9	40	500	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Di-n-butylphthalate	5700	10000	100	**0.940 JB**	NT	**0.950 JB**	**0.510 JB**	NT	**0.420 JB**	NT
Di-n-octyl phthalate	1100	10000	100	1.200 U	NT	**0.087 J**	1.200 U	NT	1.200 U	NT
Fluoranthene	2300	10000	100	**0.074 J**	NT	1.200 U	1.200 U	NT	1.200 U	NT
Phenanthrene	NLE	NLE	NLE	1.200 U	NT	1.200 U	1.200 U	NT	1.200 U	NT
Pyrene	1700	10000	100	**0.073 J**	NT	1.200 U	1.200 U	NT	1.200 U	NT
Metals										
Aluminum	NLE	NLE	NLE	**13900 B**	NT	**17700 B**	**15100 B**	NT	**14500 B**	NT
Arsenic	20	20	NLE	**14.6**	NT	**20.7**	**14.9**	NT	**19.1**	NT
Barium	700	47000	NLE	**37.1 B**	NT	**36.3 B**	**59.0 B**	NT	**48.4 B**	NT
Beryllium	16	140	NLE	**1.77**	NT	**2.11**	**2.33**	NT	**2.12**	NT
Cadmium	39	100	NLE	**0.602**	NT	**0.785**	**0.853**	NT	**0.824**	NT
Calcium	NLE	NLE	NLE	**1090 B**	NT	**330 B**	**1650 B**	NT	**1630 B**	NT
Chromium (Total)	NLE	NLE	NLE	**132**	NT	**194**	**172**	NT	**151**	NT
Cobalt	NLE	NLE	NLE	**1.98**	NT	**1.74**	**2.97**	NT	**2.16**	NT
Copper	3100	45000	NLE	**7.43 B**	NT	**4.57 B**	**11.6 B**	NT	**13.0 B**	NT
Iron	NLE	NLE	NLE	**50900**	NT	**60600**	**65100**	NT	**62100**	NT
Lead	400	800	NLE	**6.80**	NT	0.401 U	**28.0**	NT	**18.8**	NT
Magnesium	NLE	NLE	NLE	**6160 B**	NT	**7910 B**	**8240 B**	NT	**7700 B**	NT
Manganese	NLE	NLE	NLE	**36.6**	NT	**26.4**	**63.4**	NT	**34.5**	NT
Nickel (Soluble Salts)	250	2400	NLE	**9.34**	NT	**10.8**	**12.6**	NT	**10.9**	NT
Potassium	NLE	NLE	NLE	**13300**	NT	**18300**	**18700**	NT	**17100**	NT
Vanadium	370	7100	NLE	**63.6**	NT	**91.2**	**70.8**	NT	**71.6**	NT
Zinc	1500	1500	NLE	**77.6 B**	NT	**82.0 B**	**105 B**	NT	**110 B**	NT

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

mg/kg = milligram per kilogram.

NT = Not tested.

NLE = No limit established.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

Table 3.5-6
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters Detected in Groundwater (µg/L)

		Analytical Results				
	Sample ID:	P28GW-1	P28GW-1 DUP	P28GW-2	P28GW-3	P28GW-4
	Lab ID:	7051404	7051403	7051405	7051406	7051407
	Date Sampled:	12/06/2007	12/06/2007	12/06/2007	12/06/2007	12/06/2007
	Screened Interval (ft. bgs):	6-11'	6-11'	2.5-7.5'	3-8'	5-10'
Chemical	Quality Criteria[1]	Result	Result	Result	Result	Result
Volatiles						
Acetone	6,000	**1.33**	0.85 U	0.85 U	**1.25**	**1.43**
Chloroform	70	0.32 U	0.32 U	**0.66**	0.32 U	0.32 U
Toluene	600	0.27 U	0.27 U	**0.38**	0.27 U	0.27 U
Semi-Volatiles						
bis(2-Ethylhexyl)phthalate	3	**2.07 B**	1.28 U	1.28 U	**0.94 JB**	**2.30 B**
Metals						
Aluminum	200	**198**	**80.4**	**75.6**	**550**	**973**
Barium	6,000	**27.8**	**24.9**	**13.9**	**77.2**	**92.0**
Beryllium	1	0.100 U	0.100 U	0.100 U	**0.507**	**0.533**
Cadmium	4	0.200 U	0.200 U	**0.314 B**	**0.388 B**	**0.533 B**
Calcium	NLE	**5540**	**5200**	**5910**	**7160**	**30400**
Chromium (Total)	70	0.200 U	0.200 U	0.200 U	**2.34**	0.200 U
Cobalt	100*	0.200 U	0.200 U	0.200 U	**6.21**	**5.99**
Magnesium	NLE	**3220**	**3000**	**2060**	**8210**	**7380**
Manganese	50	**56.9**	**53.3**	**8.36**	**50.0**	**248**
Nickel (Soluble Salts)	100	0.300 U	0.300 U	0.300 U	**21.0**	**5.03**
Potassium	NLE	**3270**	**2980**	**507**	**2000**	**3520**
Sodium	50,000	**4670 B**	**4250 B**	**48800 B**	**4850 B**	**14700 B**
Zinc	2,000	3.58 U	3.58 U	3.58 U	**65.0**	**35.8**
Anions						
Nitrate	10,000	**2040**	**2220**	**550**	NT	NT
Nitrite	1,000	200 U	200 U	**250**	NT	NT

[1] Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

Bold = Analyte was detected.

Shaded = Concentration exceeds Quality Criteria.

µg/L = micrograms per liter.

Table 3.5-7
Fort Monmouth Phase II Site Investigation, Parcel 28
Summary of Analytical Parameters Detected in Sediment (mg/kg)

			Analytical Results			
		Sample ID:	P28SD-1	P28SD-1D	P28SD-2	P28SD-2D
		Lab ID:	7050607	7050608	7050609	7050610
		Date Sampled:	12/4/2007	12/4/2007	12/4/2007	12/4/2007
		Depth (ft. bgs):	0.0-0.5	1.0-1.5'	0.0-0.5	1.0-1.5'
Chemical	LEL[1]	SEL[2]	Result	Result	Result	Result
Volatiles						
Acetone	NLE	NLE	**0.440**	**0.480**	**0.390**	**0.330 J**
Semi-Volatiles						
Benzo[a]anthracene	0.320	1480	1.200 U	1.300 U	**0.180 J**	1.300 U
Chrysene	0.340	460	1.200 U	1.300 U	**0.270 J**	1.300 U
Di-n-butylphthalate	NLE	NLE	**0.190 JB**	**0.180 JB**	**0.150 JB**	**0.220 JB**
Fluoranthene	0.750	1020	1.200 U	1.300 U	**0.160 J**	1.300 U
Pyrene	0.490	850	1.200 U	1.300 U	**0.370 J**	1.300 U
Metals						
Aluminum	NLE	NLE	**4710 B**	**5620 B**	**4340 B**	**5630 B**
Arsenic	6	33	**2.32**	**3.39**	**2.75**	**3.20**
Barium	NLE	NLE	**28.7 B**	**40.9 B**	**31.6 B**	**34.3 B**
Beryllium	NLE	NLE	**0.454**	**0.485**	**0.399**	**0.510**
Cadmium	0.6	10	**0.222**	**0.372**	**0.449**	**0.263**
Calcium	NLE	NLE	**964 B**	**1130 B**	**1080 B**	**1150 B**
Chromium (Total)	26	110	**43.0**	**48.7**	**36.8**	**50.6**
Cobalt	NLE	NLE	**0.596**	**0.826**	**1.09**	**0.735**
Copper	16	110	**5.92 B**	**8.61 B**	**11.5 B**	**4.40 B**
Iron	NLE	NLE	**13200**	**21500**	**10600**	**13100**
Lead	31	250	**7.69**	**7.78**	**28.0**	**4.78**
Magnesium	NLE	NLE	**1530 B**	**1590 B**	**1390 B**	**1710 B**
Manganese	NLE	NLE	**24.2**	**36.6**	**31.0**	**31.5**
Nickel (Soluble Salts)	16	75	**5.42**	**6.17**	**5.28**	**5.76**
Potassium	NLE	NLE	**3220**	**3300**	**2150**	**3310**
Vanadium	NLE	NLE	**23.5**	**24.8**	**22.3**	**32.0**
Zinc	120	820	**35.9 B**	**66.7 B**	**55.6 B**	**29.5 B**

[1] NJDEP Freshwater Sediment Screening Values - Lowest Effect Levels, 1998.

[2] NJDEP Freshwater Sediment Screening Guidelines - Severe Effects Levels, 1998.
For non-polar organics (PAHs, organochlorine pesticides, PCBs), the SEL is caluculated from a site-specific TOC level. To calculate a site-specific SEL, TOC is multiplied by the the table SEL. However, no TOC analysis was performed on the FTMM sediment samples. Generally, TOC values range from 1% (10,000 mg/kg) to 10% (100,000 mg/kg) (USEPA, 1998). Since the table SEL is based on 100% TOC, the calculated site-specific SEL would be lower.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte detected.

Shaded = Concentration exceeds LEL.

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P28SD-2D	SD	1-1.5	Chromium	50.6	LEL/SEL	26/110

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P28SD-1	SD	0-0.5	Chromium	43.0	LEL/SEL	26/110
P28SD-1D	SD	1-1.5	Chromium	48.7	LEL/SEL	26/110

LEGEND

- Geoprobe Soil Sample Location
- Geoprobe Soil & Groundwater Sample Location
- Geoprobe Groundwater Sample Location
- Test Pit Soil Sample Location
- Surface Soil Sample Location
- Sediment Sample Location
- Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available.
- Geophysical Investigation Area (Electromagnetic Survey Followed by Targeted Ground Pentrating Radar of Anomalies)
- Geophysical Investigation Area - Ground Penetrating Radar (GPR)
- Building
- Installation Boundary

ECP PARCEL CATEGORY DEFINITIONS

7 Areas that are not evaluated or require additional evaluation.

* Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007).

BRAC PARCEL LABEL DEFINITIONS

8(2)PS
- CONTAMINATION DESCRIPTION
  - HS - Hazardous Substance Storage
  - HR - Hazardous Substance Release
  - PS - Petroleum Storage
  - PR - Petroleum Release
  - (P) - Possible Release or Disposal
- CATEGORY NUMBER
- PARCEL NUMBER

N

SCALE:
0 100 200 400 Feet

Base Realignment and Closure 2005

U.S. Army Corps of Engineers

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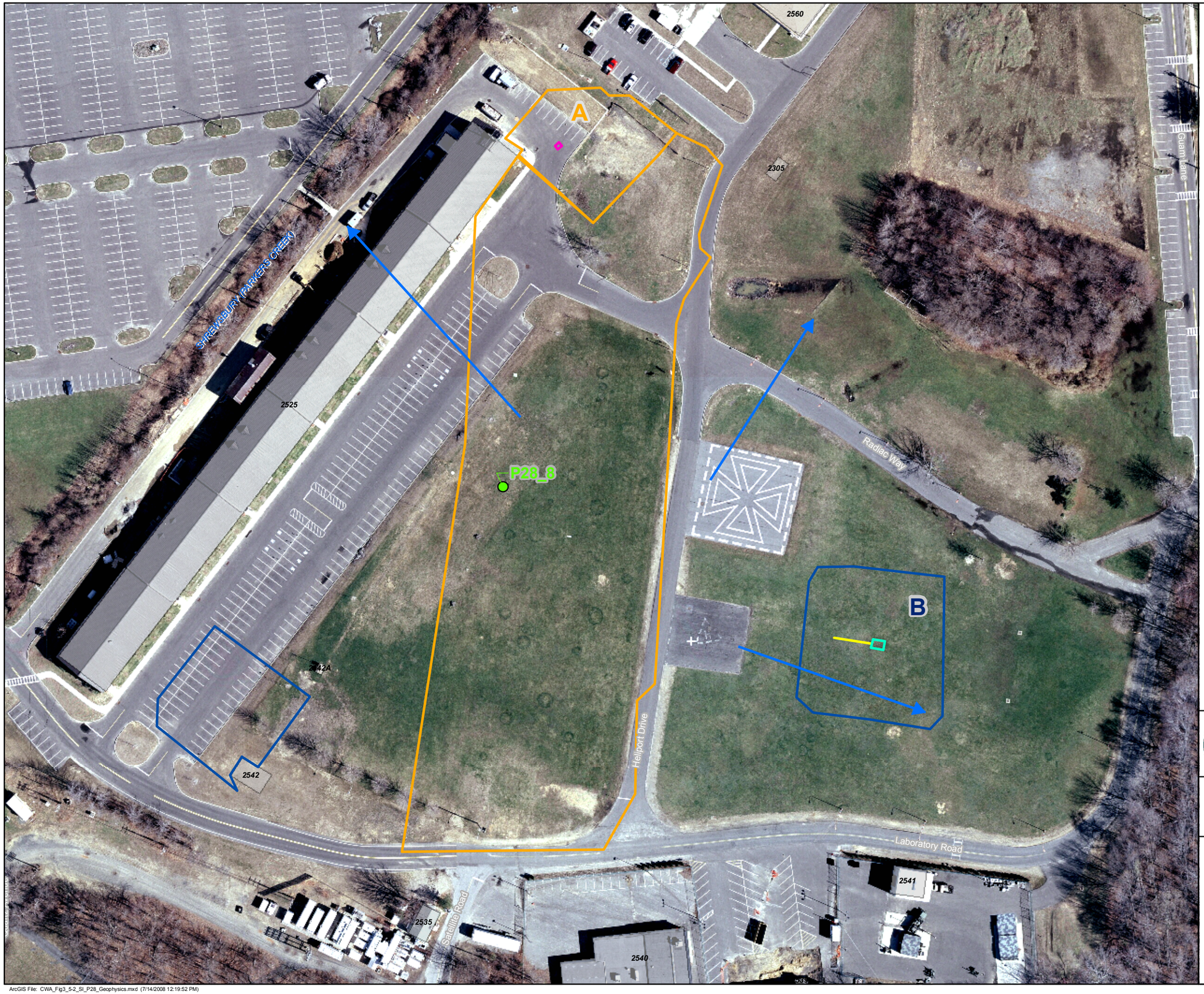
FIGURE 3.5-1

FORT MONMOUTH ECP SITE INVESTIGATION

PARCEL 28 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN

CHARLES WOOD AREA
FORT MONMOUTH
NEW JERSEY

ArcGIS File: CWA_Fig3_5-1_SI_P28_Exceeds_SampLoc.mxd (7/14/2008 12:13:05 PM)



LEGEND

- Subsurface Metallic Object (Suspected UST)
- Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available.
- Building
- Installation Boundary
- Geophysical Investigation Area (Electromagnetic Survey Followed by Targeted Ground Pentrating Radar of Anomalies)
- Geophysical Investigation Area - Ground Penetrating Radar (GPR)

GPR Scanning Results

- Suspected Pipe
- Suspected Septic System Distribution Tank
- Suspected Septic Tank

N

SCALE:

0 50 100 200 Feet

Base Realignment and Closure 2005

U.S. Army Corps of Engineers

Shaw® Shaw Environmental, Inc.

FIGURE 3.5-2

FORT MONMOUTH ECP
SITE INVESTIGATION

PARCEL 28 SUSPECTED UST
AND GPR SCANNING RESULTS

CHARLES WOOD AREA
FORT MONMOUTH
NEW JERSEY

ArcGIS File: CWA_Fig3_5-2_SI_P28_Geophysics.mxd (7/14/2008 12:19:52 PM)