



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

September 12, 2016

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

**Re: Site Investigation Addendum Letter Report for Parcel 38-Former Outdoor Firing Range, Fort Monmouth, NJ
PI G000000032**

Figures:

- Figure 1 – Layout of Parcel 38 and Sample Locations
- Figure 2 – Parcel 38 Shallow Ground Water Contours – May 2016

Tables:

- Table 1 – 2016 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards
- Table 2 – Groundwater Gauging Data and Elevations (May 23, 2016) and LFPS Sampling Summary
- Table 3 – 2016 Groundwater Sampling Results – Comparison to NJDEP Ground Water Quality Standards

Attachments:

- A. Previous Parcel 38 Correspondence
- B. *1941 Layout of Former Outdoor Pistol Range (1940 – 1955)*, Malcolm Pirnie, 2006
- C. 2016 Soil Boring and Monitoring Well Logs
- D. 2016 Monitoring Well Forms (PAR-38-GW-MW-01 through PAR-38-GW-MW-04)
- E. Low Flow Purge and Sampling Records
- F. *Section 3.7 Parcel 38 – Former Outdoor Pistol Range (1940 – 1955)* of Final Site Investigation Report (U.S. Army BRAC, 2008)

Previous Correspondence (provided in Attachment A):

1. NJDEP letter to the Army dated October 28, 2008, re: *Draft Site Inspection Report, Fort Monmouth, NJ*
2. NJDEP letter to the Army dated July 10, 2012, re: *March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008, Fort Monmouth, NJ, PI G000000032*
3. NJDEP letter to the Army dated December 30, 2015, re: *Revisions 1 – Final Environmental Condition of Property Supplemental Phase II Site Inspection Work Plan Addendum for Parcels 28, 38, 39, 49, 57, 61 and 69 dated November 2015, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) has reviewed and summarized relevant information concerning environmental investigations for the non-Installation Restoration Program (non-IRP) Parcel 38 - Former Outdoor Firing Range. This Site Investigation (SI) Addendum Letter Report provides an overview of information for the site, including results of the recently completed 2016 investigation.

1.0 OBJECTIVES

The objective of the Supplemental Environmental Condition of Property (ECP) Phase II SI field work at Parcel 38, as described in the ECP Phase II SI Work Plan (WP) (Parsons, 2015), was to complete investigations to address the New Jersey Department of Environmental Protection (NJDEP) comments on the 2008 SI (NJDEP, 2008; **Correspondence 1**). The NJDEP issued a letter (**Correspondence 2**) on July 10, 2012, which indicated that the 2008 SI surface soil sampling was not adequate due to the possibility that the soils had been reworked, and that groundwater sampling (not previously performed) was also required. Although the SI did not identify contaminants of concern (COCs), the proposed supplemental SI activities were intended to address the NJDEP's comments to determine if there are impacts of metals to the soil and groundwater from the former firing range operations. The NJDEP issued a letter on the Final ECP Phase II SI WP dated December 30, 2015 (**Correspondence 3**). All previous correspondence is provided in **Attachment A**.

2.0 SITE DESCRIPTION

The location and layout of Parcel 38 is presented in **Figure 1**. Parcel 38 is located in the northwestern portion of the Main Post (MP), northwest of Building 200. Parcel 38 consists of the Former Outdoor Firing Range, which was used from approximately 1940 to 1955. A 1941 map illustrates the pistol range layout (Malcolm Pirnie, 2006; **Attachment B**). Former range structures, including the backstop berm, have been demolished or removed (U.S. Army BRAC, 2008). According to Malcolm Pirnie, Inc. (2006): *"It is assumed that the small arms were fired into a backstop berm that has since been removed. The presence of a berm was not identified on historical maps or during the site visit."* There have been no observations of small arms munitions debris to date. Based on NJDEP comments (**Correspondence 1 and 2**), the conceptual model is that the soils at the range were "re-worked" after the range was removed and the area was no longer used for range purposes. Using that conceptual model, the soils would have been re-worked to a depth of 36 inches, as noted in NJDEP's December 30, 2015 letter (**Correspondence 3**). Re-working of soil for development or other infrastructure purposes would have involved heavy machinery scraping or tilling soil to achieve the required grades (currently, a parking lot covers a portion of the former range). That process would result in significant mixing and homogenization of the soil within the former range area.

The Parcel 38 area is currently occupied by a parking lot associated with Building 200 (formerly used as the Range House) and landscaped areas. Munitions associated with the former range are assumed to be small arms ammunition only; therefore, no munitions and explosives of concern and limited munitions constituents (MC) are anticipated (U.S. Army BRAC, 2008). The primary MC associated with small arms ranges is lead (U.S. Army BRAC, 2008).

The soil at the Parcel 38 consists of primarily of sand with some silt to at least five feet below ground surface (bgs). Deeper soils consist of green to light green organic silts and silty clays. Soil boring and monitoring well logs and forms from this SI Addendum are provided in **Attachment C** and **Attachment D**. The depth to groundwater at the MP typically ranges from two to nine feet bgs. At Parcel 38, the groundwater depth in monitoring wells PAR-38-GW-MW01 through PAR-38-GW-MW04 ranged from approximately 12 to 18 feet bgs in May 2016 (**Attachment E**). Groundwater is expected to flow north toward Lafetra Creek in the vicinity of Parcel 38 based on wells proximal to the site.

3.0 PREVIOUS INVESTIGATIONS

In December 2007, 25 surface soil samples (0 to 6 inches bgs) were collected in the suspected location of the former firing range berm to evaluate potential contamination attributable to historical firing range operations (U.S. Army BRAC, 2008). None of the metals detected exceeded the then-current NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) or non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC), and no contaminants of concern were identified. Historical analytical data are presented in **Attachment F**. No other media have previously been sampled at Parcel 38.

4.0 2016 SOIL RESULTS

Soil samples were collected in April 2016 from 15 locations (PAR-38-SB-01 through PAR-38-SB-15) at Parcel 38. The goal of the sampling approach was to collect representative soil samples from the upper 36 inches of soil to address NJDEP's concern that soils were re-worked. Given the potential that soils could be reworked as described previously in Section 2, an interval sampling scheme (and not continuous sampling) was deemed appropriate to determine if the concentrations of metals in this relatively small interval of soil (36 inches) indicate a release due to the former firing range operations. To achieve the sampling goal, three discrete 6-inch long soils samples were collected from each boring within the upper, middle, and lower portion of the 36-inch column of soil. Professional judgment was used and the potential mixing of soil after being re-worked was considered to formulate the sampling approach, which is consistent with the NJDEP technical guidance for SI of soils (NJDEP, 2015). While NJDEP guidance recommends samples biased toward suspected areas of greatest contamination for an SI (Section 3.6.11), that was not possible at Parcel 38 given the lack of observable metals impacts in soil. The gridded sampling with three vertical samples per 36-inch boring approach (total of 45 samples) used at Parcel 38 is considered sufficient to determine if metal concentrations are greater than the applicable soil remediation standards or if no further action is required.

Soil samples were collected from 0 to 6 inches (0 to 0.5 feet), 15 to 21 inches (1.25 to 1.75 feet), and 30 to 36 inches (2.5 to 3.0 feet) in each boring from the former firing range in accordance with the submitted ECP Phase II SI WP (Parsons, 2015), and where asphalt pavement was present, the samples were collected at equivalent intervals starting just below the asphalt and asphalt base material (**Figure 1**). Soil boring logs are provided in **Attachment C**. Soil samples were collected for laboratory analysis by ALS Environmental (ALS), in Middletown, PA. Lead is the primary risk driver at small arms ranges; however, small arms firing ranges may also contain, in lesser amounts, antimony, copper, zinc, and arsenic (Interstate Technology Regulatory Council [ITRC], 2003). The soil samples were analyzed for lead, antimony, copper, zinc, and arsenic, in accordance with the ECP Phase II SI WP (Parsons, 2015). None of the metals were detected in the soil samples at concentrations exceeding the Residential Direct Contact Soil Remediation Standards, Non-Residential Direct Contact Soil Remediation Standards, or NJDEP Impact to Ground Water Soil Screening Levels (SSLs), as shown in **Table 1**.

5.0 2016 GROUNDWATER RESULTS AND DISCUSSION

Four permanent monitoring wells were installed downgradient (north; PAR-38-GW-MW-01), within (PAR-38-GW-MW-04), cross-gradient to downgradient (east; PAR-38-GW-MW-02), and upgradient (south; PAR-38-GW-MW-03) of the Former Outdoor Firing Range (**Figure 1**). Groundwater elevation and sampling information is provided on **Table 2**. Groundwater elevation contours are provided on **Figure 2**. The wells were installed as approved in the ECP Phase II SI WP (Parsons, 2015), and shown in the monitoring well logs provided in **Attachment C**, and the NJDEP forms provided in **Attachment D**. The monitoring wells were developed using surge and purge methods in accordance with the procedure outlined in the NJDEP Field Sampling Procedures Manual ([FSPM]; NJDEP, 2005). The wells were sampled on May 23, 2016 for small arms munitions metals (antimony, arsenic, copper, lead, and zinc). The samples were collected only after the monitored parameters had achieved stabilization in accordance with the NJDEP FSPM (NJDEP, 2005). Low Flow Purge and Sampling (LFPS) records are provided in **Attachment E**.

Groundwater sampling results for total and dissolved metals samples are summarized in **Table 3**. Unfiltered and filtered sample results were similar so turbidity is not suspected to be a factor affecting the results. As shown in **Attachment E**, the nephelometric turbidity units (NTUs) ranged from 0.2 to 5.26, indicating low turbidity. Antimony was not detected. Copper, lead, and zinc were detected at concentrations less than the NJDEP Ground Water Quality Standards (GWQSs).

The detected concentration of arsenic in one of four unfiltered/total well samples (PAR-38-GW-MW-01; 0.0045 mg/L) slightly exceeded the NJDEP GWQS of 0.003 mg/L. Three of the four well samples were less than the NJDEP GWQS. However, the concentration at PAR-38-GW-MW-01 is less than 0.0893 mg/L, the FTMM-specific naturally occurring concentrations established by Weston (1995). The maximum detected unfiltered concentration was also less than the New Jersey Maximum Contaminant Level (MCL) of 0.005 mg/L (NJDEP, 2011) as well as the U.S. Environmental Protection Agency (USEPA) MCL of 0.01 mg/L (USEPA, 2016). It

should be further noted that none of the historical or current soil samples had concentrations of arsenic in exceedance of the NJDEP Impact to Ground Water SSLs.

The arsenic concentrations in groundwater do not appear to be indicative of a release. The maximum detected concentration in one of four unfiltered samples was only slightly greater than the NJDEP GWQS (0.0045 mg/L compared to 0.003 mg/L). There is no evidence of munitions debris or range structures remaining onsite. Lead is the primary constituent of small arms munitions projectiles, accounting for more than 85% of the mass of a small arms munition projectile (ITRC, 2003; USACE, 2015); therefore, if a release occurred, higher lead concentrations in soil and groundwater would have been expected. Arsenic may be present in pistol ammunition at less than 0.5% of the projectile mass (ITRC, 2003; Larson, et. al., 2007). However, higher concentrations of lead would be expected to be collocated with arsenic releases associated with small arms firing ranges but this was not observed.

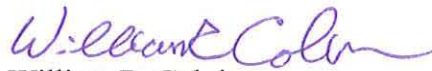
In addition, FTMM is located in an area with glauconitic soils (also known as “greensands” for the color) known to have elevated natural arsenic concentrations, many of which are above the RDCSRS (Dooley, 2001; Barringer, et. al., 2014). Arsenic in subsurface glauconitic soil can leach to groundwater and result in elevated groundwater concentrations (often in concentrations exceeding the NJDEP MCL) attributable to naturally occurring conditions (Barringer, et. al., 2014). Barringer and Reilly (2013) noted that most elevated arsenic concentrations in groundwater worldwide, including in New Jersey, are attributed to naturally occurring soil conditions. Several biogeochemical processes, including sulfide oxidation and reductive dissolution, may enable arsenic to mobilize from arsenic-bearing soils to groundwater (Barringer and Reilly, 2013; Barringer, et. al., 2014). Drilling logs for PAR-38-GW-MW-01 through PAR-38-GW-MW-04 indicate the presence of green to light green organic silts and silty clays in the soil horizon beneath the surface horizon of silty sand (**Attachment D**). The depths of the groundwater samples are consistent with the presence of green clay, indicating the likelihood that the naturally occurring soil conditions contribute to the concentration of arsenic in groundwater, particularly at PAR-38-GW-MW01 where the maximum concentration of arsenic was detected and the log denotes “green” silts and clay.

6.0 SUMMARY

Based on the results of the soil and groundwater sampling, no further investigation is recommended. Metals concentrations in soil were less than the NJDEP RDCSRS. These data, in conjunction with the historical soil sampling data (for a total of 70 samples across the former firing range area), indicate there are no releases to the soil. Arsenic was the only metal detected in the groundwater at a concentration slightly greater than the GWQS and is likely the result of naturally occurring geologic conditions. FTMM is located in an area with glauconitic soils known to have elevated naturally occurring arsenic concentrations. Subsurface soils occurring at depths coincident with the groundwater samples collected at Parcel 38 are noted to consist of green to light green organic silts and silty clays in the soil horizon beneath the surface horizon of silty sand. It is likely naturally occurring soil conditions contribute to the concentration of arsenic in groundwater.

The Army requests a No Further Action designation for Parcel 38. The technical Point of Contact (POC) for this matter is Cris Grill. Ms. Grill can be reached at (617) 449-1583 or by email at cris.grill@parsons.com. Should you have any questions or require additional information, please contact me by phone at (732) 380-7064 or by email at william.r.colvin18.civ@mail.mil.

Sincerely,



William R. Colvin
BRAC Environmental Coordinator

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

REFERENCES CITED:

- Dooley, J.H., 2001. *Baseline concentrations of arsenic, beryllium and associated elements in glauconite and glauconitic soils in the New Jersey Coastal Plain: N.J. Geological Survey Investigation Report, Trenton, N.J.* Available at: <http://www.state.nj.us/dep/dsr/soils/baseline.pdf>.
- Barringer, J.L. and P.A. Reilly, 2013. *Arsenic in Groundwater: A Summary of Sources and the Biogeochemical and Hydrogeologic Factors Affecting Arsenic Occurrence and Mobility.* In *Current Perspectives in Contaminant Hydrology and Water Resources Sustainability*, edited by Paul M. Bradley. Available at: <http://dx.doi.org/10.5772/55354>.
- Barringer, J.L., P.A. Reilly, D.D. Eberl, A.C. Mumford, W.M. Benzel, Z. Szabo, J.L. Shourds, and L.Y. Young, 2014. *Arsenic in New Jersey Coastal Plain Streams, Sediments, and Shallow Groundwater: Effects from Different Geologic Sources and Anthropogenic Inputs on Biogeochemical and Physical Mobilization Processes.* Scientific Investigations Report 2013-5107. Prepared in cooperation with the New Jersey Department of Environmental Protection.
- Interstate Technology Regulatory Council [ITRC], 2003. *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges.* January. Available at: <http://www.itrcweb.org/Guidance/GetDocument?documentID=93>.
- Larson, S.L., C.L. Teeter, V.F. Medina, and W.A. Martin, 2007. *Treatment and Management of Closed or Inactive Small Arms Firing Ranges.* Prepared for U.S. Army Corps of Engineers. ERDC/EL TR-07-6. Final. June.
- Malcolm Pirnie, Inc., 2006. *Final Historical Records Review, Fort Monmouth, New Jersey.* January.

- NJDEP, 2005. Field Sampling Procedures Manual. August. Available at:
<http://www.nj.gov/dep/srp/guidance/fspm/pdf/fsmp2005.pdf>.
- NJDEP, 2011. New Jersey Administrative Code 7:10. Safe Drinking Water Act Rules. Last amended January 4, 2011. Available at: http://www.nj.gov/dep/rules/rules/njac7_10.pdf
- NJDEP. 2015. *Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil*. March 15, ver. 1.2
- Parsons, 2015. *Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 28, 38, 39, 49, 57, 61 and 69 for Remedial Investigation/Feasibility Study/Decision Documents*. Final, Revision No. 1, November.
- U.S. Army BRAC, 2007. *Environmental Condition of Property Report. Fort Monmouth, Monmouth County, New Jersey*. Final. January 29.
- U.S. Army BRAC, 2008. *Site Inspection Report Fort Monmouth*. Final. July 21.
- USACE, 2015. *Technical Guidance for Military Munitions Response Actions*. EM 200-1-15. October 30. Available at:
http://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_200-1-15.pdf.
- Weston. 1995. *Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey*. December.



New Jersey Department of Environmental Protection
Site Remediation Program

Report Certifications for RCRA GPRA 2020, CERCLA, and Federal Facility Sites

These certifications are to be used for reports submitted for RCRA GPRA 2020, CERCLA, and Federal Facility Sites. The Department has developed guidance for report certifications for RCRA GPRA 2020, CERCLA, and Federal Facility Sites under traditional oversight. The "Person Responsible for Conducting the Remediation Information and Certification" is required to be submitted with each report. For those sites that are required or opt to use a Licensed Site Remediation Professional (LSRP) the report must also be certified by the LSRP using the "Licensed Site Remediation Professional Information and Statement". For additional guidance regarding the requirement for LSRPs at RCRA GPRA 2020, CERCLA and Federal Facility Sites see http://www.nj.gov/dep/srp/srra/training/matrix/quick_ref/rcra_cercla_fed_facility_sites.pdf.

Document: "Site Investigation Addendum Letter Report for Parcel 38-Former Outdoor Firing Range"

PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: William R. Colvin

Representative First Name: William Representative Last Name: Colvin

Title: BRAC Environmental Coordinator

Phone Number: (732) 380-7064

Ext: _____

Fax: _____

Mailing Address: P.O. Box 148

City/Town: Oceanport

State: NJ

Zip Code: 07757

Email Address: william.r.colvin18.civ@mail.mil

This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature: _____

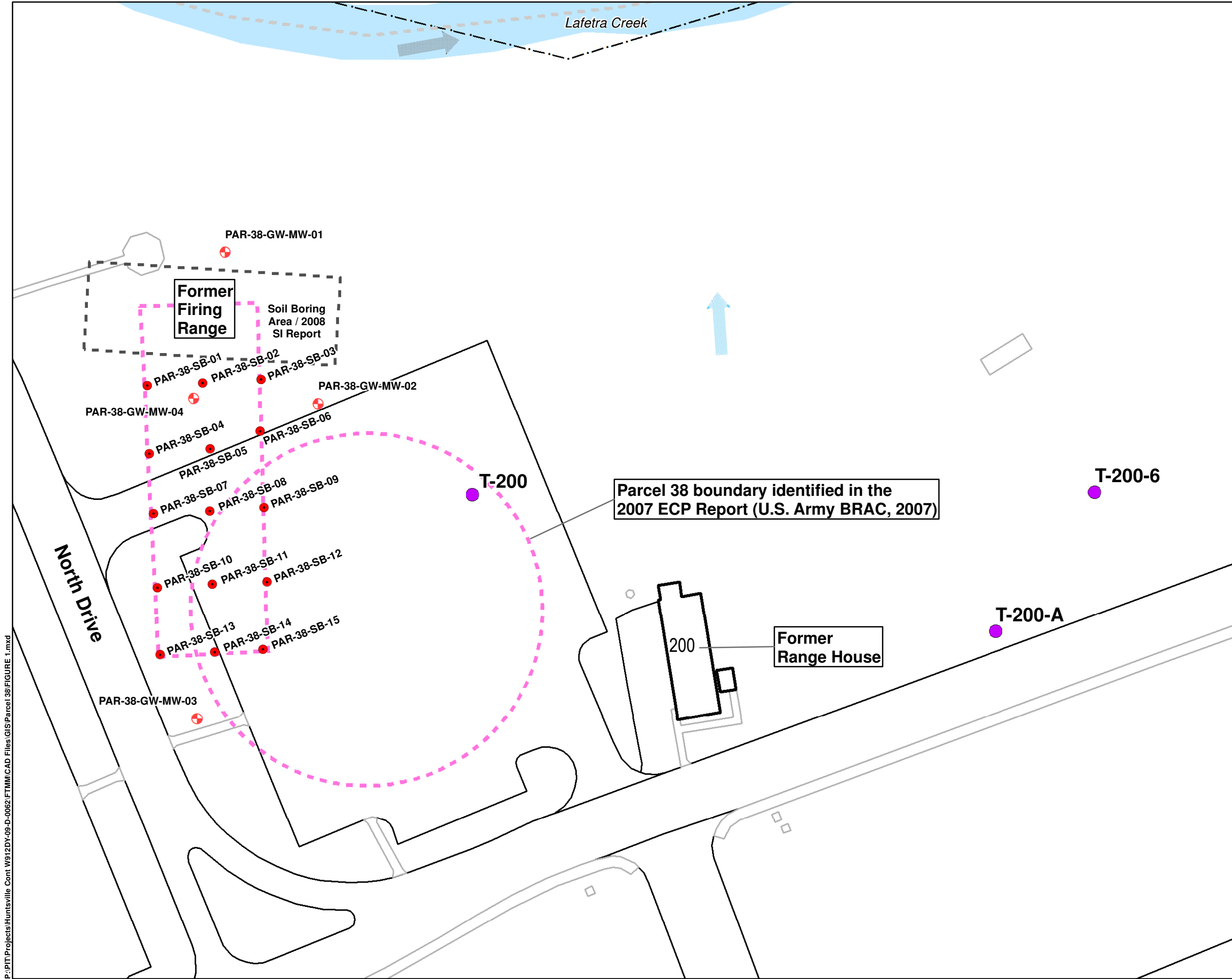
Date: 9/12/2016

Name/Title: William R. Colvin / BRAC Environmental Coordinator

FIGURES

Figure 1 - Layout of Parcel 38 and Sample Locations

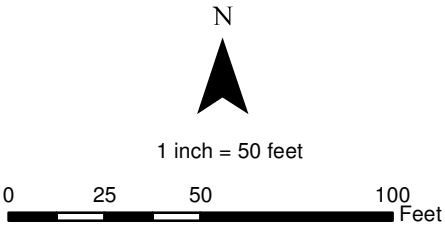
Figure 2 – Parcel 38 Shallow Ground Water Contours – May 2016



LEGEND:

- Shallow Soil Boring Location (for analysis of lead, antimony, copper, zinc, and arsenic) (2016)
- ⊕ Groundwater Monitoring Well (for analysis of lead, antimony, copper, zinc, and arsenic) (2016)
- Former Tower Location
- 2008 SI Soil Boring
- Former Firing Range
- Surface Water Feature
- Municipal Boundary
- Installation Boundary
- Inferred Groundwater Flow Direction
- Surface Water Flow Direction

Former Firing Range location based on U.S. Army BRAC. 2008. Site Investigation Report Fort Monmouth. Final. July 21, 2008



Source: FTMM Supplied CAD, 2013; USGS NHD, 2012; U.S. Army BRAC. 2008. Site Investigation Report Fort Monmouth. Final. July 21, 2008.

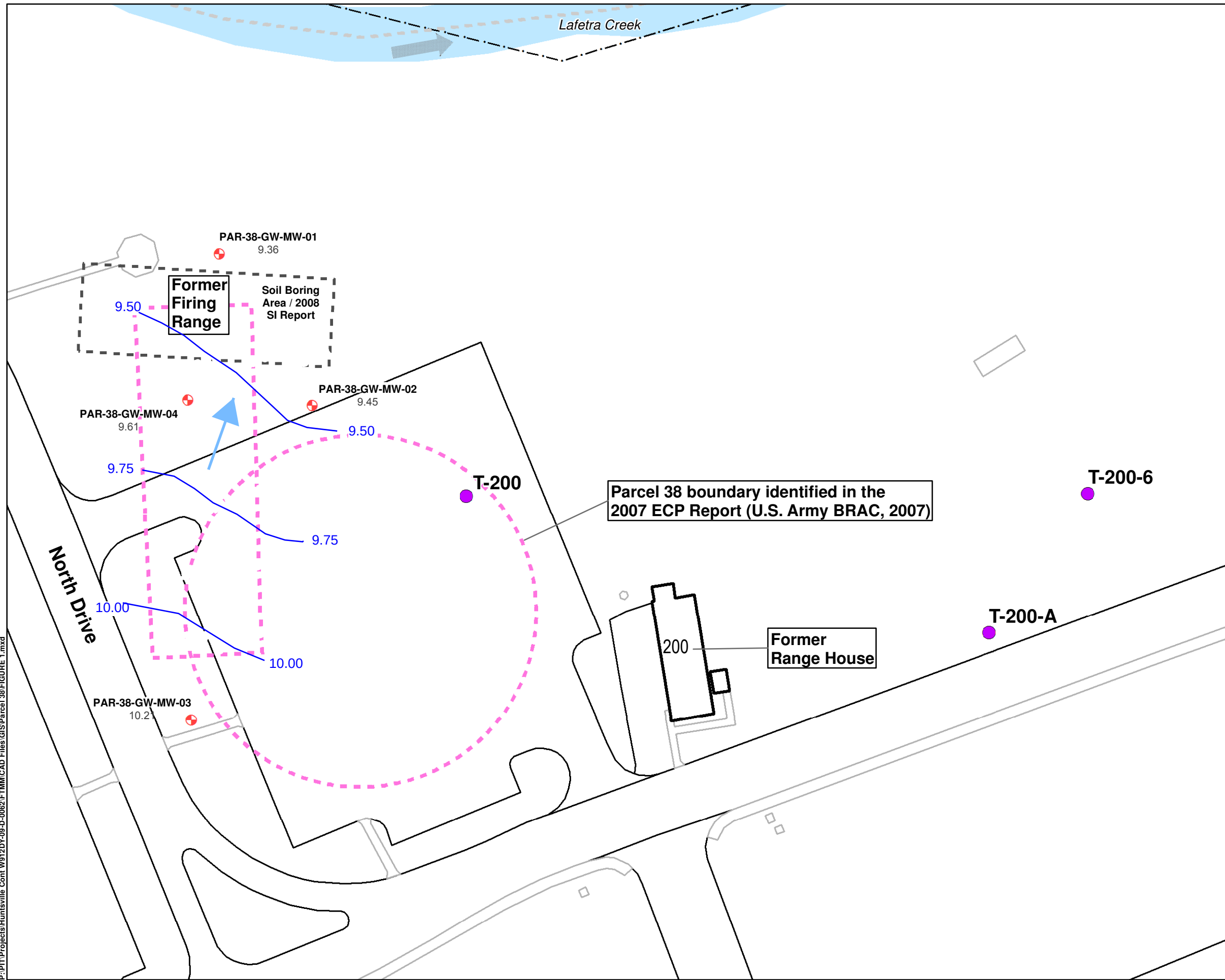
PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

**PARCEL 38 LAYOUT AND
SAMPLING LOCATIONS**

CREATED BY: RR	REVIEWED BY: CM
DATE: AUG. 2016	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-06002	FILE: FIGURE 1.mxd

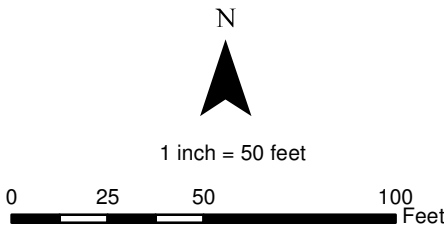
P:\PTT\Projects\Huntsville Cont W912DY-09-P-0062\FTMMCAD Files\GIS\Parcel 38\FIGURE 1.mxd



LEGEND:

- Groundwater Elevation Contour (2016) (NAVD88)
- Groundwater Monitoring Well (2016) (ft bgs)
- Former Tower Location
- 2008 SI Soil Boring
- Former Firing Range
- Surface Water Feature
- Municipal Boundary
- Installation Boundary
- Inferred Groundwater Flow Direction
- Surface Water Flow Direction

Former Firing Range location based on U.S. Army BRAC. 2008. Site Investigation Report Fort Monmouth. Final. July 21, 2008



Source: FTMM Supplied CAD, 2013; USGS NHD, 2012; U.S. Army BRAC. 2008. Site Investigation Report Fort Monmouth. Final. July 21, 2008.

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

**PARCEL 38 SHALLOW GROUND WATER
CONTOURS - MAY 2016**

CREATED BY: CKL	REVIEWED BY: CG
DATE: AUG. 2016	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-06002	FILE: FIGURE 2.mxd

TABLES

Table 1 – 2016 Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards

Table 2 – Groundwater Gauging Data and Elevations (May 23, 2016) and LFPS Sampling Summary

Table 3 – 2016 Groundwater Sampling Results – Comparison to NJDEP Ground Water Quality Standards

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
PARCEL 38
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS ² (mg/kg)	NJ Non- Residential Direct Contact SRS ³ (mg/kg)	NJ Impact to GW Soil Screening Level ⁴ (mg/kg)	Weston 1995 Background (Main Post) (mg/kg)	PAR-38-SB-01				PAR-38-SB-02			PAR-38-SB-03			
Sample ID					PAR-38-SB-01-0-0.5	PAR-38-SB-101-0-0.5	PAR-38-SB-01-1.25-1.75	PAR-38-SB-01-2.5-3	PAR-38-SB-02-0-0.5	PAR-38-SB-02-1.25-1.75	PAR-38-SB-02-2.5-3	PAR-38-SB-03-0-0.5	PAR-38-SB-03-1.25-1.75	PAR-38-SB-03-2.5-3	
Sample Depth Interval (ft) ¹					0-0.5	0-0.5	1.25-1.75	2.5-3	0-0.5	1.25-1.75	2.5-3	0-0.5	1.25-1.75	2.5-3	
Parent Sample (SA) or Field Duplicate (DUP)					SA	DUP	SA	SA	SA	SA	SA	SA	SA	SA	
Sample Date					4/6/2016	4/6/2016	4/6/2016	4/6/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	
Inorganics (mg/kg)															
Antimony	31	450	6	ND	1 J	0.951 J	1.4 J	1.4 J	0.992 J	0.8 J	0.524 J	0.827 J	0.534 J	0.315 J	
Arsenic	19	19	19	22.9	9	9.7	18	16.4	9.3 J	12.9	10	9.9	7.2	8.7	
Copper	3,100	45,000	11,000	8	7.3	8.2	3.4	5.4	10.6	2.2 J	2.9	21.6	2.2	2 J	
Lead	400	800	90	19.5	35.1	32.8	5.4 J	4.6 J	42.9	4.1 J	8.2	23.4	3.6 J	6.5	
Zinc	23,000	110,000	930	81.4	58.2	46.7	25.3	22.1	56.6	38	10.1	36.8	20.7	19	
Wet Chemistry - Solids															
Percent Solids (percent)	NLE	NLE	NLE	-	84.8	76.8	79.8	74.6	77.3	75.5	80.4	87.2	91	90.2	

Footnotes:

1) Soil samples were collected from three intervals (0-0.5 ft bgs, 1.25-1.75 ft bgs, 2.5-3.0 ft bgs) in each boring. Where asphalt pavement was present, the samples were collected at the equivalent intervals beginning just beneath the asphalt and asphalt base material.

2) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

3) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

4) The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.
< = analyte not detected above method detection limit (MDL)
J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.
ND = Not detected.
NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS
Shaded cells = concentration exceeds NJDEP Impact to GW SSL
Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
PARCEL 38
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS ² (mg/kg)	NJ Non- Residential Direct Contact SRS ³ (mg/kg)	NJ Impact to GW Soil Screening Level ⁴ (mg/kg)	Weston 1995 Background (Main Post) (mg/kg)	PAR-38-SB-04				PAR-38-SB-05			PAR-38-SB-06		
Sample ID					PAR-38-SB-04-0-0.5	PAR-38-SB-04-1.25-1.75	PAR-38-SB-104-1.25-1.75	PAR-38-SB-04-2.5-3	PAR-38-SB-05-0-0.5	PAR-38-SB-05-1.25-1.75	PAR-38-SB-05-2.5-3	PAR-38-SB-06-0.5-1	PAR-38-SB-06-1.75-2.25	PAR-38-SB-06-3-3.5
Sample Depth Interval (ft) ¹					0-0.5	1.25-1.75	1.25-1.75	2.5-3	0-0.5	1.25-1.75	2.5-3	0.5-1	1.75-2.25	3-3.5
Parent Sample (SA) or Field Duplicate (DUP)					SA	SA	DUP	SA	SA	SA	SA	SA	SA	SA
Sample Date					4/6/2016	4/6/2016	4/6/2016	4/6/2016	4/6/2016	4/6/2016	4/6/2016	4/7/2016	4/7/2016	4/7/2016
Inorganics (mg/kg)														
Antimony	31	450	6	ND	0.975 J	1.1 J	1.4 J	1.2 J	1.4 J	1 J	0.893 J	0.36 J	0.412 J	0.469 J
Arsenic	19	19	19	22.9	15.8	14.4	17.2	8.6	11.7	10.1	7.8	2.4	9.8	9.2
Copper	3,100	45,000	11,000	8	9.8	3	3.1	2.8	9.1	12.3	3.2	58.2	16.5	3
Lead	400	800	90	19.5	26	5.2 J	4.4 J	4.6 J	45.6	44.6 J	8.7	27	14.7	8
Zinc	23,000	110,000	930	81.4	52.2	40.1	39	27.3	45.3	42.8	12.1	21.6	48.7	16.7
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	84.6	81.6	82.3	81.5	71.4	78.5	82.1	93.6	84.9	80.8

Footnotes:

1) Soil samples were collected from three intervals (0-0.5 ft bgs, 1.25-1.75 ft bgs, 2.5-3.0 ft bgs) in each boring. Where asphalt pavement was present, the samples were collected at the equivalent intervals beginning just beneath the asphalt and asphalt base material.

2) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

3) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

4) The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.
< = analyte not detected above method detection limit (MDL)
J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.
ND = Not detected.
NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS
Shaded cells = concentration exceeds NJDEP Impact to GW SSL
Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
PARCEL 38
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS ² (mg/kg)	NJ Non- Residential Direct Contact SRS ³ (mg/kg)	NJ Impact to GW Soil Screening Level ⁴ (mg/kg)	Weston 1995 Background (Main Post) (mg/kg)	PAR-38-SB-07				PAR-38-SB-08			PAR-38-SB-09		
Sample ID					PAR-38-SB-07-1-1.5	PAR-38-SB-07-2.25-2.75	PAR-38-SB-07-4-4.5	PAR-38-SB-107-4-4.5	PAR-38-SB-08-0.5-1	PAR-38-SB-08-1.75-2.25	PAR-38-SB-08-3.5-4	PAR-38-SB-09-0.5-1	PAR-38-SB-09-1.75-2.25	PAR-38-SB-09-3-3.5
Sample Depth Interval (ft) ¹					1-1.5	2.25-2.75	4-4.5	4-4.5	0.5-1	1.75-2.25	3.5-4	0.5-1	1.75-2.25	3-3.5
Parent Sample (SA) or Field Duplicate (DUP)					SA	SA	SA	DUP	SA	SA	SA	SA	SA	SA
Sample Date					4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016
Inorganics (mg/kg)														
Antimony	31	450	6	ND	2.6 J	1.3 J	0.731 J	0.895 J	2.3 J	2.8 J	< 3.5 UJ	0.446 J	2.6 J	3.1 J
Arsenic	19	19	19	22.9	15	7.5	2.5 J	5.4 J	9.3	12.2	12.7 J	2.7	8.3	15.8
Copper	3,100	45,000	11,000	8	2.4 J	3.4	0.806 J	0.927 J	7.6	1.8 J	2 J	71.5	2.8	2.7
Lead	400	800	90	19.5	5.8 J	10	4 J	3.1 J	23.9	5.7 J	18.1 J	45.1	6.7	6.8
Zinc	23,000	110,000	930	81.4	40.1	13.1	9	10.3	41	35.3	19.3 J	20.1	40.9	40.2
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	77.5	75.8	85.6	85.3	84.6	86	84.1	94.3	84.9	85.7

Footnotes:

1) Soil samples were collected from three intervals (0-0.5 ft bgs, 1.25-1.75 ft bgs, 2.5-3.0 ft bgs) in each boring. Where asphalt pavement was present, the samples were collected at the equivalent intervals beginning just beneath the asphalt and asphalt base material.

2) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

3) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

4) The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.
< = analyte not detected above method detection limit (MDL)
J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.
ND = Not detected.
NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS
Shaded cells = concentration exceeds NJDEP Impact to GW SSL
Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS
PARCEL 38
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS ² (mg/kg)	NJ Non- Residential Direct Contact SRS ³ (mg/kg)	NJ Impact to GW Soil Screening Level ⁴ (mg/kg)	Weston 1995 Background (Main Post) (mg/kg)	PAR-38-SB-10			PAR-38-SB-11			PAR-38-SB-12		
Sample ID					PAR-38-SB-10-0-0.5	PAR-38-SB-10-1.2-1.75	PAR-38-SB-10-2.5-3	PAR-38-SB-11-0.5-1	PAR-38-SB-11-1.75-2.25	PAR-38-SB-11-3-3.5	PAR-38-SB-12-0.5-1	PAR-38-SB-12-1.75-2.25	PAR-38-SB-12-3-3.5
Sample Depth Interval (ft) ¹					0-0.5	1.25-1.75	2.5-3	0.5-1	1.75-2.25	3-3.5	0.5-1	1.75-2.25	3-3.5
Parent Sample (SA) or Field Duplicate (DUP)					SA	SA	SA	SA	SA	SA	SA	SA	SA
Sample Date					4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016
Inorganics (mg/kg)													
Antimony	31	450	6	ND	1.1 J	0.812 J	2.3 J	1.7 J	3 J	2.8 J	3.5 J	3 J	2.8 J
Arsenic	19	19	19	22.9	8.8	7.5	6.5	8.5	9.7	3.1	13	18.9	12.4
Copper	3,100	45,000	11,000	8	5.6	3.6	3.6	34.1	5.9	5.4	2.5	4.3	5.7
Lead	400	800	90	19.5	25	6.9	5.9 J	43.4	4.2 J	4.6 J	5.5 J	7.8	7
Zinc	23,000	110,000	930	81.4	43	10.9	21.9	67.9	19.1	29.3	36.8	26.4	18
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	85.3	85.4	77.8	85.9	82	86	86	82.2	80.8

Footnotes:

1) Soil samples were collected from three intervals (0-0.5 ft bgs, 1.25-1.75 ft bgs, 2.5-3.0 ft bgs) in each boring. Where asphalt pavement was present, the samples were collected at the equivalent intervals beginning just beneath the asphalt and asphalt base material.

2) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

3) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

4) The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.
< = analyte not detected above method detection limit (MDL)
J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.
ND = Not detected.
NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS
Shaded cells = concentration exceeds NJDEP Impact to GW SSL
Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

TABLE 1 SOIL SAMPLING RESULTS - COMPARISON TO NJDEP SOIL REMEDIATION STANDARDS PARCEL 38 FORT MONMOUTH, NEW JERSEY													
Loc ID	NJ Residential Direct Contact SRS ² (mg/kg)	NJ Non- Residential Direct Contact SRS ³ (mg/kg)	NJ Impact to GW Soil Screening Level ⁴ (mg/kg)	Weston 1995 Background (Main Post) (mg/kg)	PAR-38-SB-13			PAR-38-SB-14			PAR-38-SB-15		
Sample ID					PAR-38-SB-13-0-0.5	PAR-38-SB-13-1.25-175	PAR-38-SB-13-2.5-3	PAR-38-SB-14-0-0.5	PAR-38-SB-14-1.25-1.75	PAR-38-SB-14-2.5-3	PAR-38-SB-15-0.5-1	PAR-38-SB-15-1.25-1.75	PAR-38-SB-15-3-3.5
Sample Depth Interval (ft) ¹					0-0.5	1.25-175	2.5-3	0-0.5	1.25-1.75	2.5-3	0.5-1	1.25-1.75	3-3.5
Parent Sample (SA) or Field Duplicate (DUP)					SA	SA	SA	SA	SA	SA	SA	SA	SA
Sample Date					4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016	4/7/2016
Inorganics (mg/kg)													
Antimony	31	450	6	ND	0.311 J	0.414 J	< 3.7	< 3.8	0.547 J	0.211 J	0.298 J	0.272 J	0.244 J
Arsenic	19	19	19	22.9	8	5.4	2.8	7.8	7.3	3.6	6.6	7.3	8.1
Copper	3,100	45,000	11,000	8	6.8	6	6.3	2.6	3.3	4.5	4.7	6.7	7.8
Lead	400	800	90	19.5	38.1	5.2 J	12.9	6.4	4.5 J	10.8	3.3 J	6.4	4.4 J
Zinc	23,000	110,000	930	81.4	38.7	21	16.3	20.4	23.6	16.6	22.1	21.8	23.3
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	70.7	82.8	81.1	79.1	81.9	85.3	79.8	82.1	82

Footnotes:

1) Soil samples were collected from three intervals (0-0.5 ft bgs, 1.25-1.75 ft bgs, 2.5-3.0 ft bgs) in each boring. Where asphalt pavement was present, the samples were collected at the equivalent intervals beginning just beneath the asphalt and asphalt base material.

2) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

3) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

4) The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.
< = analyte not detected above method detection limit (MDL)
J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.
ND = Not detected.
NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS
Shaded cells = concentration exceeds NJDEP Impact to GW SSL
Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

Table 2
Groundwater Gauging Data and Elevations (May 23, 2016) and LFPS Sampling Summary
Parcel 38
Environmental Conditions of Property Phase II SI Report
Fort Monmouth, New Jersey

Site/Well ID	Installation Date	Well Permit #	Y Coord. (North)	X Coord. (East)	Depth (ft. bgs)	Casing Length (ft)	Screen Length (ft)	TOC Elevation (ft)	Gauge Time	PID Reading (ppm)	Gauged Depth to Water (ft. TOC)	Gauged Depth to Bottom (ft. TOC)	Calculated Groundwater Elevation (ft)	Well Sampled this Event
Shallow Monitoring Wells														
PAR-38-MW-01	4/8/2016	E201602891	539053.00	615944.00	21.0	10.4	10.0	22.07	9:15	0.0	12.71	20.36	9.36	Yes
PAR-38-MW-02	4/8/2016	E201602892	538975.00	615991.00	20.0	13.1	10.0	27.52	9:12	0.0	18.07	23.14	9.45	Yes
PAR-38-MW-03	4/8/2016	E201602893	538814.00	615929.00	17.0	14.4	10.0	28.66	9:06	0.0	18.45	24.40	10.21	Yes
PAR-38-MW-01	4/8/2016	E201602894	538978.00	615928.00	19.5	12.7	10.0	25.30	9:14	0.0	15.69	22.73	9.61	Yes

Notes:

- 1) ft = feet
- 2) DTW = depth to water (measured from the top of well casing)
- 3) DTB = depth to bottom of well (measured from the top of well casing)
- 4) bgs = below ground surface
- 5) ppm = parts per million (of VOCs)
- 6) TOC = Top of Casing
- 7) Elevation = feet above mean sea level
- 8) N/A = information not available
- 9) LFPS = Low-Flow Purging and Sampling

TABLE 3
GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUND WATER QUALITY
STANDARDS
PARCEL 38
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria ¹ (mg/L)	Weston 1995 Background (Main Post) (mg/L)	PAR-38-GW-MW01		PAR-38-GW-MW02	
Sample ID			PAR-38-GW-MW01-16.5	PAR-38-GW-MW01-16.5 DISSOLVED	PAR-38-GW-MW02-20.6	PAR-38-GW-MW02-20.6 DISSOLVED
Sample Depth Interval (FT)			16.5-16.5	16.5-16.5	20.6-20.6	20.6-20.6
Sample Date			5/23/2016	5/23/2016	5/23/2016	5/23/2016
Filtered?			Total	Dissolved	Total	Dissolved
Inorganics (mg/L)						
Antimony ²	0.006	0.0207	< 0.01	< 0.0066	< 0.01	< 0.0066
Arsenic	0.003	0.0893	0.0045 J	0.0097 J	0.0023 J	0.0037 J
Copper	1.3	0.0656	< 0.0036	< 0.0033	0.0051 J	0.0081 J
Lead	0.005	0.0227	< 0.0022	0.002 J	< 0.0022	0.002 J
Zinc	2	0.233	0.12	0.13	0.07	0.076

Footnotes:

- 1) NJDEP Ground Water Quality Criteria
(<http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf>). NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).
- 2) ALS was unable to reanalyze antimony using Method 6020 to achieve lower detection limits because of QC failures with Method 6020. The Method 6010 analysis, which provides for the higher detection limit and exceeds the standard, did not have QC reporting failures at the lab.

Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.

J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

Shaded cells = concentration exceeds NJ Ground Water Quality Criteria -
Adopted July 22, 2010

Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

TABLE 3
GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUND WATER QUALITY
STANDARDS
PARCEL 38
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria ¹ (mg/L)	Weston 1995 Background (Main Post) (mg/L)	PAR-38-GW-MW03		PAR-38-GW-MW04	
Sample ID			PAR-38-GW-MW03-21.4	PAR-38-GW-MW03-21.4 DISSOLVED	PAR-38-GW-MW04-19.2	PAR-38-GW-MW04-19.2 DISSOLVED
Sample Depth Interval (FT)			21.4-21.4	21.4-21.4	19.2-19.2	19.2-19.2
Sample Date			5/23/2016	5/23/2016	5/23/2016	5/23/2016
Filtered?			Total	Dissolved	Total	Dissolved
Inorganics (mg/L)						
Antimony ²	0.006	0.0207	< 0.01	< 0.0066	< 0.01	< 0.0066
Arsenic	0.003	0.0893	< 0.001	< 0.0026	0.002 J	0.003 J
Copper	1.3	0.0656	< 0.0036	0.004 J	< 0.0036	0.0036 J
Lead	0.005	0.0227	0.0022 J	0.0025 J	< 0.0022	0.0024 J
Zinc	2	0.233	0.13	0.15	0.51	0.54

Footnotes:

1) NJDEP Ground Water Quality Criteria (<http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf>). NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

2) ALS was unable to reanalyze antimony using Method 6020 to achieve lower detection limits because of QC failures with Method 6020. The Method 6010 analysis, which provides for the higher detection limit and exceeds the standard, did not have QC reporting failures at the lab.

Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

Bold chemical detection
[blank] = detect, i.e. detected chemical result value.

J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

Shaded cells = concentration exceeds NJ Ground Water Quality Criteria - Adopted July 22, 2010

Shaded cells = concentration exceeds Weston 1995 Background (Main Post)

ATTACHMENT A
Previous Parcel 38 Correspondence

1. NJDEP letter to the Army dated October 28, 2008, re: *Draft Site Inspection Report, Fort Monmouth, NJ*
2. NJDEP letter to the Army dated July 10, 2012, re: *March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008, Fort Monmouth, NJ, PI G000000032*
3. NJDEP letter to the Army dated December 30, 2015, re: *Revisions 1 – Final Environmental Condition of Property Supplemental Phase II Site Inspection Work Plan Addendum for Parcels 28, 38, 39, 49, 57, 61 and 69 dated November 2015, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
PUBLICLY FUNDED REMEDIATION ELEMENT
P.O. BOX 413
TRENTON, NJ 08625-0413

JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

October 28, 2008

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

RE: Draft Site Investigation Report
Fort Monmouth, NJ

Dear Mr. Fallon:

The NJDEP Division of Remediation Management & Response (DRMR) has reviewed the Draft Site Investigation Report dated July 21, 2008 by Shaw Environmental, Inc., which was prepared under Phase II of the Environmental Condition of Property (ECP) assessment of Fort Monmouth. Our comments are attached.

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,

A handwritten signature in black ink that reads "Larry Quinn".

Larry Quinn, P.E., CHMM, Site Manager
Bureau of Design and Construction

Attachment

NJDEP COMMENTS on
SITE INVESTIGATION REPORT
FORT MONMOUTH, NJ

General Comments

1. USTs at Parcels 14, 28, 51, 76, and 79. The recommendation of no further action (NFA) for the suspected underground storage tanks (USTs) is not acceptable to the NJDEP. The suspected USTs are subject to New Jersey regulations N.J.A.C. 7:26E – Technical Requirements for Site Remediation (the Technical Requirements). Under the Technical Requirements, Fort Monmouth is required to do at least the following in regard to the suspected USTs:
 - a) Verify the tank contents and collect a sample of any contents for analysis as specified at 7:26E-3.9(a)3.iii,
 - b) Collect and analyze at least 4 soil samples within 2 feet of each tank as specified at 7:26E-3.9(a)3.i,
 - c) Conduct a site investigation for ground water in accordance with 7:26E-3.7 and 3.4,
 - d) Implement remedial action and tank closure in accordance with 7:26E-6.3(b).

The soil and ground water sampling conducted during the Army's Site Investigation (SI) are a good starting point. However, since suspected USTs have been identified by geophysical surveys, the specific sampling requirements of 7:26E-3.4, 3.7, and 3.9 must now be followed.

The suspected USTs are **also** subject to N.J.A.C. 7:14B - Underground Storage Tanks. Under 7:14B-1.4(b)3, tanks of any size used to store heating oil for onsite consumption in a residential building (such as a barracks) are exempted from the requirements of the UST regulations. However, all other hazardous substance USTs of any size are regulated due to the aggregate volume provision found in the definition of "Tank capacity" in 7:14B-1.6. All confirmed regulated USTs at Fort Monmouth must be registered and closed in accordance with 7:14B.

2. Septic System at Parcel 28. Similarly, the recommendation of NFA for the septic tank, septic box, and septic piping at Parcel 28 is also unacceptable. The septic system components must be sampled as specified at 7:26E – 3.9(e)3 and the ground water sampling requirements of 7:26E-3.7 must also be followed.
3. Action Levels, page 2-14. Analytical results were compared to NJDEP criteria, specifically the non-residential direct contact soil cleanup criteria (NRDCSCC) and the impact-to-ground water soil cleanup criteria (IGWSCC). Subsequent to the start of the site investigation, NJDEP has promulgated new Soil Remediation Standards (SRS). The NJDEP has provided for a phase in period for the new SRS. If a Remedial Action Workplan (RAW) is submitted to the Department on or before December 2, 2008 (6 months after the June 2, 2008 promulgation date) then the

subsequent cleanup may be conducted using the previous SCC. However, any remedial actions not approved by NJDEP by the December 2, 2008 deadline must follow the new SRS. Detailed guidance can be found at the following website:
<http://www.nj.gov/dep/srp/guidance/rs/>.

4. Sediments at Parcels 15, 27, 28, 39, 43, 49, 61, and 69. NJDEP concurs with the recommendations to further evaluate sediments at these Parcels as part of a facility-wide baseline ecological evaluation. BEE
5. Indoor Air at Parcels 15, 34, 43, 50, and 52. NJDEP concurs with the recommendations to conduct one additional round of indoor air sampling at these Parcels.
6. Section 4.1.2, Surface and Subsurface Soil Investigations. This section discusses the results of soil sampling at multiple areas of concern (AOCs) relative to the NJDEP **Non-Residential** Direct Contact Soil Cleanup Criteria (NRDCSCC). Further evaluation of soil contamination is recommended at some, but not all, soil AOCs.

The future use of most Parcels at Fort Monmouth is not yet certain. Since future residential use is possible, **all** areas of soil contamination must be delineated to the **Residential** Direct Contact Soil Cleanup Criteria (RDCSCC). Remediation of soils by the Army to the NRDCSCC prior to property transfer would be acceptable, but deed notices would be required to document remaining soil contamination above the RDCSCC, and appropriate engineering controls must be implemented and documented.

*Delineate
to Res.*

*~~Exclude~~
Conclusion;
DER to
Non Res.*

Parcel-Specific Comments

Parcel 13 – Former Barracks (Buildings 2004-2016)

1. The recommendations of NFA for soil and ground water are acceptable based upon the sampling results and the results of the geophysical survey.

Assessment 7
2. The Report states that no suspected USTs were located by the geophysical surveys, however it further indicates that no UST removals have been documented at the locations of numerous former barracks within Parcel 13. The Report should provide a possible explanation(s) for why no USTs were found.

Parcel 14 – Northwest Portion of CWA

1. See General Comment #1 above.

*eg. Red property Records
Review Concludes all
Subject Building was
heated by Coal or Gas.*

Parcel 15 – Building 2700

1. The Report states that no suspected USTs were located by the geophysical surveys, however it further indicates that no UST removals have been documented at the locations of numerous former barracks within Parcel 15. The Report should provide a possible explanation(s) for why no USTs were found.
2. It is unclear why an NFA for ground water is being recommended when a ground water remediation is currently being implemented for the CW-1 area. If the Army wants to identify individual AOCs within Parcel 15 for an NFA designation, they should make that case for those individual AOCs.
3. The recommendation of NFA for soil is acceptable based upon the sampling results and the results of the geophysical survey.
4. The report states that well UST-2337-65 could not be located. If the well has been surveyed, an attempt shall be made to locate the well using the State Plane Coordinates.

Parcel 27 – Southwestern Corner CWA

1. The report states that numerous USTs were removed from this parcel and are summarized in the Phase I ECP Report. Appendix A of that document states that the Department sent UST closure approval letters for 7 of the 12 USTs that were removed, and that the Army is waiting for Department approval of the remaining 5 UST closures.

NFA for soil and ground water cannot be approved until documentation on all 12 USTs, including the closure reports for the remaining 5 USTs, are reviewed by the NJDEP project team. NJDEP requests that the Army provide a brief summary of the 7 USTs that received Department approval. This summary should include a figure showing the former UST locations and the soil and ground water sampling locations and results.

Parcel 28 - Former Eatontown Laboratory

1. See General Comment #2 above.
2. Former installation plans and figures show three separate septic tanks and leach fields and one underground transformer vault. These potential AOCs must be shown on Figure 3.5-1 to allow comparison with sample locations.

3. Figure 3.5-2 shows that only one suspected septic tank, one suspected septic distribution tank, and one suspected pipe were found. The Report should provide a possible explanation(s) for why the suspected three septic tanks and leach fields and one underground transformer vault weren't located.
4. There is no recommendation or proposal for the former storage areas and possible former tank pads.

Parcel 34 – Building 2567

No specific comments. NJDEP hopes to review the Remedial Investigation Report and Remedial Action Workplan (dated 10-28-05) on Building 2567 in the coming months.

Parcel 38 – Former Outdoor Pistol Range (1940-1955)

1. The NFA proposal is not acceptable. Since the site may have been re-worked, the surface soil sampling results are not a reliable indicator of potential ground water contamination, and a site investigation for ground water must be performed in accordance with 7:26E-3.7. Ground water samples should be analyzed for lead.

Parcel 39 - Building 1150 (Vail Hall)

1. The report states that no metal contaminants were detected in soil above the NJDEP NRDCSCC. The recommendation of NFA for soil is acceptable, however, soil contaminants must be compared to and delineated to the RDCSCC, so that a deed notice can be filed when necessary.

Parcel 43 – Building 1122 (Do-it-yourself Auto Repair)

No specific comments. NJDEP recently provided comments on reports specific to Building 1122.

Parcel 49 - Former Squier Laboratory Complex

1. NJDEP concurs with the recommendations to conduct additional sampling of surface soils to delineate contaminants above NJDEP criteria.
2. The proposal to add benzene and bromodichloromethane to the proposed CEA for the M-18 Landfill should be included in a future CEA proposal.

3. The SI Report must include some discussion regarding the source of the VOC contaminants in ground water or the remediation of the contamination, as required by N.J.A.C. 7:26E-3.13(b)4ii(1) and N.J.A.C. 7:26E-3.13(b)4ii(4).

Parcel 50, IRP Sites FTMM-54, FTMM-55 and FTMM-61

No specific comments. The comments previously provided by NJDEP on the M-18 Landfill, Building 296, and Building 290 sites in a letter dated August 14, 2007 need to be addressed.

Parcel 51 – 750 Area, 500 Area, 600 Area, 1100 Area – Former Buildings

1. See General Comment #1 above.

Parcel 52 – Building 699 - Army Exchange Services Gas Station

No specific comments. NJDEP hopes to begin reviewing the available Remedial Action Progress Reports on Building 699 in the coming months.

Parcel 57 – Former Coal Storage and Railroad Unloading – 800 Area

1. NJDEP concurs with the general recommendation to conduct additional soil and ground water sampling. A remedial investigation (RI) of ground water is required pursuant to N.J.A.C. 7:26E-4.4. A RI workplan for all proposed investigation work shall be submitted for NJDEP approval.
2. Previous NJDEP comments requested that the analytical parameters for soils include PCBs, due to reported historical coal storage and fuel unloading activities. The requested PCB analyses were not performed. Soil sample collection and analysis for PCBs must be included in the RI work plan.

Parcel 61 – Building 1075 - Patterson Health Clinic

1. NJDEP concurs with the recommendations to conduct additional soil sampling to evaluate base neutral contamination.
2. Previous NJDEP comments requested that the analytical parameters for soils include PCBs, due to reported historical coal storage and fuel unloading activities. The requested PCB analyses were not performed. Soil samples must be re-collected and analyzed for PCBs.

Parcel 69 - Building 900 Former Vehicle Repair/Motor Pool

1. The proposed NFA for soil is not acceptable. Sample analysis at this AOC should have included analysis for PCBs, due to the former waste oil tank, as stated in previous NJDEP comments. Soil samples must be re-collected and analyzed for PCBs.
2. All sediment samples collected adjacent to Parcel 69 must include PCB analysis.
3. NJDEP concurs with the recommendations to further evaluate ground water. Pursuant to N.J.A.C. 7:26E-4.4, a remedial investigation of ground water is required. An investigation workplan must be submitted for NJDEP review and approval.

Parcel 70 – Building 551 – Former Photoprocessing

1. NJDEP concurs with the recommendations for no further action (NFA).

Parcel 76 – 200 Area, 300 Area – Former Barracks

1. See General Comment #1 above.

Parcel 79 – 400 Area Former Barracks

1. See General Comment #1 above.

Parcel 80 – Former Buildings 105 and 106 – Photoprocessing

1. The footprint of the former building 105 and 106 should be shown on Figure 3.20-1. On the current Figure, it cannot be determined where the former buildings were located in relation to the Geoprobe borings, so NFA for soil can't be approved.
2. The NJDEP concurs with the recommendation for further evaluation of ground water. Pursuant to N.J.A.C. 7:26E-4.4, a remedial investigation of ground water is required. An RI workplan must be submitted for NJDEP review and approval.

Parcel 83 - Northeast MP

1. Former structures, buildings and other areas of concern are discussed in the text and in the tables but are not indicated on the Figure 3.21-1. All areas of concern, whether existing or former structures, must be depicted on the site figures.

2. The NFA proposal for ground water is acceptable, based on the ground water sampling results presented in the report.

Sanitary Sewer System

No comments.

Electrical Substations

1. As discussed in General Comment #6, a Deed Notice and engineering controls are required at the 2 locations where PCBs were found above the RDCSCC of 0.49 ppm.
-



State of New Jersey

CHRIS CHRISTIE
Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028
Phone #: 609-633-1455
Fax #: 609-633-1439

BOB MARTIN
Commissioner

KIM GUADAGNO
Lt. Governor

July 10, 2012

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

Re: March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008
Fort Monmouth, NJ
PI G000000032

Dear Ms. Green:

A review of the above referenced report, received March 27, 2012 and submitted in response to the Department's comments regarding the Draft Site investigation Report of July 21, 2008 by Shaw Environmental, Inc., has been completed by this office. Many of the parcel comments involved suspected USTs; in addition to that information provided in this submittal and the July 2008 SI, a review and comparison of Appendix G, Appendix O, and Figures 15 and 16 of the January 2007 ECP Report was conducted by this office in an attempt to ascertain the location and status of all tanks located within the parcels. Unless otherwise noted, comments and questions are provided only for each parcel referenced in the submittal and are generally presented by parcel.

Parcel 13 – Former Barracks (Buildings 2004-2016)

Geophysical surveys were performed, and sampling was conducted throughout that area at which USTs were known to or may have been present. No USTs were found; all soils analytical results were below cleanup criteria applicable to the site; no additional action for the parcel is necessary.

Parcel 14 – Former Buildings and Housing Area Northwest Portion of CWA

As indicated in the Department's correspondence of May 30, 2012, the geophysical surveys performed and sampling conducted throughout that area at which USTs were or may have been present were sufficient to adequately characterize the area. No USTs were found; all soils analytical results collected were below cleanup criteria applicable to the site. The parcel was re-categorized from Category 2 to Category 1.

Parcel 15 – Building 2700

Parcel 15 was issued a designation of No Further Action for soils and ground water, *exclusive of CW-1*, on May 9, 2012. Remediation efforts involving CW-1 continue.

Parcel 27 – Southwestern Corner CWA

The single outstanding issue at Parcel 27 was the USTs. As previously indicated, numerous USTs were removed from the parcel, however, additional documentation for same was required.

It is agreed fourteen (14) USTs have been removed and given NJDEP Closure Approval Letters/NFAs. Although it is understood Departmental approval may have been granted for an additional five USTs, as indicated on Page 6 of the referenced submittal and in Appendix G, please be advised this office does not have documentation confirming Closure Approval/NFA for the following USTs.

UST 2506-17	Reported NJDEP UST Closure Approval Date 7/10/98
UST 2624-34	Reported NJDEP UST Closure Approval Date 7/23/93
UST 2624-57	Reported NJDEP UST Closure Approval Date 9/21/95
UST 2624-58	Reported NJDEP UST Closure Approval Date 9/21/95
UST 2624-59	Reported NJDEP UST Closure Approval Date 9/21/95

Additionally, please provide information as to the status of the USTs noted in Appendix O at what appear to be Buildings 2566 and 2505, located just north of Building 2503?

Any sediment issues which may have resulted from parcel operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 28 – Former Eatontown Laboratory**Underground Storage Tanks**

Although this office is in agreement with the information submitted in regard to the majority of the USTs as noted on Parcel 28, questions remain on several, which are not considered as given a designation of NFA at this time.

As above, documentation for closure approval or NFA is not available for confirmation on the following USTs.

UST 2539-28	Reported NJDEP UST Closure Approval Date 3/31/93
UST 2539-64	Reported NJDEP UST Closure Approval Date 3/31/93
UST-2531-21	Reported NJDEP UST Closure Approval Date 8/29/00

UST 2542-29 and UST 2564-32 are reported as no release observed. A Standard Reporting Form and/or Site Assessment Compliance Statement were reported sent to us 11/22/91, however, no designation of NFA was granted, nor comments apparently generated.

Appendix O indicates three USTs within that area which underwent a geophysical survey between Building 2525 & Heliport Drive. The center UST appears to correlate to UST P28-8, which, based upon the investigation performed, warrants no further action. Although it is agreed no tanks remain in that area, please provide any record of their removal or indication as to evidence of a discharge upon removal. As previously discussed, a designation of NFA for USTs cannot be granted without sampling.

Septic Tanks & Leachfields

Leachfield East of Heliport Drive, South of Radiac Way – It is agreed the four test pits were adequate for characterization of the leachfield; no additional action is necessary for the leachfield. It does not appear, however, the suspected D-box/entirety of the septic system was investigated. Although they are not designed to hold liquids/sludges (but rather to distribute the liquids after the solids fall out into the holding tank), particularly as the structure apparently remains in place, additional information is required as to whether the structure could have been/functioned as a holding tank (field notes do reference it as a septic tank) which did contain solids or liquids which should have been sampled.

Septic System & Septic Tank A – Located off the northeast corner of Building 2525, a suspected septic tank was located via GPR scanning, as denoted as “A” on Figure 3.5-2 of the ECP Site Investigation. Sampling efforts, however, were performed only at the associated leachfield. What efforts were made to adequately characterize any holding tank contents of the actual septic tank, as required by the Tech Regulations in effect at the time of investigation (NJAC 7:26E-3.9(e)3)? As regarding the associated leachfield, a minimum of 4 samples is required. A single soil and single ground water sample is inadequate.

Septic System at Southeastern Corner of Parcel - For that septic system located in the southeastern corner of the parcel as sampled by P28-SB1, the findings/requirements noted in the above paragraph also apply.

Former Storage Areas/Possible Former Tank Pads – This area received a designation of NFA on March 29, 2012.

Parcel 34 – Building 2567/FTMM 58

Elevated levels of ground water contamination underwent treatment via a Permit-by-Rule approved in October of 2010. The Department most recently responded on March 7, 2012 approving monitoring via two rounds of seasonal high ground water analytical sampling.

As recently discussed, although piping was cleaned at the time of tank removal, it necessary to remove the piping and dispensing equipment/island.

Parcel 38 – Former Outdoor Pistol Range (1940-1955)

Although no exceedences were noted, Departmental comments indicated the surface soil sampling was not adequate due to the possibility the parcel soils had been re-worked; a ground water investigation was therefore required. The Army will be submitting the results of a ground water investigation in a future letter report to this office. If you wish to receive comments on anticipated frequency and locations of the ground water sampling points and methodology (ie low-flow), please submit the sampling plan prior to implementation.

Parcel 39 – Building 1150/Vail Hall

Previous comments indicated the soil exceedences, although permitted to remain in place with institutional controls (Deed Notice), must be compared to and delineated to the RDCSCC. The Army has agreed, in this submittal, to prepare a revised map indicating delineation boundaries to the more stringent criteria, as appropriate. A draft Deed Notice for same is to be submitted to this office for review and comment.

Any sediment issues which may have resulted from operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 43 – Building 1122 (Do-it-Yourself Auto Repair)

No comments based on submittal; Army acknowledges Department's March 18, 2011 comments; remedial efforts are ongoing.

Any sediment issues which may have resulted from parcel operations are to be addressed as part of the ongoing facility wide ecological assessment.

Parcel 49 – Former Squier Laboratory Complex

The Site Investigation indicated five surface soil samples contained base neutrals at concentrations above the NRDCSCC, while one sample contained PCBs above the NRDCSCC. The Department concurred with the recommendation of additional sampling for delineation purposes. The March 2012 submittal, however, specifies no sampling will be performed in regard to the BNs exceedences as they "are commonly detected in soil directly beneath asphalt pavement".

Base Neutrals (BNs)

Although it is agreed elevated levels of BN constituents related to asphalt rather than a discharge may be encountered beneath asphalt paving, it is not agreed sufficient information has been provided at this time to document each location at which BN exceedences are noted is unrelated to site operations. The previously approved proposal for additional sampling remains appropriate for each sample location at which exceedences were noted.

PCBs

Regarding PCBs, a re-sample is currently proposed in the location at which PCBs were noted to exceed the NRDCSCC, sample P49-SS8-A. As no Remedial Action Workplan for this parcel was previously approved, the Soil Remediation Standards (0.2 ppm) apply. As such, PCBs exceed the standard at three locations – P49-SB3-A and P49-SS7-A (which also exhibits the highest levels of BN contamination), in addition to SS8-A. Delineation to the most stringent standard is required.

Arsenic

A review of the site operations and the analytical data, including the horizontal and vertical distribution of the arsenic, the lead to arsenic ratio, as well as the presence of glauconitic soils indicate the arsenic encountered in this area is representative of naturally occurring levels.

Volatile Organics

It is agreed further discussion regarding volatile organics in ground water at the M-18 Landfill is to be discussed in a forthcoming Remedial Investigation Report for the landfill.

USTs

As with the above parcels, although many tanks have received a designation of NFA, several tanks do not have sufficient documentation to be designated same. These include:

- UST-293-67 – per Appendix G, report submitted 2/26/96; no Departmental response
- UST-290-193 - per Appendix G, report submitted October 1993, no Departmental response
- UST 283-59 – per Appendix G, reported Closure Approval 2/24/00; no confirmation available
- UST 283-58 - per Appendix G, no sampling was performed
- UST 296-69 – per Appendix G, report submitted 2/26/96; no Departmental response

For those USTs which Appendix G indicates reports were previously submitted and not responded to, unfortunately, this office has no record of same and re-submittal is required for comment.

Parcel 50 – IRP Sites FTMM-54, FTMM-55 & FTMM-61

The Army acknowledges the Department's August 14, 2007 letter, the comments of which are to be addressed via Remedial Investigation Report Addendums for FTMM-54 (Site 296), FTMM-55 (Site 290) and FTMM-61 (Site 283). Submittal dates were not indicated. This office will await submittal of same.

Parcel 51 – 750 Area, 500 Area, 600 Area, 1100 Area – Former Buildings

The geophysical survey and sampling conducted at portions of the parcel were insufficient to allow for determination of NFA for the USTs previously/currently located in the parcel. Further investigation conducted north of Building 750 revealed the presence of USTs UHOT 1123B and 1123C at the two northernmost previously identified anomalies. The USTs were subsequently removed, as was affected soil. Although it is indicated all soils were removed to below 1000 ppm TPH, Table 2 at Attachment D appears to indicate soils at sample 1123B East Wall at 8.5-9' contains TPH at 9832.44 ppm. Clarification is needed.

Although it is understood the additional investigation undertaken in June of 2009 revealed the presence of the two above referenced USTs located above Semaphore Ave, it is unclear what efforts were made to investigate the nine potential USTs/anomalies noted on Figure 3.12-2 south of Echo Avenue? Are they all to be included in the Building 750 submittal?

Additional questions regarding USTs within the parcel remain. As above, documentation for closure approval or NFA is not available for confirmation on the following USTs.

No geophysical surveys, sampling or at least reports appear to have been performed or submitted for the following USTs - UST 68, 635, 637, 642, 643, 645, 647, 648, 649, 650, 651, 652, 653, 654, 656-97, 656-98, 657-90, 658-100, 660, 662, 663, 665, 667, 689-102.

Appendix O indicates USTs which do not appear to be "closed" per Appendix G which were/are also present in areas outside the geophysical survey, including those at Building 676, several along Sherrill Avenue north of Building 600, east of Brewer Ave by Buildings 545 and 554, Building 555, and several by Building 557.

Although Appendix G indicates closure reports were submitted, it also indicates no Departmental response was received for the following USTs - UST-682-106, UST 656-104, UST 659-101, UST 114-1, UST 645-78, UST 789-126.

USTs 750 – report pending

UST 501-76 – Appendix G indicates NFAed July 10, 1998, however confirmation unavailable

UST 551-80 – Appendix G indicates NFAed August 29, 2000, however, confirmation unavailable

UST 695 – Appendix indicates NFA August 24, 2000, however, confirmation unavailable

Parcel 52 – Building 699 – Army Exchange Services Gas Station

No comments based on submittal; Army acknowledges Department's March 18, 2011 comments; remedial efforts are ongoing.

Parcel 57 – Former Coal Storage & Railroad Unloading – 800 Area

Three surface soil samples contained B/Ns at concentrations above the NRDCSCC. The Department concurred with the general recommendation to conduct additional sampling, and required the submittal of a Remedial Investigation Workplan. The March 2012 submittal, however, states the exceedences were related to the asphalt pavement under which the samples were collected.

As with Parcel 49, it is agreed elevated levels of BN constituents related to asphalt rather than a discharge may be encountered beneath asphalt paving. However, information has not been submitted to document these sample results are not reflective of site operations, particularly given the nature of operations in the area. Delineation is necessary.

PCBs analyses was required due to the proximity of the railroad tracks/unloading area, as indicated in the Department's June 15, 2007 letter, rather than historical operations at Parcel 57.

As PCBs are often associated with rail road tracks and spurs, analysis for same is appropriate and remains a requirement.

Ground Water

Although the previous proposal for delineation of ground water exceedences was approved, the current submittal indicates NFA is warranted due to naturally occurring background conditions. The Department is conducting further review of the information provided.

Parcel 61 - Building 1075 – Patterson Health Clinic

Soil sampling conducted at the parcel indicated elevated levels of three base neutral compounds in a soil sample collected beneath an area of former asphalt paving at the southeastern corner of Building 1075. The Department is in agreement the PAHs are not reflective of a discharge nor of operations performed at the site. No additional action for same is necessary.

As discussed, the analyses for PCBs as indicated in the Department's October 2008 correspondence is not required, based upon a review of areas of concern located within the parcel.

UST 1076-209 – Although Appendix G indicates the closure report was being prepared, recent conversation indicates no submittal of the report is anticipated as the tank was a "clean closure." This would, of course, not allow for comment or designation of NFA for this tank. Additionally, information previously submitted indicates this tank was installed at a location at which a leaking UST was removed and remediated. It does not appear closure information for that UST was submitted.

Parcel 69 – Building 900 – Former Vehicle Repair/Motor Pool

The previous Departmental comments indicated soil sampling was inadequate for designation of NFA as analytical parameters did not include PCBs. Although it is understood your position is that PCBs are not suspected to have been disposed of in the former waste oil AST at Building 900, the Technical Requirements for Site Remediation, both those in effect at the time of sampling, as well as those currently in effect, require the inclusion of PCBs in the analytical parameters for sampling of soil when waste oil is involved.

Regarding analytical parameters for sediment sampling, that will be addressed as part of the ongoing facility wide ecological assessment.

One ground water sample previously indicated an exceedence of PCE. Per this submittal, the Army plans to resample the ground water at the location of temporary well point P69GW-1. Previous Departmental correspondence, however, stated the submittal of a ground water remedial investigation workplan was required for NJDEP review and approval. If resampling of a single location, in anticipation of a "clean" result is performed, rather than several delineation sampling points, please ensure the resultant submittal includes adequate rationale/justification to confirm the area of greatest possible contamination was sufficiently targeted.

Two USTs were previously noted as within the parcel. UST 900-142 was granted Closure Approval Letter/NFA on July 10, 1998, while documentation for closure approval or NFA is not available for confirmation on the following UST:

UST 900-141 Reported NJDEP UST Closure Approval Date 7/10/98

Parcel 70 – Building 551 – Former Photoprocessing

The October 28, 2008 Departmental correspondence concurred with the recommendation for no further action. As a note however, we do not have a copy of the Appendix G referenced 8/29/00 Closure Approval Letter for UST 551-80

Parcel 76 – 200 Area, 300 Area – Former Barracks

A geophysical survey was performed throughout Parcel 76, with suspect USTs noted in the western portion of the parcel. Although sampling conducted within that western portion of the parcel indicated no exceedences of the applicable cleanup criteria, additional investigation was required regarding the possible USTs.

Additional evaluation was documented in the June 2011 Remedial Investigation and Closure Report, which references Incident #s 09-11-04-1553-32, 10-04-28-1333-57, 10-04-13-1710-23, 09-11-19-1710-57 and 10-01-06-1342-44 and the removal of UHOTS 544, 543, 542, 541, 540, 539 and 538. Affected soils were reported removed to below the 1000 ppm contingency analytical threshold; a ground water investigation was performed via the installation of four monitor wells as ground water was encountered in the excavations.

The adequacy of the investigations/remedial actions presented in the report submittal cannot be determined, as insufficient information has been provided. No information was contained in Appendices A through E, nor were any Figures included (this information was missing in many of the Attachment D reports, some of which was obtainable through previous submittals and information, some not). No comparison could be made of UST locations against geophysical anomalies, sample locations, or monitor well locations. A review of Table 2/Summary of Laboratory Analyses as a stand-alone document (without sampling location/result maps, further association between sample ID and tank) is insufficient to allow for documentation of soils removal to below the above stated 1000 ppm contingency analytical threshold, or even the 5100 ppm EPH standard at each tank, or to determine if the ground water investigation (placement of monitor wells) was adequate.

Additionally, although it is agreed no USTs appear to remain in the eastern portion of Parcel 76, no remedial documentation was submitted for those former tank locations as noted on Appendix O and Figure 15 of the January 2007 ECP Report in the eastern portion of Parcel 76, as follows:

UST-261-45	UST-262-46	UST-263-47	UST-264-48	UST-265-49
UST-266-50	UST-267-51	UST-268-52	UST-269-53(contamination per Appendix G)	

As previously discussed, a designation of no further action for these USTs cannot be issued without an investigation in accordance with the Technical Requirements for Site Remediation.

Parcel 79 – 400 Area Former Barracks

A geophysical survey was previously performed throughout the parcel, identifying potential USTs in only that portion as noted in Figure 3.19-1. Additional evaluation of the area encountered eight USTs, noted as UHOTs 437, 440, 441, 444, 445, 448 and 450 which were subsequently removed, while contamination was noted at Building 449. A ground water investigation is to be performed based upon the presence of ground water in the excavation. Additional comments regarding same will be forthcoming pending submittal.

As with Parcel 76, above, although it is agreed no USTs appear to remain, no remedial documentation was submitted for many of those former tank locations noted on Appendix O and Figure 15 of the January 2007 ECP Report at other areas of the parcel, and/or insufficient information currently exists to allow for designation of NFA.

North of Fisher Avenue

- UST-401-26 – per Appendix G, no samples were collected, no report submitted
- UST-411-28 – per Appendix G, report submitted 02/26/96, no Departmental response noted
- UST-416-32 – per Appendix G, no samples collected, no report submitted
- UST-421-37 – per Appendix G, report submitted 7/22/98, no Departmental response noted
- UST-423-39 – per Appendix G, report submitted 2/26/96, no Departmental response noted

South of Fisher Ave, North of Leonard Ave

- UST-430-45 – per Appendix G, report submitted 10/23/97, no Departmental response noted
- UST-447 – Not referenced on Appendix G; located east of grid sampling; sampling status unclear

South of Leonard Avenue

- UST-454-51 – Reported Closure Approval date 7/10/98 – no record of same
- UST-142-73 – per Appendix G, report submitted 10/23/97, no Departmental response received
- UST-142-13 – per Appendix G, report submitted 10/23/97, no Departmental response received
- UST-29-1 – per Appendix G, report submitted 11/22/91, no Departmental response noted
- UST-490-58 – per Appendix G, no sampling; “site closed by NJDEP”; no record of same
- UST-492-59 – Reported Closure Approval date 8/29/00 – no record of same
- UST-202-a – “clean closure”, no report submitted
- UST-202-b – per Appendix G, *30 tons of soil removed, report submittal pending*
- UST-202-21 – per Appendix G, TPH ND, no report submitted
- UST-202-22 – per Appendix G, TPH ND, no report submitted

Please submit documentation in accordance with the Tech Regs for each of the above to allow for comment/designation of NFA. For those which Appendix G indicates reports were previously submitted and not responded to, unfortunately, this office has no record of same and re-submittal is required.

Additionally, with the exception of the above referenced UST-454-51, and UST 475-52 (NFA 10/23/00), no documentation of sampling activities for that area shown on Appendix O extending from Tilly Avenue north to Leonard Avenue, previously shown to include approximately 22 USTs, appears to have been submitted.

Finally, please indicate what investigation, if any, has taken place at the two former and one current ASTs located north of Hazen Drive.

Parcel 80 – Former Buildings 105 & 106 - Photoprocessing

Prior to issuing a determination as to the adequacy of the soil sampling, additional information is required regarding the basis for establishment of the sample locations. Were as-builts or other plans available for the demolished buildings to assist in locating former floor drains, septic systems, discharge points, etc.?

Although the previous proposal for delineation of ground water exceedences was approved, the current submittal indicates NFA is warranted due to naturally occurring background conditions. The Department is conducting further review of the information provided.

Parcel 83 – Former Photoprocessing, Vehicle Maintenance, Coal Storage & Railroad Unloading, Maintenance Shops

The 2008 SI Report, Section 4.1.2, indicates “eight surface soil samples contained B/Ns at concentrations above the NJDEP NRDCSCC. Two surface soil samples contain lead at concentrations above the NJDEP NRDCSCC and MPBC. Further evaluation is recommended.”

While the exceedences at P83-SB9C were apparently not included in that statement, nor plotted, several PAH constituents were noted above the residential and non-residential criteria at 4.5-5'. Vertical delineation appears incomplete at this location.

Although this office does not as yet agree the PAH exceedences at this parcel are due to current/former asphalt (particularly at SB9 or B5), re-collection of the samples as proposed to assist in determining same is acceptable. The further evaluation must, of course, include all exceeded contaminant categories if the intent is to prove no discharge.

Trichloroethylene is reported on Table 3.21-4 of the SI Report above criteria at sample location P83-SB9B, at 5.8 ppm, at 1.5-2', with no discussion provided. Please provide same.

Metals exceedences were noted at three locations – SB10A, SB9A and B5A; this office considers location SB-10 to be above criteria for arsenic and lead (residential criteria is 400 ppm).

As regarding arsenic in soils, although it is agreed the site soils are often associated with elevated levels of naturally occurring arsenic, the parcel specific soil analytical results, the lead to arsenic ratio, and the decrease of arsenic with depth at those locations exhibiting an elevated level, do not appear to indicate the exceedences are naturally occurring, and must be included in a remedy.

As with the above parcels, although many tanks have received a designation of NFA, several tanks do not have sufficient documentation to be designated same. These include:

UST-421-37 – Per Appendix G, report submitted 10/23/97; no Departmental response
UST-273-65 - Per Appendix G, 6000 gallon gasoline tank still in use
UST-273-66 – Per Appendix G, 10000 gallon gasoline tank still in use
UST-273-67 – Per Appendix G, 10000 gal gasoline tank still in use
UST-117-72 – Per Appendix G, remedial action report completed July '98; status unknown
UST-108-7 – Per Appendix G, report submitted 2/26/96; no Departmental response
UST-108-60 through 64 – Per Appendix G, remediation efforts ongoing
UST-161-68 – Per Appendix G, waste oil tank RAR submitted 2/26/96, no response
UST-161-14 – Per Appendix G, RAR submitted 2/26/96, no Departmental response

Appendix O also includes several former USTs on the parcel which appear to have had no documentation of closure or investigation submitted, including those at Buildings 479, 66, 276, 485, 280, 281 and 167.

Electrical Substations

The October 28, 2008 correspondence indicated the need for establishment of a Deed Notice and engineering controls due to elevated levels of PCBs above the RDCSCC of 0.49 ppm. The March 2012 proposal is for resampling of the two locations at which results were above the criteria, with a letter report to follow. This is acceptable, however, please be advised a Deed Notice will be required for any soils left in place *within these two areas*, which exhibit a result of greater than 0.2 ppm PCBs. No engineering controls are required if all results are below 1 ppm.

Miscellaneous

Attachment E of the submittal references numerous letters from the NJDEP regarding UST closure approvals/NFAs, however, the letters dated July 23, 1993 and September 21, 1995 were not included in the submittal. Submittal of those two letters would be beneficial and appreciated.

Vapor Intrusion Investigation

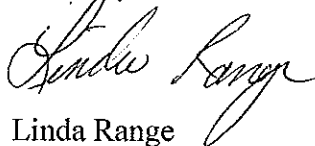
Submittal of the report is anticipated shortly.

Baseline Ecological Evaluation

Submittal of the amended report is anticipated shortly.

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

Sincerely,



Linda Range
Bureau of Case Management

C: Joe Pearson, Calibre Systems
Rich Harrison, FMERA
Julie Carver, Matrix



State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028
Phone #: 609-633-1455
Fax #: 609-633-1439

BOB MARTIN
Commissioner

December 30, 2015

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

Re: **Revision 1 - Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 28, 38, 39, 49, 57, 61 and 69** dated November 2015
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received November 24, 2015, prepared by Parsons Government Services Inc. (Parsons), on behalf of the U.S. Army Engineering and Support Center, Huntsville (USAESCH). As indicated in the report, activities are to be performed with the goal of Decision Document acceptance in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP), 40 CFR Part 300, and “to the extent possible to meet the requirements of New Jersey Administrative Code (NJAC) 7:26E Technical Requirements for Site Remediation”, as well as support closure of environmental sites to facilitate transfer of real property.

The workplan describes Site Investigation activities to be performed at the ECP Parcels as indicated above. The revised workplan has addressed many of the previously noted questions and issues. comments; remaining comments are as follows:

Parcel 28

Previous comments have been adequately addressed. Please note, however, although the Department of the Army may of course analyze ground water samples for both total and dissolved (filtered and unfiltered) concentrations of lead for its own purposes, this program accepts only unfiltered analytical results for consideration in decisions relative to case closure.

Parcel 38

The DEP's May 19, 2015 correspondence had indicated soil sampling was to be performed to depths of at least 36", with continuous sampling conducted in 6" increments. Although the proposal states sampling will be performed to a depth of 36 inches bgs, the proposal includes sampling only from the 0 to 0.5, 1.25 to 1.75 and 2.5 to 3.0 feet bgs. As the soils in the area have been re-worked, this is unacceptable; continuous sampling is required for adequate evaluation.

The monitor well locations as proposed are acceptable at this time. As above, however, this program does not accept filtered ground water analytical results.

Parcel 39

No additional comment.

Parcel 49

Although Section 1.9.4, and Response D1 of the November 19, 2015 correspondence accompanying the submittal generally reference only exceedances of the former NRDSCC, further review of the sampling performed during the 2007 Site Investigation indicate exceedances of the current RDCSRS at 11 locations (0-6" unless otherwise indicated) as below:

P49-SB1-C (5.5-6') – benzo(a)anthracene 0.73, benzo(a)pyrene 0.56, benzo(b)fluorene 0.75

P49-SB3 -A – PCBs 0.34; benzo(a)pyrene 0.44, benzo(b)fluorene 0.67

P49-SB4-A (6-12") – benzo(a)anthracene 2.5, benzo(a)pyrene 2.2, benzo(b)fluorene 2.8

P49-SB5-A – benzo(a)pyrene 0.46

P49-SS7-A – PCBs 0.47; benzo(a)anthracene 80, benzo(a)pyrene 54, benzo(b)fluorene 75, benzo(k)fluorene 29, chrysene 79, dibenz(a,h)anthracene 2.6, indeno(1,2,3-cd)pyrene 18

P49-SS8-A – PCBs 8.85; benzo(a)anthracene 3.6, benzo(a)pyrene 2.6, benzo(b)fluorene 3.9, benzo(k)fluorene 1.5, indeno(1,2,3-cd)pyrene 0.93

P49-SS9-A – benzo(a)anthracene 10.0, benzo(a)pyrene 9.8, benzo(b)fluorene 9.2, bkf 6.3, chrysene 10.0, dibenz(a,h)anthracene 1.3, indeno(1,2,3-cd)pyrene 3.5

P49-SS10-A – benzo(a)pyrene 0.61, benzo(b)fluorene 0.96

P49-SS11-A – benzo(a)pyrene 0.31

P49-SS12-A – benzo(a)pyrene 0.36

P49-SS13-A – benzo(a)anthracene 0.81, benzo(a)pyrene 0.73, benzo(b)fluorene 1.2

All locations at this time are considered representative of contamination which, under the Technical Requirements for Site Remediation, must be addressed. Several of the above locations (underlined) are proposed for resampling, with step-out borings/sampling as needed. This is acceptable.

P49-SS13 has been identified in the Revised SIWP as containing an elevated level of PAHs attributable to DAP. This office does not agree. P49-SS10 through SS12 are in the area of P49-SS13, and also contain levels above applicable standard which is representative of contamination that must be addressed at this time. Benzo(a)anthracene is present at 0.81 ppm, benzo(a)pyrene from 0.31 to 0.81ppm, and benzo(b)fluorene from 0.96 to 1.2 ppm at these four locations. Additional sampling may of course be performed if it is believed the results are representative of asphalt "cross contamination".

Parcel 57

Section 1.9.5, line 38 references "PAHs detected in shallow soil can be attributed to anthropogenic sources such as asphalt, road base, and DAP versus onsite historical activities." Historic operations in this parcel also, of course, included coal storage and a railroad unloading area.

Page 1-24 line 12 discusses sampling performed in 2010 which were either non-detect or at concentrations below the RDCSRS; a review of the data indicated certain of the MDLs exceeded their respected RDCSRS.

As stated in prior correspondence, the Main Post Background Concentrations (MPBC), as with the CWBC, were never accepted by the DEP. Continued reference to the document or individual constituent "MPBC"s within a submittal will not be considered in evaluations. As previously specified, background determinations are made on an area specific basis.

Also, as above, filtered ground water analytical results as discussed on page 1-25 (and page 7 of the accompanying correspondence) are not accepted by the Department.

Parcel 61

As indicated in the May 2015 DEP correspondence, this office previously agreed no additional action was necessary. As detailed for the November conference call, no further documentation from this office is necessary.

Parcel 69

All comments addressed.

Please contact this office if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Linda S. Range". The signature is fluid and cursive, with the first name "Linda" being the most prominent part.

Linda S. Range

ATTACHMENT B
1941 Layout of Former Outdoor Pistol Range (1940 – 1955), Malcolm
Pirnie, 2006

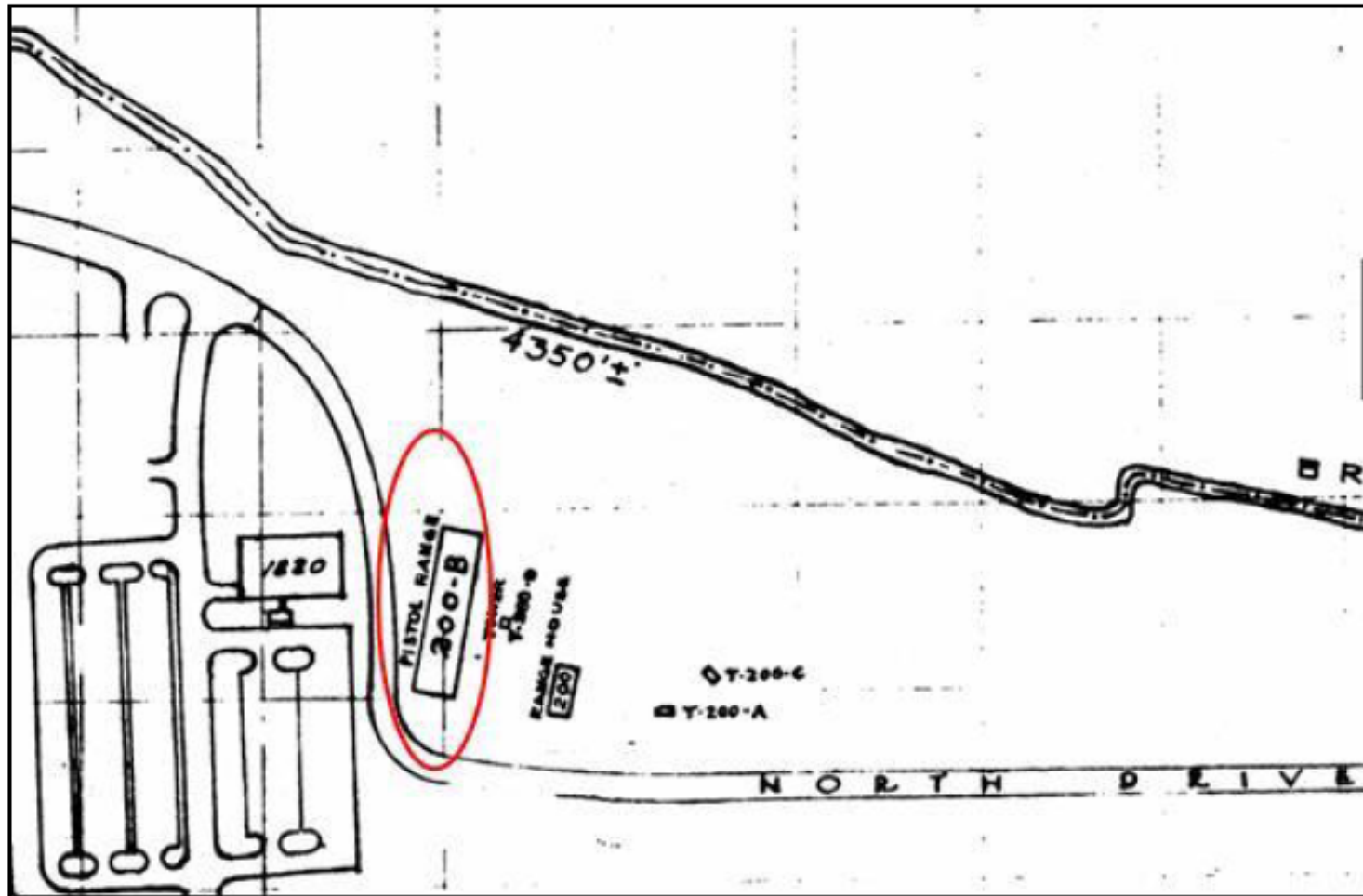


Figure 4-19: Location of the Former Outdoor Firing Range (1940-1955 Pistol Range) (FTMM017)

Source: Malcom Pirnie, Inc. 2006

ATTACHMENT C
2016 Soil Boring and Monitoring Well Logs

Well Construction Detail (Single Cased - Stickup)

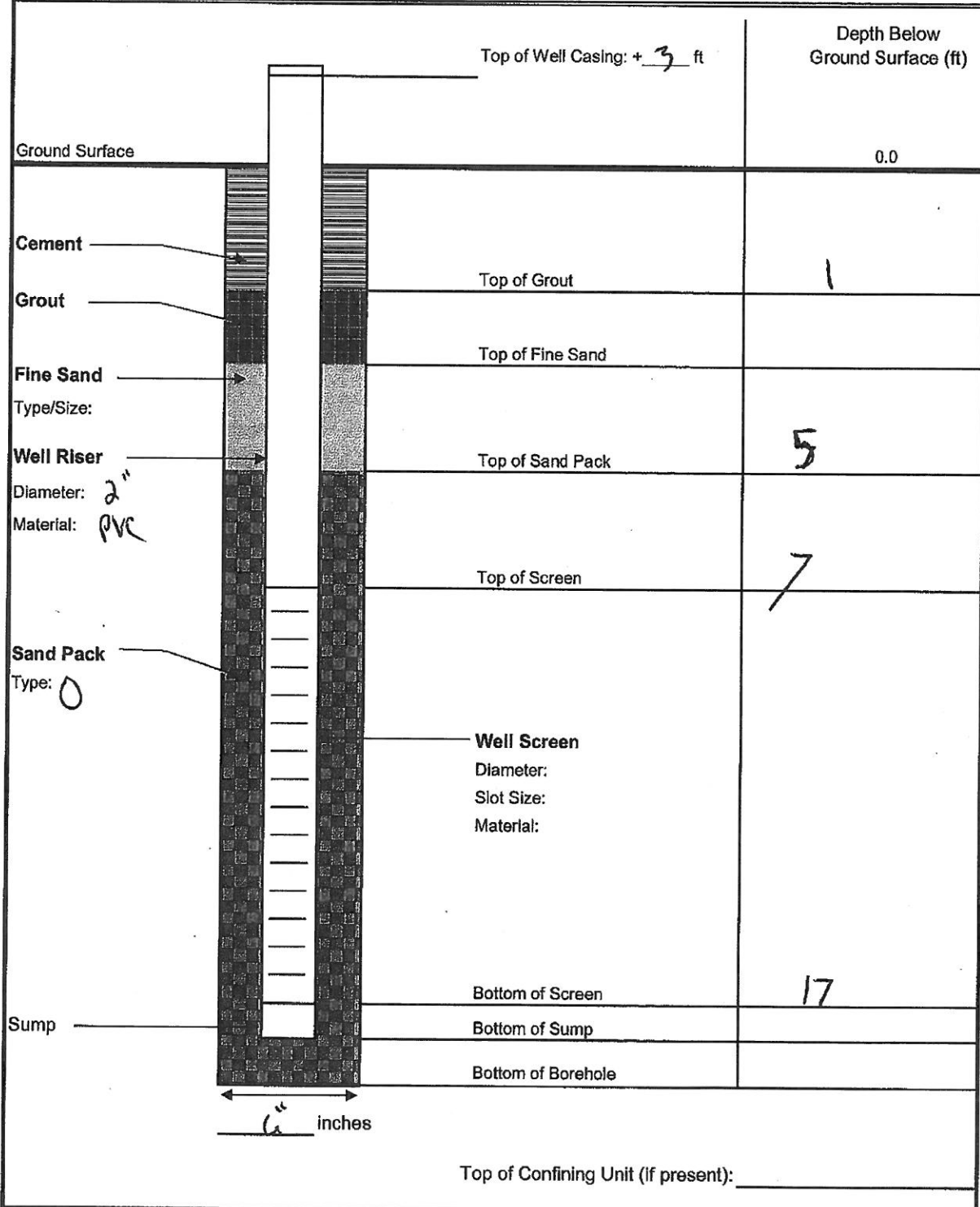
Client: USACE

Well ID: PAP-38-MW-01

NJBWA Permit No.

Date Well Installed: 4/8/16

Location: local 38



Well Construction Detail (Single Cased - Stickup)

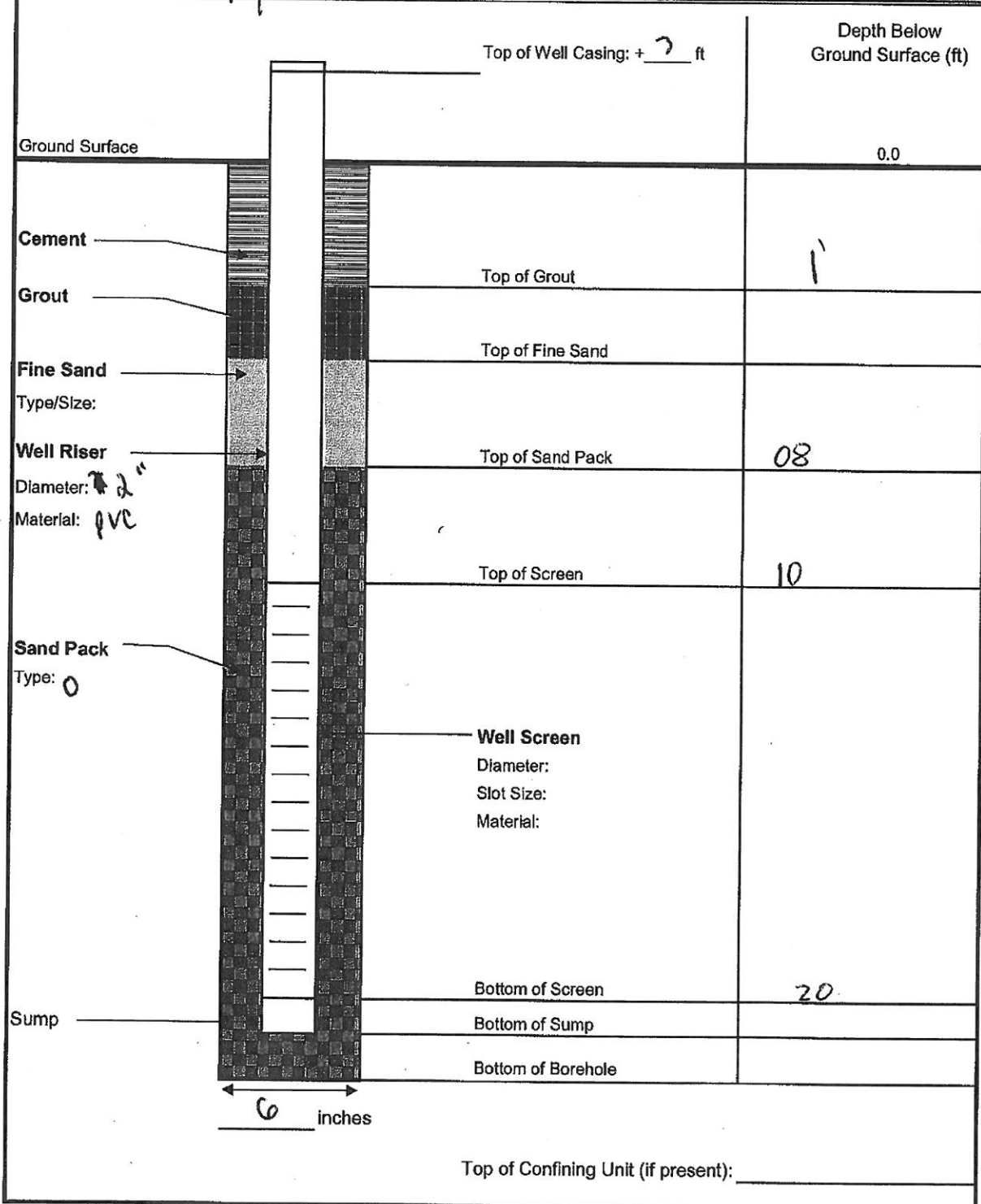
Client: USACE

Well ID: PAR-38-MW-02

NJBWA Permit No.

Date Well Installed: 4/8/16

Location: Pirral 38



Well Construction Detail (Single Cased - Stickup)

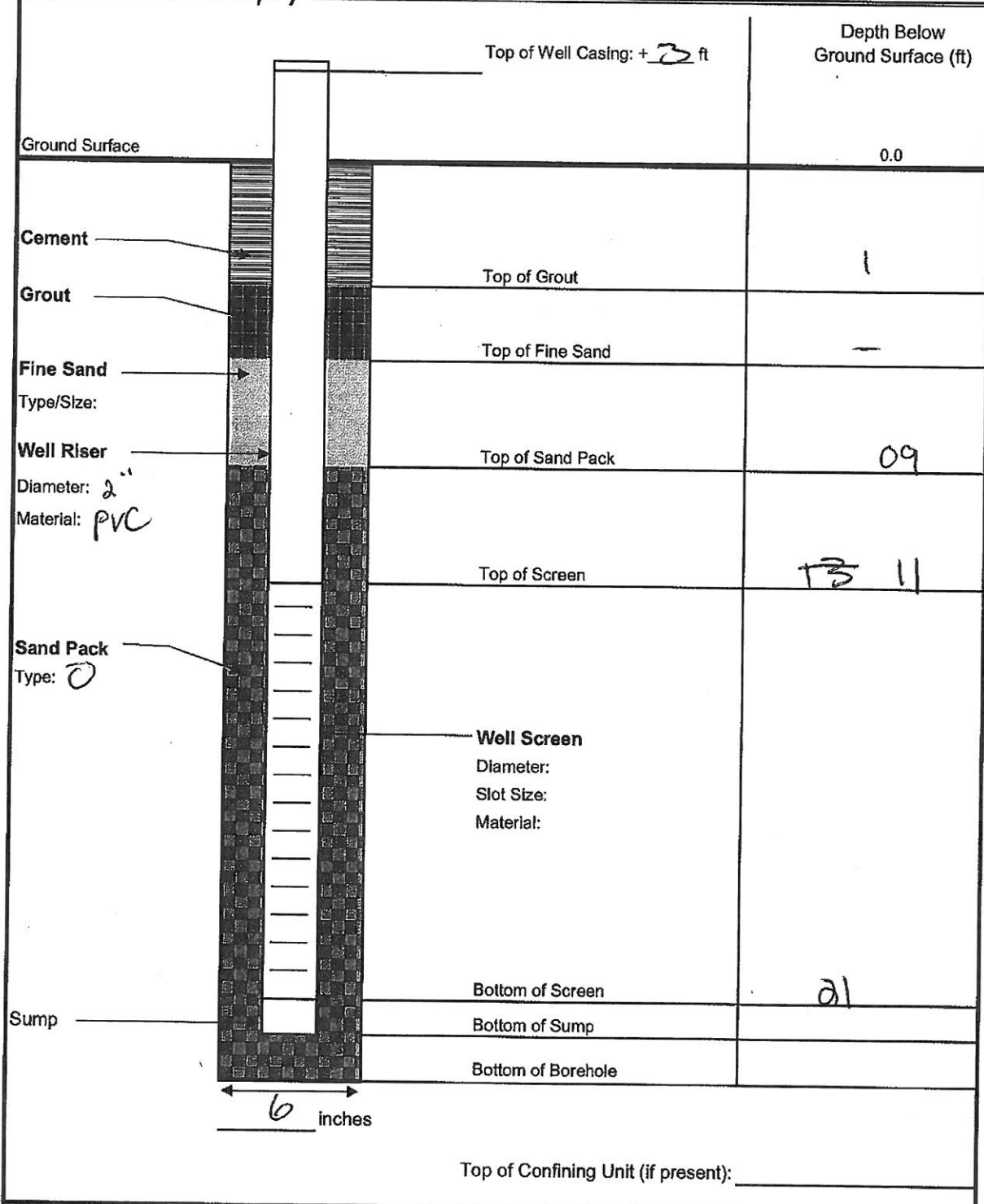
Client: USACE

Well ID: PAR-38-MW-03

NJBWA Permit No.

Date Well Installed: 4/8/16

Location: Parcel 38



Well Construction Detail (Single Cased - Stickup)

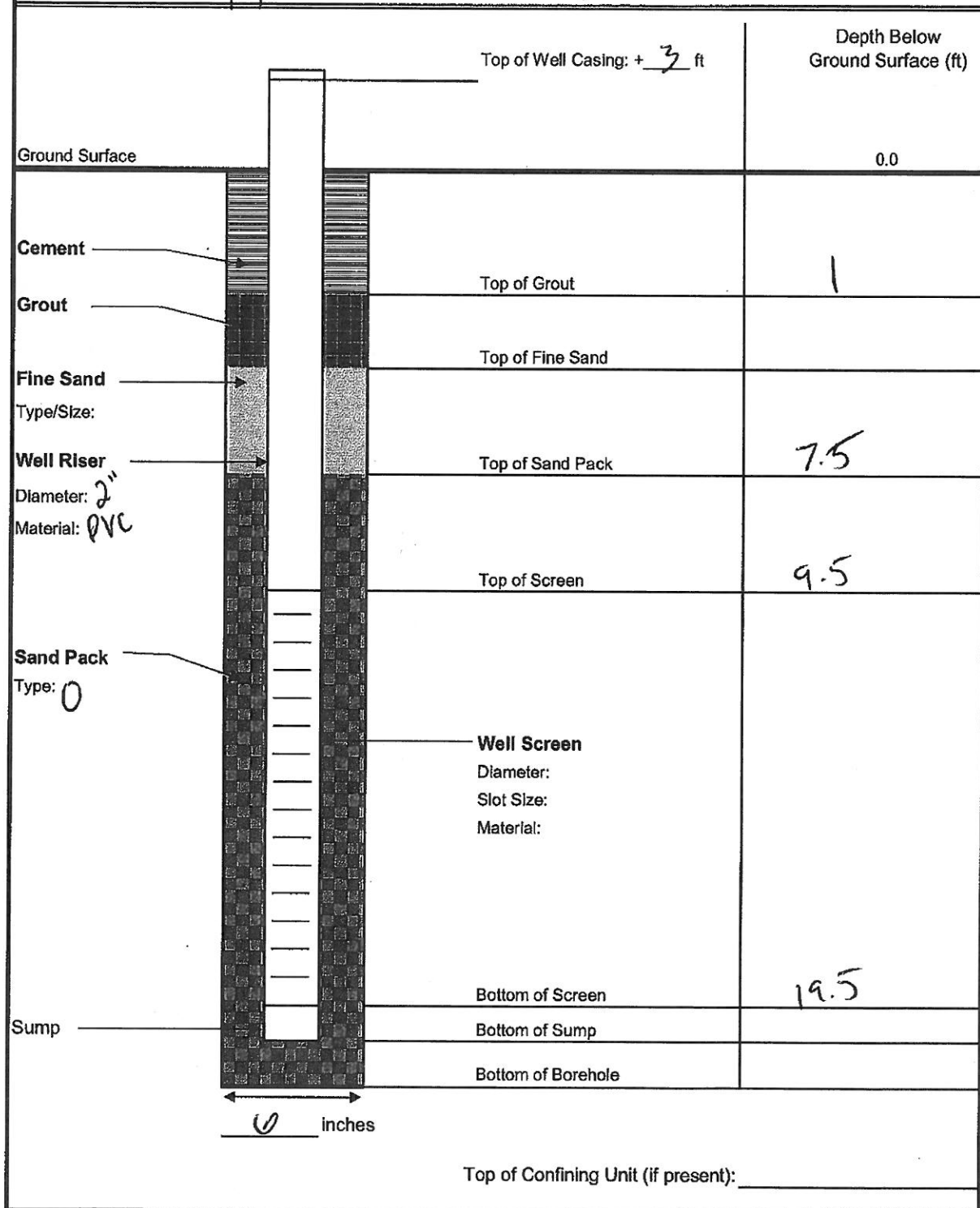
Client: USACE

Well ID: PAR-38-MW-04

NJBWA Permit No.

Date Well Installed: 4/8/16

Location: Parcel 38



Soil Boring Log

CLIENT: USACE					INSPECTOR: CW		BORING/WELL ID: PAR-38-6W-01	
PROJECT NAME: FTMM - ECP					DRILLER: JOE BRENAK		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: RAIN 55°F		Parcel 38	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)			
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R) 7822DT		LOCATION PLAN	
WATER LEVEL: ~12'					DATE/TIME START: 4/7/16		Oceanport, New Jersey	
DATE: 4/7/16					DATE/TIME FINISH: 4/7/16			
TIME: 1400					WEIGHT OF HAMMER: N/A			
MEAS. FROM: BGS w/ WLM					DROP OF HAMMER: N/A			
TYPE OF HAMMER: N/A								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
0			60/30	0	0-6" Moist, Brown, MC SAND little silt, trace grass			
1					6-18" Moist, Brown, MF SAND, little silt, trace f gravel			
2								
3					18-36" Moist, Brown, MF SAND, little silt, trace clay			
4								
5			60/38	0	0-38" SAA, moist			
6								
7								
8								
9								
10								
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S -- Split-Spoon				Granular (Sand & Gravel)				
U -- Undisturbed Tube				Fine Grained (Silt & Clay)				
C -- Rock Core				V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15				
A -- Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>CU</u>		BORINGWELL ID: <u>PAF-38-LW-02</u>	
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE BARNAK</u>		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>50°F RAIN</u>		<u>Parcel 38</u>	
PROJECT NUMBER: 748810-					CONTRACTOR: <u>East Coast Drilling, Inc. (ECDI)</u>			
GROUNDWATER OBSERVATIONS					RIG TYPE: <u>Geoprobe(R) 7822DT</u>		LOCATION PLAN	
WATER LEVEL: <u>~12'</u>					DATE/TIME START: <u>4/7/16</u>		Oceanport, New Jersey	
DATE: <u>4/7/16</u>					DATE/TIME FINISH: <u>4/7/16</u>			
TIME: <u>1400</u>					WEIGHT OF HAMMER: <u>N/A</u>			
MEAS. FROM: <u>BSS w/ WLM</u>					DROP OF HAMMER: <u>N/A</u>			
TYPE OF HAMMER: <u>N/A</u>								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
<u>1.0</u>			<u>60/60</u>	<u>0</u>	<u>0-10" SAA</u>			
<u>1.1</u>					<u>10"-50" moist, m. dense, Brown/orange-brown/gray mf mottled SAND, little silt, little clay</u>			
<u>1.2</u>								
<u>1.3</u>								
<u>1.4</u>					<u>50"-60" light brown/light gray/ mf SAND, some silt, little clay</u>			
<u>1.5</u>			<u>60/60</u>	<u>0</u>	<u>60"-</u>			
<u>1.6</u>					<u>0-5" SAA</u>			
<u>1.7</u>					<u>5"-28" wet, light brown, m. dense mf SAND, some silt, little clay</u>			
<u>1.8</u>					<u>28"-60" moist, gray/brown/dark gray, m. dense mf SAND, little silt.</u>			
<u>1.9</u>								
<u>2.0</u>								
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S - Split-Spoon				Granular (Sand & Gravel)				
U - Undisturbed Tube				Fine Grained (Silt & Clay)				
C - Rock Core				V. Loose: 0-4 Dens: 30-50 V. Soft: <2 Stiff: 8-15				
A - Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>WJ</u>		BORING/WELL ID: <u>PAC-38-5B-01</u>	
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE P. ANAK</u>		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>44° Windy</u>		<u>Parcel 38</u>	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)			
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R)7822DT		LOCATION PLAN	
WATER LEVEL: <u>N/A</u>					DATE/TIME START: <u>4/6/16</u>		Oceanport, New Jersey	
DATE: <u>N/A</u>					DATE/TIME FINISH: <u>4/6/16</u>			
TIME: <u>N/A</u>					WEIGHT OF HAMMER: <u>N/A</u>			
MEAS. FROM: <u>N/A</u>					DROP OF HAMMER: <u>N/A</u>			
TYPE OF HAMMER: <u>N/A</u>								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
1600 0	0-0.5		6/60	0	0-10" moist, loose, mf sand, trace silt, trace grass			
1605 1	1.25-2.5				10"-22" moist, m. dense, mf brown sand, little silt, little f.g. clay			
1610 2	2				22"-60" moist, m. dense, mf brown/gray/grey mottled sand, little silt,			
3	2.5-3							
4								
5								
6								
7								
8								
9								
10								
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S - Split-Spoon				Granular (Sand & Gravel)				
U - Undisturbed Tube				Fine Grained (Silt & Clay)				
C - Rock Core				V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15				
A - Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log																							
CLIENT: USACE PROJECT NAME: FTMM - ECP PROJECT LOCATION: FTMM Parcel PROJECT NUMBER: 748810-			INSPECTOR: CW DRILLER: JOE BARNAK WEATHER: 54°F windy CONTRACTOR: East Coast Drilling, Inc. (ECDI)		BORING/WELL ID: PAT-38-SB-02 LOCATION DESCRIPTION: Parcel 38																		
GROUNDWATER OBSERVATIONS WATER LEVEL: _____ DATE: _____ TIME: _____ MEAS. FROM: _____			RIG TYPE: Geoprobe® 7822DT DATE/TIME START: 4/8/16 0850 DATE/TIME FINISH: 4/4/16 0900 WEIGHT OF HAMMER: N/A DROP OF HAMMER: N/A TYPE OF HAMMER: N/A		LOCATION PLAN Oceanport, New Jersey																		
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS																
0	0-6		60/60	0	0-10" Dark Brown, Loose moist, MF SAND, little silt, trace grass																		
1	1.25-1.75				10"-36" Brown, moist, M. Dense MF SAND, little F gravel, little silt																		
2																							
3	2.5-3				36"-48" moist, Brown/orange-brown/grey MF mottled SAND, little silt, trace clay																		
4																							
5					48"-60" moist, Brown/orange-brown/grey MF mottled, SAND, trace silt																		
6					end of Boring 5'																		
7																							
8																							
9																							
10																							
Remarks:																							
Sample Types S - Split-Spoon U - Undisturbed Tube C - Rock Core A - Auger Cuttings			Consistency vs. Blowcount / Foot <table border="1" style="width: 100%; font-size: 0.8em;"> <thead> <tr> <th colspan="2">Granular (Sand & Gravel)</th> <th colspan="2">Fine Grained (Silt & Clay)</th> </tr> </thead> <tbody> <tr> <td>V. Loose: 0-4</td> <td>Dense: 30-50</td> <td>V. Soft: <2</td> <td>Stiff: 8-15</td> </tr> <tr> <td>Loose: 4-10</td> <td>V. Dense: >50</td> <td>Soft: 2-4</td> <td>V. Stiff: 15-30</td> </tr> <tr> <td>M. Dense: 10-30</td> <td></td> <td>M. Stiff: 4-8</td> <td>Hard: >30</td> </tr> </tbody> </table>				Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	M. Dense: 10-30		M. Stiff: 4-8	Hard: >30	and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation
Granular (Sand & Gravel)		Fine Grained (Silt & Clay)																					
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15																				
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30																				
M. Dense: 10-30		M. Stiff: 4-8	Hard: >30																				

Soil Boring Log

CLIENT: USACE PROJECT NAME: FTMM - ECP PROJECT LOCATION: FTMM Parcel PROJECT NUMBER: 748810-					INSPECTOR: <u>CW</u> DRILLER: <u>JOE DAPNAK</u> WEATHER: _____ CONTRACTOR: East Coast Drilling, Inc. (ECDI) RIG TYPE: Geoprobe® 7822DT DATE/TIME START: <u>4/7/16</u> DATE/TIME FINISH: <u>4/7/16</u> WEIGHT OF HAMMER: <u>N/A</u> DROP OF HAMMER: <u>N/A</u> TYPE OF HAMMER: <u>N/A</u>		BORING/WELL ID: <u>PAP-38-SD-03</u> LOCATION DESCRIPTION: <u>Parcel 38</u> LOCATION PLAN: _____ Oceanport, New Jersey																		
GROUNDWATER OBSERVATIONS WATER LEVEL: _____ DATE: <u>N/A</u> TIME: _____ MEAS. FROM: _____																									
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS																		
0	0-0.5		60/49	0	0-3" Moist, Brown, Loose, MC SAND, trace grass, trace silt.																				
1	1.25-1.75				3"-60" moist, light brown, m. dense, m f SAND, little f gravel, trace silt																				
2																									
	2.5-3																								
3																									
4																									
5					end of Boring @ 5'																				
6																									
7																									
8																									
9																									
10																									
Remarks:																									
Sample Types S -- Split-Spoon U -- Undisturbed Tube C -- Rock Core A -- Auger Cuttings				Consistency vs. Blowcount / Foot <table border="1"> <tr> <th colspan="2">Granular (Sand & Gravel)</th> <th colspan="2">Fine Grained (Silt & Clay)</th> </tr> <tr> <td>V. Loose: 0-4</td> <td>Dense: 30-50</td> <td>V. Soft: <2</td> <td>Stiff: 8-15</td> </tr> <tr> <td>Loose: 4-10</td> <td>V. Dense: >50</td> <td>Soft: 2-4</td> <td>V. Stiff: 15-30</td> </tr> <tr> <td>M. Dense: 10-30</td> <td></td> <td>M. Stiff: 4-8</td> <td>Hard: >30</td> </tr> </table>				Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	M. Dense: 10-30		M. Stiff: 4-8	Hard: >30	and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation	
Granular (Sand & Gravel)		Fine Grained (Silt & Clay)																							
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15																						
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30																						
M. Dense: 10-30		M. Stiff: 4-8	Hard: >30																						

Soil Boring Log

CLIENT: USACE					INSPECTOR: CW		BORING/WELL ID: PAC-38-2B-04	
PROJECT NAME: FTMM - ECP					DRILLER: JOE BAANAK		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: 44°F windy		Parcel 38	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)			
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R) 7822DT		LOCATION PLAN	
WATER LEVEL: _____					DATE/TIME START: 4/6/16		Oceanport, New Jersey	
DATE: _____					DATE/TIME FINISH: 4/6/16			
TIME: _____					WEIGHT OF HAMMER: N/A			
MEAS. FROM: _____					DROP OF HAMMER: N/A			
					TYPE OF HAMMER: N/A			
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
1545 0	0-6		60/41	0	0-6" moist, loose, brown, mf SAND, trace silt, trace glass, trace coal	I		
1550 1	1.25-1.75				6-41" moist, m. dense, brown, SAND, little silt, trace F gravel, trace wood frags			
2								
1555 3	2.5-3							
4								
5					end of Boring 51			
6								
7								
8								
9								
0								
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S - Split-Spoon				Granular (Sand & Gravel)				
U - Undisturbed Tube				Fine Grained (Silt & Clay)				
C - Rock Core				V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15				
A - Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log

CLIENT: USACE					INSPECTOR: CW		BORING/WELL ID: PAR-38-2B-05	
PROJECT NAME: FTMM - ECP					DRILLER: JOE BARNACK		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: 40°F High Winds		Parcel 38	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)			
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R) 7822DT		LOCATION PLAN	
WATER LEVEL: N/A					DATE/TIME START: 4/6/16 1525		Oceanport, New Jersey	
DATE: N/A					DATE/TIME FINISH: 4/6/16 1535			
TIME: N/A					WEIGHT OF HAMMER: N/A			
MEAS. FROM: N/A					DROP OF HAMMER: N/A			
TYPE OF HAMMER: N/A								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL		STRATA	COMMENTS
1530 0	0-6		60/46	0	0-4" Moist, MF, loose Brown SAND, trace silt, trace gravel		I	
1535 1	125-175				4"-40" Moist, M. dense, Brown SAND, little silt, trace gravel, back to 26"			
2								
1540 3	2.5-3							
4								
5					END of Boring 5'			
6								
7								
8								
9								
10								
Remarks:								
Sample Types					Consistency vs. Blowcount / Foot			
S - Split-Spoon					Granular (Sand & Gravel)			
U - Undisturbed Tube					Fine Grained (Silt & Clay)			
C - Rock Core					V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15			
A - Auger Cuttings					Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30			
					M. Dense: 10-30 M. Stiff: 4-8 Hard: >30			
					and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation			

Soil Boring Log

CLIENT: USACE PROJECT NAME: FTMM - ECP PROJECT LOCATION: FTMM Parcel PROJECT NUMBER: 748810-					INSPECTOR: <u>CLW</u> DRILLER: <u>JOE BERNARD</u> WEATHER: _____ CONTRACTOR: East Coast Drilling, Inc. (ECDI)		BORING/WELL ID: <u>PAB-38-SB-04</u> LOCATION DESCRIPTION: <u>Parcel 38</u>																
GROUNDWATER OBSERVATIONS WATER LEVEL: _____ DATE: _____ TIME: _____ MEAS. FROM: _____					RIG TYPE: Geoprobe(R) 7822DT DATE/TIME START: <u>4/7/16</u> DATE/TIME FINISH: <u>4/7/16</u> WEIGHT OF HAMMER: <u>N/A</u> DROP OF HAMMER: <u>N/A</u> TYPE OF HAMMER: <u>N/A</u>		LOCATION PLAN Oceanport, New Jersey																
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS																
<u>0</u>			<u>6 1/4</u>	<u>0</u>	<u>0-5" Asphalt / asphalt millings</u>																		
<u>0.5-1</u>					<u>5"-10" moist, m. dense mf, gray SAND, trace silt</u>																		
<u>1.75-2.25</u>					<u>10"-60" moist, m. dense, mf BROWN SAND, little silt, trace f gravel</u>																		
<u>0.3</u>	<u>3-3.5</u>																						
<u>0.4</u>																							
<u>0.5</u>																							
<u>0.6</u>																							
<u>0.7</u>																							
<u>0.8</u>																							
<u>0.9</u>																							
<u>1.0</u>																							
Remarks:																							
Sample Types					Consistency vs. Blowcount / Foot																		
S - Split-Spoon U - Undisturbed Tube C - Rock Core A - Auger Cuttings					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Granular (Sand & Gravel)</th> <th colspan="2">Fine Grained (Silt & Clay)</th> </tr> <tr> <td>V. Loose: 0-4</td> <td>Dense: 30-50</td> <td>V. Soft: <2</td> <td>Stiff: 8-15</td> </tr> <tr> <td>Loose: 4-10</td> <td>V. Dense: >50</td> <td>Soft: 2-4</td> <td>V. Stiff: 15-30</td> </tr> <tr> <td>M. Dense: 10-30</td> <td></td> <td>M. Stiff: 4-8</td> <td>Hard: >30</td> </tr> </table>			Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	M. Dense: 10-30		M. Stiff: 4-8	Hard: >30
Granular (Sand & Gravel)		Fine Grained (Silt & Clay)																					
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15																				
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30																				
M. Dense: 10-30		M. Stiff: 4-8	Hard: >30																				
					and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation																		

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>CW</u>		BORING/WELL ID: <u>PAR-38-SB-07</u>	
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE BANIAK</u>		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>54°F windy</u>		<u>Parcel 38</u>	
PROJECT NUMBER: 748810					CONTRACTOR: <u>East Coast Drilling, Inc. (ECDI)</u>		LOCATION PLAN	
GROUNDWATER OBSERVATIONS					RIG TYPE: <u>Geoprobe(R) 7822DT</u>		Oceanport, New Jersey	
WATER LEVEL:					DATE/TIME START: <u>4/6/16</u> <u>0905</u>			
DATE: <u>N/A</u>					DATE/TIME FINISH: <u>4/6/16</u> <u>0715</u>			
TIME:					WEIGHT OF HAMMER: <u>N/A</u>			
MEAS. FROM:					DROP OF HAMMER: <u>N/A</u>			
TYPE OF HAMMER: <u>N/A</u>								

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADVI REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			<u>100</u>	<u>56</u>	<u>0-2" Asphalt</u>		
					<u>2"-6" Asphalt millings/Rock frags</u>		
<u>0970</u>	<u>1</u>	<u>1-1.5</u>			<u>6-10" Concrete</u>		
					<u>10"-12" Asphalt frags/Rock frags</u>		
<u>0925</u>	<u>2</u>	<u>2.25-2.75</u>			<u>12"-27" Brown and grey, moist m. Dense and SAND, little silt, trace f gravel</u>		
	<u>3</u>				<u>27"-36" Moist, Brown/Orange-Brown/ Dark Brown, Mf SAND some silt</u>		
<u>0930</u>	<u>4</u>	<u>4-4.5</u>			<u>36"-56" moist, light Brown/grey, m. Dense, ME SAND, trace silt</u>		
	<u>5</u>						
	<u>6</u>						
	<u>7</u>						
	<u>8</u>						
	<u>9</u>						
	<u>10</u>						

Remarks:

Sample Types	Consistency vs. Blowcount / Foot			
S - Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
U - Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
C - Rock Core	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
A - Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: >30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE					INSPECTOR: CW		BORING/WELL ID: PAR-38-SB-08	
PROJECT NAME: FTMM - ECP					DRILLER: JOE BARNAK		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: RAIN 54°F		Parcel 38	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)			
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R)7822DT		LOCATION PLAN	
WATER LEVEL:					DATE/TIME START: 4/7/16 0920		Oceanport, New Jersey	
DATE: N/A					DATE/TIME FINISH: 4/7/16 0930			
TIME:					WEIGHT OF HAMMER: N/A			
MEAS. FROM:					DROP OF HAMMER: N/A			
TYPE OF HAMMER: N/A								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
0			60/4	0	0-6" Asphalt			
0935	0.5-1				6-13" Dark Brown, moist, MC SAND, f gravel (some)			
6940	1.75-2.25				13"-33" moist, Brown, m. dense, MF SAND, little silt, trace f gravel			
0945	3-3.5				33"-48" moist, light Brown, m. dense MC SAND, trace silt			
					48"-54" moist, Red Brown, m. dense MF SAND, little silt			
					end of Boring @ 5'			
5								
6								
7								
8								
9								
10								
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S - Split-Spoon				Granular (Sand & Gravel)				
U - Undisturbed Tube				Fine Grained (Silt & Clay)				
C - Rock Core				V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15				
A - Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>CW</u>		BORING/WELL ID: <u>Pw-38-5B-07</u>																
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE BARNUM</u>		LOCATION DESCRIPTION																
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>55°F WIND/RAIN</u>		<u>Parcel 38</u>																
PROJECT NUMBER: 748810-					CONTRACTOR: <u>East Coast Drilling, Inc. (ECDI)</u>		LOCATION PLAN																
GROUNDWATER OBSERVATIONS					RIG TYPE: <u>Geoprobe(R) 7822DT</u>		Oceanport, New Jersey																
WATER LEVEL:					DATE/TIME START: <u>4/7/16 1135</u>																		
DATE: <u>N/A</u>					DATE/TIME FINISH: <u>4/7/16 1140</u>																		
TIME:					WEIGHT OF HAMMER: <u>N/A</u>																		
MEAS. FROM:					DROP OF HAMMER: <u>N/A</u>																		
TYPE OF HAMMER: <u>N/A</u>																							
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS																
0			<u>6/10</u>	<u>0</u>	0-6" Asphalt, millings, F, gravel																		
1190	0.5-1				6'-12" Dark Brown / Dark grey, moist, loose, MC SAND, trace silt, trace Brick																		
1195	1.75-2.25				12'-20" light grey, M. dense, trace SAND, trace silt																		
1200	3-3.5				20'-40" of Brown/orange-Brown/grey, mottled SAND, little silt																		
5					end of Boring 25																		
6																							
7																							
8																							
9																							
10																							
Remarks:																							
Sample Types				Consistency vs. Blowcount / Foot																			
S - Split Spoon U - Undisturbed Tube C - Rock Core A - Auger Cuttings				<table border="1"> <tr> <th colspan="2">Granular (Sand & Gravel)</th> <th colspan="2">Fine Grained (Silt & Clay)</th> </tr> <tr> <td>V. Loose: 0-4</td> <td>Dense: 30-50</td> <td>V. Soft: <2</td> <td>Stiff: 8-15</td> </tr> <tr> <td>Loose: 4-10</td> <td>V. Dense: >50</td> <td>Soft: 2-4</td> <td>V. Stiff: 15-30</td> </tr> <tr> <td>M. Dense: 10-30</td> <td></td> <td>M. Stiff: 4-8</td> <td>Hard: >30</td> </tr> </table>				Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	M. Dense: 10-30		M. Stiff: 4-8	Hard: >30
Granular (Sand & Gravel)		Fine Grained (Silt & Clay)																					
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15																				
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30																				
M. Dense: 10-30		M. Stiff: 4-8	Hard: >30																				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation																			

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>OW</u>		BORING/WELL ID: <u>PAR-38-SB-10</u>	
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE BARNAK</u>		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>55°F clear windy</u>		<u>Parcel 38</u>	
PROJECT NUMBER: 748810-					CONTRACTOR: <u>East Coast Drilling, Inc. (ECDI)</u>			
GROUNDWATER OBSERVATIONS					RIG TYPE: <u>Geoprobe(R) 7822DT</u>		LOCATION PLAN	
WATER LEVEL:					DATE/TIME START: <u>4/7/16 0955</u>		Oceanport, New Jersey	
DATE: <u>N/A</u>					DATE/TIME FINISH: <u>4/7/16 1065</u>			
TIME:					WEIGHT OF HAMMER: <u>N/A</u>			
MEAS. FROM:					DROP OF HAMMER: <u>N/A</u>			
TYPE OF HAMMER: <u>N/A</u>								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
1020 0	0-0.5		60/66	○	0-7" moist, red brown, MC SAND, trace silt, trace grass			
1025 1	1.25-1.75			○	7"-24" moist, brown, m. dense, mt SAND, little silt			
1030 2	2.5-3			○	24"-35" moist, light brown, MC SAND, trace silt			
3				○	35"-56" moist			
4				○				
5				○				
6				○				
7				○				
8				○				
9				○				
10				○				
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S - Split-Spoon				Granular (Sand & Gravel)				
U - Undisturbed Tube				Fine Grained (Silt & Clay)				
C - Rock Core				V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-16				
A - Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log

CLIENT: USACE PROJECT NAME: FTMM - ECP PROJECT LOCATION: FTMM Parcel PROJECT NUMBER: 748810-					INSPECTOR: CW DRILLER: JOE BARNAK WEATHER: 54°F CONTRACTOR: East Coast Drilling, Inc. (ECDI)		BORING/WELL ID: PAR-38-SB-11 LOCATION DESCRIPTION: Parcel 38																
GROUNDWATER OBSERVATIONS WATER LEVEL: N/A DATE: N/A TIME: N/A MEAS. FROM:					RIG TYPE: Geoprobe(R) 7822DT DATE/TIME START: 4/7/16 0935 DATE/TIME FINISH: 4/7/16 0945 WEIGHT OF HAMMER: N/A DROP OF HAMMER: N/A TYPE OF HAMMER: N/A		LOCATION PLAN Oceanport, New Jersey																
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS																
0			60/55		0-6" Asphalt + millings																		
1000	0.51				6"-10" Brown, loose, moist, mf SAND, little silt, little																		
1005	1.75-2.25				f gravel																		
2					10"-38" Brown, moist, m. dense MF SAND, little silt																		
1010	3-3.5				38"-60" moist, brown/orange-brown/gray mf mottled SAND, trace silt																		
4																							
5					no & 5'																		
6																							
7																							
8																							
9																							
10																							
Remarks:																							
Sample Types S - Split-Spoon U - Undisturbed Tube C - Rock Core A - Auger Cuttings					Consistency vs. Blowcount / Foot <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">Granular (Sand & Gravel)</th> <th colspan="2">Fine Grained (Silt & Clay)</th> </tr> <tr> <td>V. Loose: 0-4</td> <td>Dense: 30-50</td> <td>V. Soft: <2</td> <td>Stiff: 8-15</td> </tr> <tr> <td>Loose: 4-10</td> <td>V. Dense: >50</td> <td>Soft: 2-4</td> <td>V. Stiff: 15-30</td> </tr> <tr> <td>M. Dense: 10-30</td> <td></td> <td>M. Stiff: 4-8</td> <td>Hard: >30</td> </tr> </table>			Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	M. Dense: 10-30		M. Stiff: 4-8	Hard: >30
Granular (Sand & Gravel)		Fine Grained (Silt & Clay)																					
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15																				
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30																				
M. Dense: 10-30		M. Stiff: 4-8	Hard: >30																				
					and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation																		

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>AW</u>		BORING/WELL ID: <u>PAR-38-3B-12</u>	
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE BARNAK</u>		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>55°F Wind</u>		<u>Parcel 38</u>	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)			
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R) 7822DT		LOCATION PLAN	
WATER LEVEL: <u>N/A</u>					DATE/TIME START: <u>4/7/16 1120</u>		Oceanport, New Jersey	
DATE: <u>N/A</u>					DATE/TIME FINISH: <u>4/7/16 1130</u>			
TIME: <u>N/A</u>					WEIGHT OF HAMMER: <u>N/A</u>			
MEAS. FROM:					DROP OF HAMMER: <u>N/A</u>			
TYPE OF HAMMER: <u>N/A</u>								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
0			60/60	0	0-6" Asphalt & Millings			
1135	0.5-1				6"-19" Brown and grey, moist MF SAND, trace f gravel			
1140	1.75-2.25				19"-60" moist, light brown/gray-brown MF SAND, trace silt			
1145	3-3.5							
5					END of Boring @ 5'			
6								
7								
8								
9								
10								
Remarks:								
Sample Types				Consistency vs. Blowcount / Foot				
S - Split-Spoon				Granular (Sand & Gravel)				
U - Undisturbed Tube				Fine Grained (Silt & Clay)				
C - Rock Core				V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15				
A - Auger Cuttings				Loose: 4-10 V. Dense: >50 Soft 2-4 V. Stiff: 15-30				
				M. Dense: 10-30 M. Stiff: 4-8 Hard: >30				
				and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation				

Soil Boring Log

CLIENT: USACE PROJECT NAME: FTMM - ECP PROJECT LOCATION: FTMM Parcel PROJECT NUMBER: 748810-					INSPECTOR: <u>CU</u> DRILLER: <u>JOE BARNAK</u> WEATHER: <u>55°F Windy</u> CONTRACTOR: East Coast Drilling, Inc. (ECDI)		BORINGWELL ID: <u>PAR-38-SB-14</u> LOCATION DESCRIPTION: <u>Prul 38</u>	
GROUNDWATER OBSERVATIONS WATER LEVEL: <u>N/A</u> DATE: <u>N/A</u> TIME: <u>N/A</u> MEAS. FROM:					RIG TYPE: Geoprobe(R)7822DT DATE/TIME START: <u>4/7/10 1015</u> DATE/TIME FINISH: <u>4/7/10 1025</u> WEIGHT OF HAMMER: <u>N/A</u> DROP OF HAMMER: <u>N/A</u> TYPE OF HAMMER: <u>N/A</u>		LOCATION PLAN Oceanport, New Jersey	
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
1100 0	0-0.5		60/60	0	0-4" moist, brown, MC SAND, trace silt, trace f, gravel trace grass			
1105 1	1.25-1.75				4"-10" moist, light brown, MC SAND, trace silt, little f, gravel			
1110 2	2.5-3				10"-60" moist, brown/orange-brown/ gray mottled SAND, trace silt, trace f gravel			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								
81								
82								
83								
84								
85								
86								
87								
88								
89								
90								
91								
92								
93								
94								
95								
96								
97								
98								
99								
100								

Remarks:

Sample Types

S - Split-Spoon
 U - Undisturbed Tube
 C - Rock Core
 A - Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)

V. Loose: 0-4 Dense: 30-50
 Loose: 4-10 V. Dense: >50
 M. Dense: 10-30

Fine Grained (Silt & Clay)

V. Soft: <2 Stiff: 8-15
 Soft: 2-4 V. Stiff: 15-30
 M. Stiff: 4-8 Hard: >30

and - 35-50%
 some - 20-35%
 little - 10-20%
 trace - <10%

moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE					INSPECTOR: <u>CW</u>		BORING/WELL ID: <u>PAP-38-SB-15</u>	
PROJECT NAME: FTMM - ECP					DRILLER: <u>JOE BARNAK</u>		LOCATION DESCRIPTION	
PROJECT LOCATION: FTMM Parcel					WEATHER: <u>55°F Wind/RAIN</u>		Parcel 38	
PROJECT NUMBER: 748810-					CONTRACTOR: East Coast Drilling, Inc. (ECDI)		LOCATION PLAN	
GROUNDWATER OBSERVATIONS					RIG TYPE: Geoprobe(R) 7822DT		Oceanport, New Jersey	
WATER LEVEL: _____					DATE/TIME START: <u>4/7/16 1105</u>			
DATE: _____					DATE/TIME FINISH: <u>4/7/16 1115</u>			
TIME: _____					WEIGHT OF HAMMER: N/A			
MEAS. FROM: _____					DROP OF HAMMER: N/A			
TYPE OF HAMMER: N/A								
DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS	
0			<u>68/55</u>	<u>0</u>	0-5" Asphalt			
1120	0.5-1				5"-30" light brown, moist, n. sand MC SAND, trace silt			
1125	1.75-2.25				30"-55" moist, n. sand, Brown/gray c. brown/gray mottled MF SAND, trace silt.			
1130	3-3.5							
4								
5								
6								
7								
8								
9								
10								
Remarks:								
Sample Types					Consistency vs. Blowcount / Foot			
S - Split-Spoon					Granular (Sand & Gravel)			
U - Undisturbed Tube					Fine Grained (Silt & Clay)			
C - Rock Core					V. Loose: 0-4 Dense: 30-50 V. Soft: <2 Stiff: 8-15			
A - Auger Cuttings					Loose: 4-10 V. Dense: >50 Soft: 2-4 V. Stiff: 15-30			
					M. Dense: 10-30 M. Stiff: 4-8 Hard: >30			
					and - 35-50% some - 20-35% little - 10-20% trace - <10% moisture, density, color, gradation			

ATTACHMENT D
2016 Monitoring Well Forms

WELL PERMIT

New Well

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to further conditions and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit

Certifying Driller: JAMES W DUFFY, MASTER LICENSE # 0001581

Permit Issued to: EAST COAST DRILLING, INC.

Company Address: 1256 N CHURCH ST MOORESTOWN, NJ 08057

PROPERTY OWNER

Name: US GOV - DEPT. OF ARMY

Organization: US Gov - Dept. of Army

Address: Washington

City: Washington **State:** District of Columbia **Zip Code:** 20310

PROPOSED WELL LOCATION

Facility Name: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth **Municipality:** Eatontown Boro **Lot:** 1 **Block:** 301

Easting (X): 615942 **Northing (Y):** 539058

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: PAR-38-GW-MW-01

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: MONITORING

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings: _____

Depth (ft.): 25

Case ID Number: _____

Pump Capacity (gpm): 0

Deviation Requested: N

Drilling Method: Hollow Stem Augers

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: March 16, 2016
Expiration Date: March 16, 2017

Approved by the authority of:
Bob Martin
Commissioner

Well Permit -- Page 1 of 2

Terry D. Pilawski
Terry Pilawski, Chief
Bureau of Water Allocation and Well Permitting

MONITORING WELL RECORD

PROPERTY OWNER: US GOV - DEPT. OF ARMY

Company/Organization: US Gov - Dept. of Army

Address: Washington Washington, District of Columbia 20310

WELL LOCATION: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth Municipality: Eatontown Boro Lot: 1 Block: 301

Easting (X): 615944 Northing (Y): 539053
Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: April 8, 2016

DATE WELL COMPLETED: April 8, 2016

WELL USE: MONITORING

Other Use(s): _____

Local ID: PAR-38-GW-MW-01

WELL CONSTRUCTION

Total Depth Drilled (ft.): 21 Finished Well Depth (ft.): 21 Well Surface: Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	21	8		
Casing	0	11	2	PVC	Sch 40
Screen	11	21	2	PVC	.010

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	9	8	2	10	188	16
Gravel Pack	9	21	8	2	#0		

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes

Static Water Level: 13 ft. below land surface

Water Level Measure Tool: M-Scope

Well Development Period: 2 hrs.

Method of Development: Pump

Pump Type: _____

Pump Capacity: gpm

Total Design Head: ft.

Drilling Fluid: _____

Drill Rig: 7822DT

Health and Safety Plan Submitted? Yes

ATTACHMENTS:

GEOLOGIC LOG

0 - 13: Light Brown SM - Silty sands, sand-silt mixtures

13 - 21: Green OL - Organic silts and organic silty clays of low plasticity

ADDITIONAL INFORMATION:

Driller of Record: Joseph Barnak,
MONITORING LICENSE # 534717

Company: EAST COAST DRILLING, INC.



New Jersey Department of Environmental Protection
Site Remediation Program

**MONITORING WELL CERTIFICATION FORM A - AS-BUILT
CERTIFICATION**

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth - Parcel 38

List all AKAs: _____

Street Address: Highway 35

Municipality: Eatontown Boro (Township, Borough or City)

County: Monmouth Zip Code: 07724

Program Interest (PI) Number(s): _____ Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Gov - Dept. of Army

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

- | | |
|--|---------------------------|
| 1. Well Permit Number (This number must be permanently affixed to the well casing):... | <u>E201602891</u> |
| 2. Site Well Number as shown on application or plans): | <u>PAR-38-GW-MW-01</u> |
| 3. Well Completion Date: | <u>4/8/2016</u> |
| 4. Distance from Top of Casing (cap off) to ground surface (nearest 0.01'): | <u>+3.00</u> |
| 5. Total Depth of Well to the nearest ½ foot: | <u>21</u> |
| 6. Depth to Top of Screen (or top of open hole) from top of casing (nearest 0.01'):..... | <u>11.00</u> |
| 7. Screen Length (or length of open hole) in feet: | <u>10</u> |
| 8. Screen or Slot Size: | <u>.010</u> |
| 9. Screen or Slot Material: | <u>Sch. 40 PVC</u> |
| 10. Casing Material (PVC, steel, or other – specify): | <u>Sch. 40 PVC</u> |
| 11. Casing Diameter (inches): | <u>2</u> |
| 12. Static Water Level from top of casing at the time of installation (nearest 0.01'): | <u>13.00</u> |
| 13. Yield (gallons per minute): | <u>1</u> |
| 14. Development Technique (specify): | <u>Pump</u> |
| 15. Length of Time well is developed/pumped or bailed (hours and minutes): | <u>2 Hours 00 Minutes</u> |



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth

List all AKAs: FTMM

Street Address: OACSIM - U.S. Army Fort Monmouth, PO Box 148

Municipality: Oceanport (Township, Borough or City)

County: Monmouth Zip Code: 07757

Program Interest (PI) Number(s): G000000032 Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Army (Fort Monmouth)

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201602891

2. Site Well Number (As shown on application or plans): PAR-38-MW-01

3. Geographic Coordinate NAD 83 to nearest 1/100 of a second:

Latitude: North 40° 18' 44.96

Longitude: West 74° 03' 21.50"

4. New Jersey State Plane Coordinates NAD 83 datum, US survey feet units, to nearest foot:

North 539053

East 615944

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 22.07

Elevation Top of Outer casing: 22.51

Elevation of ground: 19.07

Check one: ☒ NAVD 88 ☐ NVGD29 ☐ On Site Datum ☐ Other

6. Source of elevation datum (benchmark, number/description and elevation/datum). If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation (referencing NAVD 88).

GPS Observation

7. Significant observations and notes:

SECTION D. LAND SURVEYOR'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

Professional Land Surveyor's Signature: _____ Date _____

Surveyor's Name: Kenny L. Kennon License Number: 37195

Firm Name: Kennon Surveying Services, Inc. Certificate of Authorization #: 27944900

Mailing Address 5 Powder Horn Drive, Suite 4

City/Town: Warren State New Jersey Zip Code: 07059

Phone Number 732-564-1818 Ext.: _____ Fax: _____

WELL PERMIT

New Well

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to further conditions and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit

Certifying Driller: JAMES W DUFFY, MASTER LICENSE # 0001581

Permit Issued to: EAST COAST DRILLING, INC.

Company Address: 1256 N CHURCH ST MOORESTOWN, NJ 08057

PROPERTY OWNER

Name: US GOV - DEPT. OF ARMY

Organization: US Gov - Dept. of Army

Address: Washington

City: Washington

State: District of Columbia

Zip Code: 20310

PROPOSED WELL LOCATION

Facility Name: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth

Municipality: Eatontown Boro

Lot: 1

Block: 301

Easting (X): 615994 **Northing (Y):** 538977

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: PAR-38-GW-MW-02

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: MONITORING

Other Use(s):

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings:

Depth (ft.): 25

Case ID Number:

Pump Capacity (gpm): 0

Deviation Requested: N

Drilling Method: Hollow Stem Augers

Attachments:

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: March 16, 2016

Expiration Date: March 16, 2017

Approved by the authority of:

Bob Martin

Commissioner

Well Permit -- Page 1 of 2

Terry D. Pilawski

Terry Pilawski, Chief

Bureau of Water Allocation and Well Permitting

MONITORING WELL RECORD

PROPERTY OWNER: US GOV - DEPT. OF ARMY

Company/Organization: US Gov - Dept. of Army

Address: Washington Washington, District of Columbia 20310

WELL LOCATION: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth Municipality: Eatontown Boro Lot: 1 Block: 301

Easting (X): 615991 Northing (Y): 538975
Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: April 8, 2016

DATE WELL COMPLETED: April 8, 2016

WELL USE: MONITORING

Other Use(s): _____

Local ID: PAR-38-GW-MW-02

WELL CONSTRUCTION

Total Depth Drilled (ft.): 20 Finished Well Depth (ft.): 20 Well Surface: Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	20	8		
Casing	0	10	2	PVC	Sch 40
Screen	10	20	2	PVC	.010

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	8	8	2	10	188	16
Gravel Pack	8	20	8	2	#0		

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes

Static Water Level: 12.5 ft. below land surface

Water Level Measure Tool: M-Scope

Well Development Period: 2.5 hrs.

Method of Development: Pump

Pump Type: _____

Pump Capacity: gpm

Total Design Head: ft.

Drilling Fluid: _____

Drill Rig: 7822DT

Health and Safety Plan Submitted? Yes

ATTACHMENTS:

GEOLOGIC LOG

0 - 12: Light Brown SM - Silty sands, sand-silt mixtures

12 - 20: Light Green OL - Organic silts and organic silty clays of low plasticity

ADDITIONAL INFORMATION:

Driller of Record: Joseph Barnak,
MONITORING LICENSE # 534717

Company: EAST COAST DRILLING, INC.



New Jersey Department of Environmental Protection
Site Remediation Program

**MONITORING WELL CERTIFICATION FORM A - AS-BUILT
CERTIFICATION**

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth - Parcel 38

List all AKAs: _____

Street Address: Highway 35

Municipality: Eatontown Boro (Township, Borough or City)

County: Monmouth Zip Code: 07724

Program Interest (PI) Number(s): _____ Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Gov - Dept. of Army

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing):...	<u>E201602892</u>
2. Site Well Number as shown on application or plans):	<u>PAR-38-GW-MW-02</u>
3. Well Completion Date:	<u>4/8/2016</u>
4. Distance from Top of Casing (cap off) to ground surface (nearest 0.01'):	<u>+3.00</u>
5. Total Depth of Well to the nearest ½ foot:	<u>20</u>
6. Depth to Top of Screen (or top of open hole) from top of casing (nearest 0.01'):	<u>10.00</u>
7. Screen Length (or length of open hole) in feet:	<u>10</u>
8. Screen or Slot Size:	<u>.010</u>
9. Screen or Slot Material:	<u>Sch. 40 PVC</u>
10. Casing Material (PVC, steel, or other – specify):	<u>Sch. 40 PVC</u>
11. Casing Diameter (inches):	<u>2</u>
12. Static Water Level from top of casing at the time of installation (nearest 0.01'):	<u>12.50</u>
13. Yield (gallons per minute):	<u>1</u>
14. Development Technique (specify):	<u>Pump</u>
15. Length of Time well is developed/pumped or bailed (hours and minutes):	<u>2 Hours 30 Minutes</u>



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth

List all AKAs: FTMM

Street Address: OACSIM - U.S. Army Fort Monmouth, PO Box 148

Municipality: Oceanport (Township, Borough or City)

County: Monmouth Zip Code: 07757

Program Interest (PI) Number(s): G000000032 Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Army (Fort Monmouth)

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201602892

2. Site Well Number (As shown on application or plans): PAR-38-MW-02

3. Geographic Coordinate NAD 83 to nearest 1/100 of a second:

Latitude: North 40° 18' 44.19" Longitude: West 74° 03' 20.90"

4. New Jersey State Plane Coordinates NAD 83 datum, US survey feet units, to nearest foot:

North 538975 East 615991

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 27.52

Elevation Top of Outer casing: 28.09 Elevation of ground: 24.58

Check one: ☒ NAVD 88 ☐ NVGD29 ☐ On Site Datum ☐ Other

6. Source of elevation datum (benchmark, number/description and elevation/datum). If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation (referencing NAVD 88).

GPS Observation

7. Significant observations and notes:

SECTION D. LAND SURVEYOR'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

Professional Land Surveyor's Signature: _____ Date: _____

Surveyor's Name: Kenny L. Kennon License Number: 37195

Firm Name: Kennon Surveying Services, Inc. Certificate of Authorization #: 27944900

Mailing Address 5 Powder Horn Drive, Suite 4

City/Town: Warren State New Jersey Zip Code: 07059

Phone Number 732-564-1818 Ext.: _____ Fax: _____

WELL PERMIT

New Well

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to further conditions and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit

Certifying Driller: JAMES W DUFFY, MASTER LICENSE # 0001581

Permit Issued to: EAST COAST DRILLING, INC.

Company Address: 1256 N CHURCH ST MOORESTOWN, NJ 08057

PROPERTY OWNER

Name: US GOV - DEPT. OF ARMY

Organization: US Gov - Dept. of Army

Address: Washington

City: Washington **State:** District of Columbia **Zip Code:** 20310

PROPOSED WELL LOCATION

Facility Name: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth **Municipality:** Eatontown Boro **Lot:** 1 **Block:** 301

Easting (X): 615928 **Northing (Y):** 538815

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: PAR-38-GW-MW-03

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: MONITORING

Other Use(s): _____

Diameter (in.): 2

Regulatory Program

Depth (ft.): 25

Requiring Wells/Borings: _____

Pump Capacity (gpm): 0

Case ID Number: _____

Drilling Method: Hollow Stem Augers

Deviation Requested: N

Attachments: _____

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: March 16, 2016

Expiration Date: March 16, 2017

Approved by the authority of:

Bob Martin
Commissioner

Well Permit -- Page 1 of 2

Terry D. Pilawski

Terry Pilawski, Chief
Bureau of Water Allocation and Well Permitting

MONITORING WELL RECORD

PROPERTY OWNER: US GOV - DEPT. OF ARMY

Company/Organization: US Gov - Dept. of Army

Address: Washington Washington, District of Columbia 20310

WELL LOCATION: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth

Municipality: Eatontown Boro

Lot: 1

Block: 301

Easting (X): 615929 Northing (Y): 538814

Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: April 8, 2016

DATE WELL COMPLETED: April 8, 2016

WELL USE: MONITORING

Other Use(s): _____

Local ID: PAR-38-GW-MW-03

WELL CONSTRUCTION

Total Depth Drilled (ft.): 17 Finished Well Depth (ft.): 17 Well Surface: Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	17	8		
Casing	0	7	2	PVC	Sch 40
Screen	7	17	2	PVC	.010

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	5	8	2	7.5	141	12
Gravel Pack	5	17	8	2	#0		

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes

Static Water Level: 12 ft. below land surface

Water Level Measure Tool: M-Scope

Well Development Period: 2 hrs.

Method of Development: Pump

Pump Type: _____

Pump Capacity: gpm

Total Design Head: ft.

Drilling Fluid: _____

Drill Rig: 7822DT

Health and Safety Plan Submitted? Yes

ATTACHMENTS:

GEOLOGIC LOG

0 - 9: Light Brown SM - Silty sands, sand-silt mixtures

9 - 17: Light Green OL - Organic silts and organic silty clays of low plasticity

ADDITIONAL INFORMATION:

Driller of Record: Joseph Barnak,
MONITORING LICENSE # 534717

Company: EAST COAST DRILLING, INC.



New Jersey Department of Environmental Protection
Site Remediation Program

**MONITORING WELL CERTIFICATION FORM A - AS-BUILT
CERTIFICATION**

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth - Parcel 38

List all AKAs: _____

Street Address: Highway 35

Municipality: Eatontown Boro (Township, Borough or City)

County: Monmouth Zip Code: 07724

Program Interest (PI) Number(s): _____ Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Gov - Dept. of Army

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

- | | |
|--|---------------------------|
| 1. Well Permit Number (This number must be permanently affixed to the well casing):.. | <u>E201602893</u> |
| 2. Site Well Number as shown on application or plans): | <u>PAR-38-GW-MW-03</u> |
| 3. Well Completion Date: | <u>4/8/2016</u> |
| 4. Distance from Top of Casing (cap off) to ground surface (nearest 0.01'): | <u>+3.00</u> |
| 5. Total Depth of Well to the nearest ½ foot: | <u>17</u> |
| 6. Depth to Top of Screen (or top of open hole) from top of casing (nearest 0.01'):..... | <u>7.00</u> |
| 7. Screen Length (or length of open hole) in feet: | <u>10</u> |
| 8. Screen or Slot Size: | <u>.010</u> |
| 9. Screen or Slot Material: | <u>Sch. 40 PVC</u> |
| 10. Casing Material (PVC, steel, or other – specify): | <u>Sch. 40 PVC</u> |
| 11. Casing Diameter (inches): | <u>2</u> |
| 12. Static Water Level from top of casing at the time of installation (nearest 0.01'): | <u>12.00</u> |
| 13. Yield (gallons per minute): | <u>1</u> |
| 14. Development Techinque (specify): | <u>Pump</u> |
| 15. Length of Time well is developed/pumped or bailed (hours and minutes): | <u>2 Hours 00 Minutes</u> |



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth

List all AKAs: FTMM

Street Address: OACSIM - U.S. Army Fort Monmouth, PO Box 148

Municipality: Oceanport (Township, Borough or City)

County: Monmouth Zip Code: 07757

Program Interest (PI) Number(s): G000000032 Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Army (Fort Monmouth)

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201602893

2. Site Well Number (As shown on application or plans): PAR-38-MW-03

3. Geographic Coordinate NAD 83 to nearest 1/100 of a second:

Latitude: North 40° 18' 42.60"

Longitude: West 74° 03' 21.71"

4. New Jersey State Plane Coordinates NAD 83 datum, US survey feet units, to nearest foot:

North 538814

East 615929

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 28.66

Elevation Top of Outer casing: 29.39

Elevation of ground: 25.87

Check one: ☒ NAVD 88 ☐ NVGD29 ☐ On Site Datum ☐ Other

6. Source of elevation datum (benchmark, number/description and elevation/datum). If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation (referencing NAVD 88).

GPS Observation

7. Significant observations and notes:

SECTION D. LAND SURVEYOR'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

Professional Land Surveyor's Signature: _____ Date _____

Surveyor's Name: Kenny L. Kennon License Number: 37195

Firm Name: Kennon Surveying Services, Inc. Certificate of Authorization #: 27944900

Mailing Address 5 Powder Horn Drive, Suite 4

City/Town: Warren State New Jersey Zip Code: 07059

Phone Number 732-564-1818 Ext.: _____ Fax: _____

WELL PERMIT

New Well

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachments accompanying same application, and applicable laws and regulations. This permit is also subject to further conditions and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permit

Certifying Driller: JAMES W DUFFY, MASTER LICENSE # 0001581

Permit Issued to: EAST COAST DRILLING, INC.

Company Address: 1256 N CHURCH ST MOORESTOWN, NJ 08057

PROPERTY OWNER

Name: US GOV - DEPT. OF ARMY

Organization: US Gov - Dept. of Army

Address: Washington

City: Washington

State: District of Columbia

Zip Code: 20310

PROPOSED WELL LOCATION

Facility Name: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth

Municipality: Eatontown Boro

Lot: 1

Block: 301

Easting (X): 615932 **Northing (Y):** 538979

Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: PAR-38-GW-MW-04

SITE CHARACTERISTICS

PROPOSED CONSTRUCTION

WELL USE: MONITORING

Other Use(s):

Diameter (in.): 2

Regulatory Program

Requiring Wells/Borings:

Depth (ft.): 25

Case ID Number:

Pump Capacity (gpm): 0

Deviation Requested: N

Drilling Method: Hollow Stem Augers

Attachments:

SPECIFIC CONDITIONS/REQUIREMENTS

Approval Date: March 16, 2016

Expiration Date: March 16, 2017

Approved by the authority of:

Bob Martin

Commissioner

Well Permit -- Page 1 of 2

Terry D. Pilawski

Terry Pilawski, Chief

Bureau of Water Allocation and Well Permitting

MONITORING WELL RECORD

PROPERTY OWNER: US GOV - DEPT. OF ARMY

Company/Organization: US Gov - Dept. of Army

Address: Washington Washington, District of Columbia 20310

WELL LOCATION: Fort Monmouth - Parcel 38

Address: Highway 35

County: Monmouth Municipality: Eatontown Boro Lot: 1 Block: 301

Easting (X): 615928 Northing (Y): 538978
Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: April 8, 2016

DATE WELL COMPLETED: April 8, 2016

WELL USE: MONITORING

Other Use(s): _____

Local ID: PAR-38-GW-MW-04

WELL CONSTRUCTION

Total Depth Drilled (ft.): 20 Finished Well Depth (ft.): 19.5 Well Surface: Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	20	8		
Casing	0	9.5	2	PVC	Sch 40
Screen	9.5	19.5	2	PVC	.010

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	6.5	8	2	7.5	141	12
Gravel Pack	6.5	20	8	2	#0		

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes

Static Water Level: 12.5 ft. below land surface

Water Level Measure Tool: M-Scope

Well Development Period: 2 hrs.

Method of Development: Pump

Pump Type: _____

Pump Capacity: gpm

Total Design Head: ft.

Drilling Fluid: _____

Drill Rig: 7822DT

Health and Safety Plan Submitted? Yes

ATTACHMENTS:

GEOLOGIC LOG

0 - 12: Light Brown SM - Silty sands, sand-silt mixtures

12 - 20: Light Green OL - Organic silts and organic silty clays of low plasticity

ADDITIONAL INFORMATION:

Driller of Record: Joseph Barnak,
MONITORING LICENSE # 534717

Company: EAST COAST DRILLING, INC.



New Jersey Department of Environmental Protection
Site Remediation Program

**MONITORING WELL CERTIFICATION FORM A - AS-BUILT
CERTIFICATION**

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth - Parcel 38

List all AKAs: _____

Street Address: Highway 35

Municipality: Eatontown Boro (Township, Borough or City)

County: Monmouth Zip Code: 07724

Program Interest (PI) Number(s): _____ Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Gov - Dept. of Army

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

- | | |
|--|---------------------------|
| 1. Well Permit Number (This number must be permanently affixed to the well casing): | <u>E201602894</u> |
| 2. Site Well Number as shown on application or plans): | <u>PAR-38-GW-MW-04</u> |
| 3. Well Completion Date: | <u>4/8/2016</u> |
| 4. Distance from Top of Casing (cap off) to ground surface (nearest 0.01'): | <u>+3.00</u> |
| 5. Total Depth of Well to the nearest ½ foot: | <u>19.5</u> |
| 6. Depth to Top of Screen (or top of open hole) from top of casing (nearest 0.01'): | <u>9.5</u> |
| 7. Screen Length (or length of open hole) in feet: | <u>10</u> |
| 8. Screen or Slot Size: | <u>.010</u> |
| 9. Screen or Slot Material: | <u>Sch. 40 PVC</u> |
| 10. Casing Material (PVC, steel, or other – specify): | <u>Sch. 40 PVC</u> |
| 11. Casing Diameter (inches): | <u>2</u> |
| 12. Static Water Level from top of casing at the time of installation (nearest 0.01'): | <u>12.50</u> |
| 13. Yield (gallons per minute): | <u>1</u> |
| 14. Development Technique (specify): | <u>Pump</u> |
| 15. Length of Time well is developed/pumped or bailed (hours and minutes): | <u>2 Hours 00 Minutes</u> |



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: Fort Monmouth

List all AKAs: FTMM

Street Address: OACSIM - U.S. Army Fort Monmouth, PO Box 148

Municipality: Oceanport (Township, Borough or City)

County: Monmouth Zip Code: 07757

Program Interest (PI) Number(s): G000000032 Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner US Army (Fort Monmouth)

2. Well Location (Street Address) Highway 35

3. Well Location (Municipal Block and Lot) Block# 301 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201602894

2. Site Well Number (As shown on application or plans): PAR-38-MW-04

3. Geographic Coordinate NAD 83 to nearest 1/100 of a second:

Latitude: North 40° 18' 44.22"

Longitude: West 74° 03' 21.71"

4. New Jersey State Plane Coordinates NAD 83 datum, US survey feet units, to nearest foot:

North 538978

East 615928

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 25.30

Elevation Top of Outer casing: 26.02 Elevation of ground: 22.35

Check one: ☒ NAVD 88 ☐ NVGD29 ☐ On Site Datum ☐ Other

6. Source of elevation datum (benchmark, number/description and elevation/datum). If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation (referencing NAVD 88).

GPS Observation

7. Significant observations and notes:

SECTION D. LAND SURVEYOR'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

Professional Land Surveyor's Signature: _____ Date: _____

Surveyor's Name: Kenny L. Kennon License Number: 37195

Firm Name: Kennon Surveying Services, Inc. Certificate of Authorization #: 27944900

Mailing Address 5 Powder Horn Drive, Suite 4

City/Town: Warren State New Jersey Zip Code: 07059

Phone Number 732-564-1818 Ext.: _____ Fax: _____

ATTACHMENT E
Low Flow Purge and Sampling Records

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: PAR-38-GW-MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling

WELL PERMIT #:

AOC # (AREA): Parcel 38

DATE: 5/23/16

SCREENED INTERVAL (TOC): 10.36 - 10.36

SAMPLING PERSONNEL NAME: Nick Laros

WELL DIAMETER (in.): 2

SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0

FEET OF SATURATED SCREEN (ft): 7.65

WELL DEPTH (TOC): 20.36

DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 12.71

FEET OF WATER IN WELL (ft): 7.65

PUMP INTAKE DEPTH (ft below TOC): 16.5

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mv)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*		
0935	X		5.33	NA	0.191	NA	47.3	NA	5.57	NA	888	NA	12.28	NA	250	12.90
0940	X		5.30	0.03	0.187	0.004	51.7	4.4	6.55	0.98	673	215	11.87	0.41	250	12.92
0945	X		5.34	0.04	0.181	0.006	57.0	5.3	5.48	1.07	205	468	11.40	0.47	250	12.92
0950	X		5.44	0.10	0.175	0.006	57.5	0.5	4.78	0.70	201	4	11.50	0.10	250	12.93
0955	X		5.40	0.04	0.171	0.004	62.6	5.1	4.65	0.13	176	25	11.47	0.03	250	12.93
1000	X		5.41	0.01	0.173	0.002	65.2	2.6	4.12	0.53	128	48	11.45	0.02	250	12.93
1005	X		5.40	0.01	0.170	0.003	69.2	4.0	4.61	0.49	69.9	58.1	11.47	0.02	250	12.93
1010	X		5.39	0.01	0.168	0.002	72.8	3.6	4.60	0.01	36.4	31.5	11.55	0.08	250	12.93
1015	X		5.37	0.02	0.167	0.001	72.3	0.5	4.70	0.10	9.3	29.1	11.54	0.01	250	12.93
1020	X		5.36	0.01	0.166	0.001	72.9	0.6	4.66	0.04	2.6	6.7	11.60	0.06	250	12.93
1025	X		5.36	0.00	0.163	0.003	73.6	0.7	4.58	0.08	1.9	0.7	11.57	0.03	250	12.93
1030	X		5.35	0.01	0.169	0.006	74.5	0.9	4.61	0.03	3.1	1.2	11.58	0.01	250	12.93

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; +/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

[illegible]

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: PAR-38-GW-YW02

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling

WELL PERMIT #:

AOC # (AREA): Parcel 38

DATE: 5/23/16

SCREENED INTERVAL (TOC): 13.14-23.14

SAMPLING PERSONNEL NAME: J. Lopez

WELL DIAMETER (in.) 2

SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0

FEET OF SATURATED SCREEN (ft): 5.07

WELL DEPTH (TOC): 23.14

DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 16.07

FEET OF WATER IN WELL (ft): 5.07

PUMP INTAKE DEPTH (ft below TOC): 20.6

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mv)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*		
1055	X		4.14	NA	0.318	NA	154.3	NA	2.45	NA	128	NA	16.40	NA	350	18.29
1100	X		3.78	0.36	0.338	0.020	181.4	27.1	2.43	2.02	96.7	31.3	14.69	1.71	350	18.29
1105	X		3.75	0.03	0.358	0.020	192.2	10.8	1.85	0.58	31.4	65.3	14.54	0.15	350	18.29
1110	X		3.76	0.01	0.370	0.012	201.3	9.1	1.73	0.12	13.9	17.5	14.46	0.08	350	18.29
1115	X		3.76	0.00	0.377	0.007	211.8	10.5	1.88	0.15	6.0	7.9	14.44	0.02	350	18.29
1120	X		3.75	0.01	0.383	0.006	221.0	9.2	2.05	0.17	0.6	5.4	14.44	0.00	350	18.29
1125	X		3.74	0.01	0.385	0.002	229.9	8.9	2.15	0.10	0.3	0.3	14.44	0.00	350	18.29
1130	X		3.75	0.01	0.388	0.003	239.9	10.0	2.20	0.05	0.3	0.0	14.48	0.04	350	18.29
1135	X		3.75	0.00	0.390	0.002	242.2	2.3	2.23	0.03	0.5	0.2	14.49	0.01	350	18.29
1140	X		3.75	0.00	0.391	0.001	244.8	2.6	2.27	0.04	0.2	0.3	14.51	0.02	350	18.29

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; +/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: 860-38-602-01001

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAL-38-GW-MWD-20.6 ; PAL-38-GW-MWD-20.6-Dissolved

[illegible]

QA/QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or NO

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or NO

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water purged w/ bladder pump through GAC
- sample collected @ 1140

INVESTIGATION DERIVED WASTE (IDW):

[illegible]

--	--	--	--	--	--	--	--	--

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: ~~44~~ PAE-38-MW03

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling

WELL PERMIT #:

AOC # (AREA): 38

DATE: 5/23/16

SCREENED INTERVAL (TOC): 14.4-24.4

SAMPLING PERSONNEL NAME: C. Watson

WELL DIAMETER (in.): 2

SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0

FEET OF SATURATED SCREEN (ft): 5.95

WELL DEPTH (TOC): 24.4

DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 18.45

FEET OF WATER IN WELL (ft): 5.95

PUMP INTAKE DEPTH (ft below TOC): 21.4

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mv)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*		
1130	X		4.12	NA	0.285	NA	361.6	NA	5.95	NA	28.2	NA	17.74	NA	250	18.57
1135	X		3.98	0.14	0.296	0.009	397.5	35.9	5.98	0.03	20.4	7.8	16.77	0.97	250	18.75
1140	X		3.90	0.02	0.295	0.001	396.2	1.3	4.98	1.0	10.4	10	16.52	0.25	250	18.83
1145	X		3.73	0.03	0.295	Q	396.0	0.2	4.66	0.32	9.82	0.58	16.41	0.11	258	18.96
1150	X		3.92	0.01	0.294	0.001	395.5	0.5	4.48	0.18	9.46	0.36	16.35	0.06	250	19.09
1155	X		3.92	Q	0.294	Q	393.6	1.9	4.22	0.26	7.18	2.28	16.31	0.04	250	19.21
1200	X		3.92	Q	0.294	Q	391.1	2.5	4.08	0.14	7.29	0.09	16.27	0.04	250	19.30
1205	X		3.92	Q	0.295	0.001	388.3	2.8	4.00	0.08	5.10	2.19	16.30	0.03	250	19.37
1210	X		3.92	Q	0.294	0.001	386.4	1.9	3.96	0.04	5.51	0.41	16.25	0.05	250	19.43
1215			3.92	Q	0.294	Q	385.1	1.3	3.94	0.02	5.26	0.25	16.26	0.01	250	19.49 *

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; +/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: PAR-38-MW-3

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-38-MW-03-21.4

[illegible]

QAIQC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or NO

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or NO

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

INVESTIGATION DERIVED WASTE (IDW): GAC Bucket

--	--	--	--	--	--	--	--	--

--	--	--	--	--	--	--	--	--

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: PAR-38-GW-17004

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling

WELL PERMIT #:

AOC # (AREA): Parcel 38

DATE: 5/23/16

SCREENED INTERVAL (TOC): 12.73 - 22.73

SAMPLING PERSONNEL NAME: J. Lohrey

WELL DIAMETER (in.): 8

SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0

FEET OF SATURATED SCREEN (ft): 7.04

WELL DEPTH (TOC): 22.73

DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 15.69

FEET OF WATER IN WELL (ft): 7.04

PUMP INTAKE DEPTH (ft below TOC): 19.2

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mv)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*		
1205	X		3.76	NA	0.367	NA	232.9	NA	9.08	NA	876	NA	15.11	NA	300	15.88
1210	X		3.73	0.03	0.379	0.012	247.0	14.1	8.92	0.16	917	41	14.30	0.81	300	15.88
1215	X		3.63	0.10	0.391	0.012	272.8	25.8	9.57	0.65	730	187	13.77	0.53	300	15.88
1220	X		3.64	0.01	0.413	0.022	302.9	30.1	9.62	0.05	315.0	415	13.56	0.21	300	15.88
1225	X		3.68	0.04	0.422	0.009	345.7	42.8	9.80	0.18	67.7	247.3	13.65	0.09	300	15.88
1230	X		3.69	0.01	0.434	0.012	343.0	2.7	9.55	0.25	235	167.3	13.58	0.07	300	15.88
1235	X		3.70	0.01	0.449	0.015	337.4	5.6	8.78	0.77	34.8	200.2	13.68	0.10	300	15.88
1240	X		3.70	0.00	0.447	0.002	337.5	0.1	8.17	0.61	30.5	4.3	13.55	0.13	300	15.88
1245	X		3.70	0.00	0.456	0.009	341.6	4.1	8.48	0.31	6.8	23.7	13.61	0.06	300	15.88
1250	X		3.70	0.00	0.457	0.001	343.1	1.5	8.47	0.01	5.2	3.6	13.59	0.02	300	15.88
1255	X		3.71	0.01	0.459	0.002	343.9	0.8	8.37	0.10	4.1	0.9	13.56	0.03	300	15.88
1300	X		3.71	0.00	0.460	0.001	341.2	2.7	8.35	0.02	2.7	0.4	13.57	0.01	300	15.88

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; +/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS

CLIENT: USACE

WELL #: PAR-38-GW-M004

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-38-GW-MW04-19.2 ? PAR-38-GW-MW04-19.2 - Dissolved

[illegible]

QA/QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or NO

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or NO

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water - purged w/ bladder pump through GAC
- sample collected @ 1300

INVESTIGATION DERIVED WASTE (IDW):

Date:

Volume Transferred to Drum:

Drum Number:

ATTACHMENT F
Section 3.7 Parcel 38 – Former Outdoor Pistol Range (1940 – 1955) of
Final Site Investigation Report (U.S. Army BRAC, 2008)

3.7 Parcel 38 – Former Outdoor Pistol Range (1940 - 1955)

3.7.1 Site Description

Parcel 38 is located in the northwestern portion of the MP, directly west of Bldg 200. The former Outdoor Firing Range was used from approximately 1940 through 1955. The small arms firing that occurred at the former Pistol Range (1935-1940 Pistol Range) directly west of Bldg 292 was relocated to this location around 1940 when the STP was constructed on the old range location. Range structures and the backstop berm at the former Outdoor Firing Range (1940-1955) have been removed/demolished. Munitions associated with the former Outdoor Firing Range are assumed to be small arms ammunition only; therefore, no MEC and limited MC are anticipated. The primary MC associated with small arms ranges is lead. Additional information pertaining to this parcel can be found in Section 4.3.4, Section 5.2.1.2, Section 5.2.2, and Section 5.10 of the Phase I ECP (1).

3.7.2 Previous Investigations

This site was originally included in the IRP as FTMM-21. Evidence of the former Outdoor Firing Range was uncovered during preparation of a preliminary assessment report. Because the location of the former range has been developed for over 40 years, the IRP recommendation was for NFA. This determination was approved by the NJDEP. An HRR was subsequently conducted at FTMM under the MMRP. Based on information discovered during the HRR, the correct location of the pistol Range was identified. Because the correct location is a manicured lawn adjacent to Bldg 1220, which may not have been heavily re-worked, the recommendation in the HRR was for further evaluation.

3.7.3 Site Investigation Sampling

The findings of the HRR (29) were reviewed to determine the location of the former berm and to establish a soil sampling grid. In order to evaluate the potential impact from previous pistol range operations in the area of the former berm, the following soil sampling was conducted at the former Outdoor Firing Range (29).

Surface Soil Investigation

Surface soil samples were collected in December 2007 in Parcel 38. A total of 25 surface soil samples (including one duplicate sample) were collected from 24 distinct hand augered borings located in the area of the former berm (**Figure 3.7-1**). Samples were taken in order to determine if any contamination exists from previous pistol range operations. Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval bgs. No visual or olfactory evidence of impacted soil was noted.

Table 3.7-1 presents a summary of all field activities, and all sample locations are provided on **Figure 3.7-1**. A summary of sampling activities, including sample IDs, collection dates, and analytical parameters, is provided in **Table 3.7-2**.

Table 3.7-1
Parcel 38 Sampling Location, Rationale and Analytical

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
38SS-A1 through 38SS-C8 (25 samples – includes 1 duplicate sample)	Surface soil	Soil samples were collected from the 0- to 6-inch bgs interval (below topsoil) from a sample grid (conducted on 15-ft centers) to investigate the former pistol range berm.	TAL Metals

3.7.4 Site Investigation Results

Surface Soil Investigation Results

Surface soil samples were analyzed for TAL metals.

As shown in **Table 3.7-3**, a total of 18 metals were detected at Parcel 38; however, no metals were detected at concentrations above the NJDEP NRDCSCC or RDCSCC. No COCs were identified in soil at Parcel 38.

3.7.5 Summary and Conclusions

No constituents were identified above applicable NJDEP criteria. NFA is recommended for Parcel 38.

**Table 3.7-2
Parcel 38 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	HAND AUGER	P38-SS1-A	12/21/07	9:00	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS2-A	12/21/07	9:10	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS3-A	12/21/07	9:20	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS4-A	12/21/07	9:30	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS5-A	12/21/07	9:40	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS6-A	12/21/07	9:50	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS7-A	12/21/07	10:00	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS8-A	12/21/07	10:10	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS1-B	12/21/07	10:20	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS2-B	12/21/07	10:30	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS3-B	12/21/07	10:40	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS4-B	12/21/07	10:50	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS4-B DUPLICATE	12/21/07	10:50	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS5-B	12/21/07	11:00	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS6-B	12/21/07	11:10	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS7-B	12/21/07	11:20	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS8-B	12/21/07	11:30	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS1-C	12/21/07	11:40	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS2-C	12/21/07	11:50	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS3-C	12/21/07	12:00	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS4-C	12/21/07	12:10	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS5-C	12/21/07	12:20	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS6-C	12/21/07	12:30	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS7-C	12/21/07	12:40	0.0	0.5					X				
SOIL	HAND AUGER	P38-SS8-C	12/21/07	12:50	0.0	0.5					X				
BLANK	FIELD	FIELD BLANK	12/21/07	13:00	--	--					X				

X = Sample analyzed for the indicated analytical parameter suite

Table 3.7-3
Fort Monmouth Phase II Site Investigation, Parcel 38
Summary of Analytical Parameters Detected in Soil (mg/kg)

Chemical	Sample ID: Date Sampled: Depth (ft. bgs):		Analytical Results												
			P38SS-A1 7055601	P38SS-A2 7055602	P38SS-A3 7055603	P38SS-A4 7055604	P38SS-A5 7055605	P38SS-A6 7055606	P38SS-A7 7055607	P38SS-A8 7055608	P38SS-B1 7055609	P38SS-B2 7055610	P38SS-B3 7055611	P38SS-B4 7055612	P38SS-B4 DUP 7055625
			12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007
			0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Metals															
Aluminum	NLE	NLE	13100 B	14800 B	14900 B	16300 B	12800 B	13500 B	12400 B	14300 B	19700 B	17900 B	15100 B	15800 B	16700 B
Arsenic	20	NLE	10.0	11.2	9.05	10.8	9.25	12.6	13.0	13.0	15.1	16.0	11.9	9.52	11.8
Barium	47,000	NLE	44.6 B	62.6 B	42.5 B	46.0 B	31.6 B	28.5 B	34.3 B	25.9 B	79.6 B	67.7 B	35.9 B	40.7 B	40.4 B
Beryllium	140	NLE	0.936	1.17	1.77	1.84	1.47	1.30	1.31	1.34	1.75	1.73	2.00	1.92	2.15
Cadmium	100	NLE	0.192	0.220	0.112	0.322	0.120	0.168	0.131	0.169	0.543	0.461	0.367	0.384	0.766
Calcium	NLE	NLE	417 B	602 B	1410 B	805 B	979 B	740 B	742 B	771 B	925 B	668 B	599 B	779 B	873 B
Chromium (Total)	NLE	NLE	80.8	102	141	151	124	108	103	117	175	157	160	154	171 B
Cobalt	NLE	NLE	0.525	1.03	1.24	1.76	1.40	1.58	1.69	1.35	1.83	1.19	1.29	1.32	1.71
Copper	45,000	NLE	18.2 B	23.5 B	13.2 B	12.3 B	9.78 B	8.55 B	12.2 B	12.0 B	34.0 B	23.8 B	11.6 B	12.4 B	13.2 B
Iron	NLE	NLE	31000	38000	52700 E	56500 E	46300 E	43300 E	41400	44200	63200 E	59900 E	64200 E	58200 E	62200 E
Lead	800	NLE	76.3	104	36.2	35.3	26.0	13.0	15.8	23.3	176	96.5	24.9	75.2	104
Magnesium	NLE	NLE	3380	4210	6590	6810	5390	4650	4260	4860	6860	6450	7090	7140	7780 B
Manganese	NLE	NLE	70.7 B	87.5 B	51.2 B	66.2 B	62.8 B	67.8 B	78.7 B	79.6 B	66.1 B	69.1 B	47.1 B	64.0 B	66.9 B
Mercury	270	NLE	0.32	0.62	0.116 U	0.115 U	0.114 U	0.103 U	0.113 U	0.109 U	0.137 U	0.110 U	0.101 U	0.121 U	0.104 U
Nickel (Soluble Salts)	2,400	NLE	11.4	14.8	12.1	10.7	8.67	8.57	8.56	8.17	62.4	22.7	9.97	10.7	12.4
Potassium	NLE	NLE	6170 B	7580 B	14000 B	14200 B	11500 B	9430 B	8420 B	9730 B	13100 B	12600 B	15600 B	15500 B	17200 B
Vanadium	7,100	NLE	102	129	100	98.0	77.5	71.5	69.3	73.8	715	273	109	95.9	107
Zinc	1,500	NLE	73.2 B	98.1 B	106 B	88.0 B	68.2 B	55.1 B	67.2 B	56.2 B	95.2 B	86.3 B	76.5 B	85.9 B	98.4 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 3.7-3
Fort Monmouth Phase II Site Investigation, Parcel 38
Summary of Analytical Parameters Detected in Soil (mg/kg)

Chemical	Sample ID: Date Sampled: Depth (ft. bgs):		Analytical Results											
			P38SS-B5 7055613	P38SS-B6 7055614	P38SS-B7 7055615	P38SS-B8 7055616	P38SS-C1 7055617	P38SS-C2 7055618	P38SS-C3 7055619	P38SS-C4 7055620	P38SS-C5 7055621	P38SS-C6 7055622	P38SS-C7 7055623	P38SS-C8 7055624
			12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007	12/21/2007
			0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5
Chemical	NRDCSCC ²	IGWSCC ³	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Metals														
Aluminum	NLE	NLE	13200 B	14800 B	15300 B	14200 B	10800 B	15000 B	15700 B	13100 B	9750 B	11600 B	13900 B	12700 B
Arsenic	20	NLE	10.2	11.0	11.3	12.9	8.65	9.75	9.70	9.53	9.65	8.61	11.9	12.2
Barium	47,000	NLE	32.7 B	42.5 B	52.9 B	46.9 B	42.6 B	36.1 B	48.3 B	35.5 B	24.6 B	42.2 B	30.9 B	31.9 B
Beryllium	140	NLE	1.07	1.18	1.19	1.14	1.45	1.96	2.04	1.65	0.895	0.988	1.35	1.23
Cadmium	100	NLE	0.131	0.141	0.299	0.291	0.524	0.417	0.620	0.479	0.299	0.551	0.410	0.583
Calcium	NLE	NLE	954 B	868 B	1090 B	1030 B	1620 B	422 B	829 B	764 B	899 B	1250 B	950 B	1010 B
Chromium	NLE	NLE	93.7	98.9	91.2	90.8	113 B	159 B	161 B	127 B	75.6 B	72.3 B	112 B	98.3 B
Cobalt	NLE	NLE	1.10	1.16	0.507	1.26	1.76	1.54	1.55	1.43	1.47	1.21	1.71	1.64
Copper	45,000	NLE	11.2 B	9.55 B	14.6 B	13.5 B	15.5 B	11.4 B	14.6 B	13.5 B	9.30 B	19.0 B	11.3 B	10.7 B
Iron	NLE	NLE	35700	38300	36500	36500	41500	57400 E	58100 E	49200 E	28200	29900	41900	37500
Lead	800	NLE	16.7	16.3	37.3	18.4	57.4	21.8	39.9	42.7	25.0	64.9	21.5	19.0
Magnesium	NLE	NLE	3880	4060	4050	3750	5110 B	6950 B	7340 B	6000 B	3050 B	3310 B	4780 B	4240 B
Manganese	NLE	NLE	79.0 B	87.2 B	128 B	85.4 B	63.0 B	49.1 B	59.1 B	58.0 B	64.4 B	114 B	77.4 B	73.5 B
Mercury	270	NLE	0.106 U	0.105 U	0.106 U	0.103 U	0.109 U	0.108 U	0.112 U	0.112 U	0.112 U	0.118 U	0.102 U	0.108 U
Nickel	2,400	NLE	8.53	8.66	9.47	11.6	16.8	9.33	13.5	10.8	7.67	8.62	9.54	9.22
Potassium	NLE	NLE	7980 B	8870 B	8280 B	8150 B	10600 B	15100 B	16000 B	13000 B	5980 B	6470 B	9910 B	8730 B
Vanadium	7,100	NLE	67.2	69.3	68.0	71.2	132	96.0	118	106	56.9	53.1	81.4	69.0
Zinc	1,500	NLE	57.9 B	52.6 B	76.7 B	63.0 B	91.6 B	80.5 B	103 B	75.1 B	51.3 B	93.1 B	68.7 B	72.4 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.

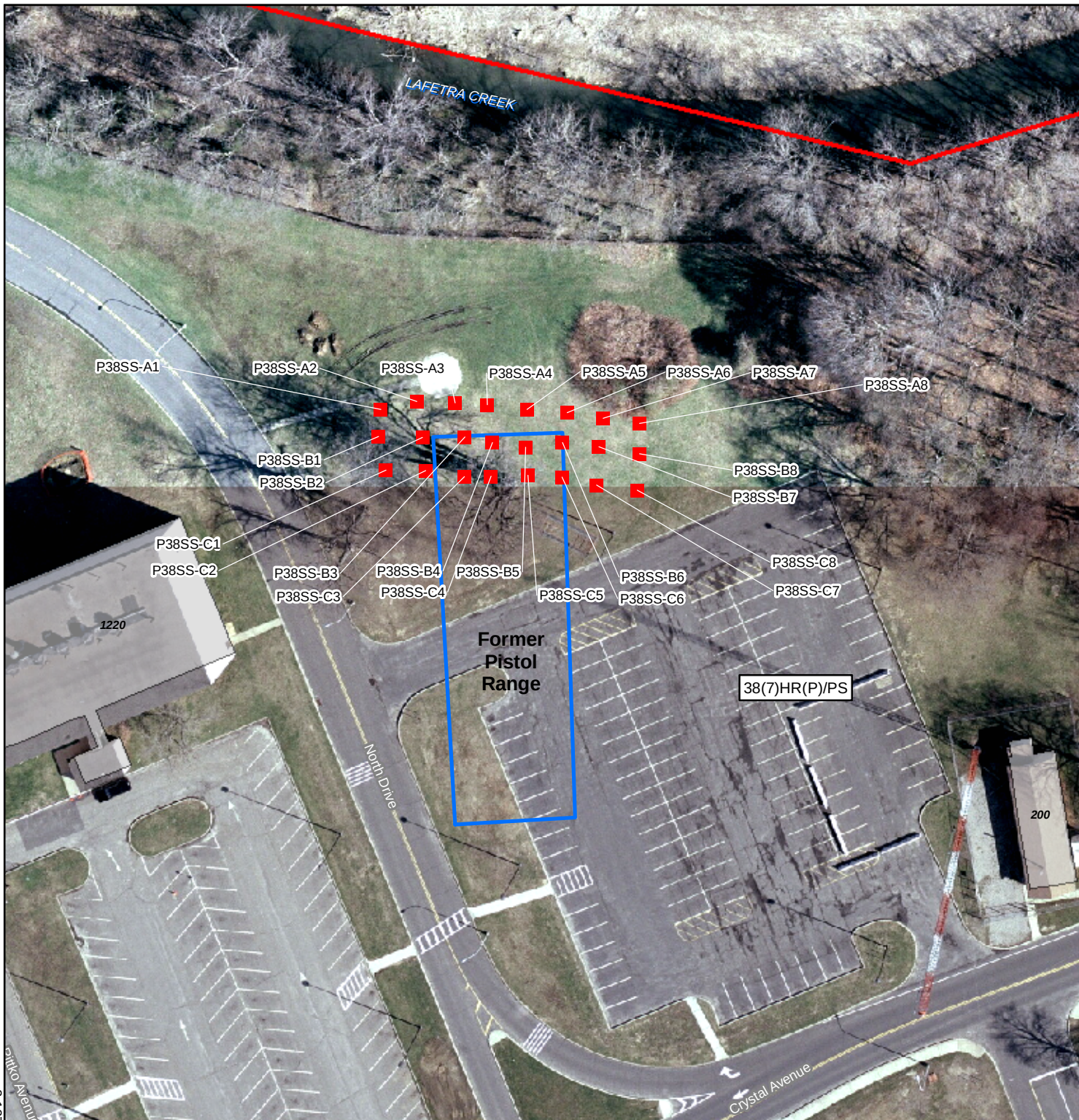
NLE = No limit established.

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).

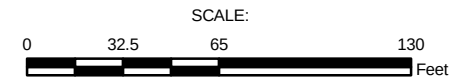


LEGEND

- Surface Soil Sample Location
- Former Pistol Range
- Water Body
- Building
- Installation Boundary

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	



Base Realignment and Closure 2005



Shaw Shaw Environmental, Inc.



FIGURE 3.7-1
FORT MONMOUTH ECP
SITE INVESTIGATION
PARCEL 38 SAMPLE LOCATIONS
 MAIN POST
 FORT MONMOUTH
 NEW JERSEY