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

27 October 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 80 (Former Photo Processing), Fort Monmouth, NJ
PI G000000032

Figures:

Figure 1 – Layout of Parcel 80 and Sample Locations
Figure 2 – Delineation of Vanadium in Soil to the NJDEP RDCSRS
Figure 3 – Vanadium Concentrations in Soil at FTMM
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Figure 5 – Arsenic Concentrations in Soil at FTMM
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Tables:

Table 1 – Soil Sampling Results – Comparison to NJDEP Soil Remediation Standards
Table 2 – Detected Groundwater Sampling Results – Comparison to NJDEP Ground Water Quality Standards

Attachments:

A. Previous Parcel 80 Correspondence
B. Soil Boring and Monitoring Well Logs
C. PAR-80-GW-MW01 Monitoring Well forms
D. Low Flow Purge and Sampling Records

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) has prepared this Site Investigation (SI) Addendum Letter Report for the data recently collected at the non-Installation Restoration Program (non-IRP) Parcel 80 (Former Photo Processing).

1.0 OBJECTIVES

The objective of the Supplemental ECP Phase II SI field work at Parcel 80, as described in the Environmental Condition of Property (ECP) Phase II SI Work Plan (WP) Addendum, was to

delineate concentrations of vanadium, arsenic, and copper in soil in localized areas and to determine if beryllium concentrations in groundwater continued to exceed the New Jersey Department of Environmental Protection (NJDEP) Ground Water Quality Standard (GWQS). As previously stated in the ECP Phase II SI WP, no evidence of release to the environment associated with the operations on the site was identified as part of the ECP Report (U.S. Army BRAC, 2007). The concentrations and distributions of the metals investigated under this report indicate that they are likely due to background conditions and not a release, as discussed further below. Sample locations are shown on **Figure 1**. The ECP Phase II SI WP Addendum was accepted by the NJDEP for Parcel 80 in a letter dated December 22, 2015, provided in **Attachment A**.

2.0 SOIL RESULTS AND DISCUSSION

Soil samples were collected on April 1, 2016 in accordance with the approved ECP Phase II SI WP Addendum and in accordance with the NJDEP Field Sampling Procedures Manual ([FSPM]; NJDEP, 2005). Soil borings were logged and installed using a Geoprobe®. Soil boring logs are provided in **Attachment B**. Soil samples were collected for laboratory analysis by ALS Environmental (ALS), in Middletown, PA, as described below.

Vanadium - Soil borings PAR-80-SB-03, PAR-80-SB-04 and PAR-80-SB-05 were advanced to delineate the extent of vanadium detected above the NJDEP Residential Direct Contact Soil Remediation Standard (RDCSRS) at sampling location CU-03. The vanadium concentration at CU-03 was 82.7 mg/kg compared to the RDCSRS of 78 mg/kg. Soil samples were collected at three 6-inch intervals (0.5-1.0 feet, 3.0-3.5 feet, and approximately 4.0-4.5 feet bgs) and submitted to the lab for vanadium and arsenic analyses; soil samples from PAR-80-SB-04 were also analyzed for arsenic to support characterization at a nearby location (as discussed further below). Samples collected at the deepest interval at locations PAR-80-SB-04 and PAR-80-SB-05 were placed on hold pending the results of the shallow samples. The vanadium results were all below the NJDEP RDCSRS, therefore the deepest (4.0-4.5 feet bgs) samples were not analyzed. Soil sampling results are provided in **Table 1**. There were no additional exceedances of the RDCSRS at these new sampling locations, therefore delineation of vanadium at CU-03 is considered complete, as shown on **Figure 2**.

The delineated concentrations of vanadium are not believed to be indicative of a release, and there are several lines of evidence that indicate this, as follows:

- There are no identified sources of vanadium based on the former operations at Parcel 80. Parcel 80 was occupied by buildings that contained a former printing plant and former photo-processing facility. Operations noted at Building 106 in 1950 and 1958 included arc lamp photography, letter press printing, photograph developing, and carbon arc sensitizing. None of these operations are a known source of vanadium.

- The largest amount of vanadium released to soil occurs through the natural weathering of

geological formations (ATSDR, 2012; Byerrum et al., 1974[1]; Van Zinderen Bakker and Jaworski, 1980[2]).

- Outside of Buildings 105 and 106, the SI indicates that there was a dedicated temporary central storage area for recyclables. Materials were held behind Buildings 105 and 106 on a periodic basis before being shipped to the Defense Reutilization and Marketing Office. Items containing hazardous materials, such as refrigerants, were drained prior to being stored in this area. The majority of the larger recyclable material was stored directly on the ground surface. Scrap metal was stored in five individual roll-offs and several trailers were used to house various electronics, computers, and office furniture prior to recycling. Additionally, several empty metal trash cans, empty ASTs, and metal piping were stored on the ground surface to the east of Buildings 105 and 106. The nature of these storage operations was that all items were stored temporarily, and most were stored in containers or on covered storage pads, which would limit the ability for any of the stored materials to break down. No evidence of release to the environment associated with these operations was identified as part of the ECP Report (U.S. Army BRAC, 2007). In addition, there are few anthropogenic sources for a release of vanadium, including fossil fuels, mining tailings, vanadium-enriched slag heaps, municipal sewage sludge, and certain fertilizers (ATSDR, 2012[3]), none of which are related to Parcel 80.

- Vanadium concentrations at Parcel 80 are within the range found in glauconitic soils in the New Jersey Coastal Plain. Dooley[4] (2001) analyzed 113 glauconitic (whole) soil samples from the Coastal Plain and found that the vanadium concentration ranged from 1.7 ppm to 707 ppm with a 62 ± 102 ppm mean. The maximum concentration of vanadium at Parcel 80 was 89.2 mg/kg, which is well within the range encountered by Dooley. FTMM-wide vanadium concentrations (not associated with a release) are similar to what was encountered by Dooley, with most concentrations ranging from non-detect to about 200 mg/kg, as shown on **Figure 3**. The mean concentration of detected vanadium at FTMM is 51.2 mg/kg. Based on the data, vanadium concentrations at FTMM appear to largely or wholly be related to background conditions expected for an area with glauconitic soils, and specifically at Parcel 80 the concentrations do not appear to be indicative of a release.

Arsenic and Copper - Soil borings PAR-80-SB-06, PAR-80-SB-07 and PAR-80-SB-08 (including PAR-80-SB-04 above) were advanced to delineate arsenic and copper detections above the RDCSRS at sampling locations CU-07, CU-04, and TP-7. Soil samples were collected at three 6-inch intervals (0.5-1.0 feet, 3.0-3.5 feet, and 4.0-4.5 feet bgs) and submitted to the lab

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[1] Byerrum, R.U., Eckardt, R.E., Hopkins, L.L., Libsch, J.F., Rostoker, W., Zenz, C., Gordon, W.A., Mountain, J.T., Hicks, S.P. & Boaz, T.D. (1974) *Vanadium*, Washington DC, National Academy of Sciences, pp. 1–117.

[2] Van Zinderen Bakker, X. & Jaworski, J.F. (1980) *Effects of Vanadium in the Canadian Environment*, Ottawa, National Research Council Canada, Associate Committee Scientific Criteria for Environmental Quality, pp. 1–94.

[3] ATSDR, Toxicological Profile for Vanadium. 2012.

[4] 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., on file at New Jersey Department of Environmental Protection.

for arsenic and copper analyses. Samples collected at the 4.0-4.5 feet bgs interval at locations PAR-80-SB-07 and PAR-80-SB-08 were placed on hold pending the results of the shallow samples. Soil sampling results are provided in **Table 1**. There were no exceedances of the RDCSRS for copper. A review of the soil data reveals that arsenic was delineated vertically and horizontally to below the RDCSRS using the additional sample results, and therefore delineation of arsenic in soil is complete as shown on **Figure 4**.

The delineated arsenic concentrations are not believed to be indicative of a release for the following reasons:

- There are no identified sources of arsenic based on the former operations at Parcel 80. There was no known source for a release related to the photo processing or the storage areas outside of Buildings 105 and 106, as stated in the ECP Report (U.S. Army BRAC, 2007). As discussed in the ECP Report, and ECP Supplemental Phase II SI Work Plan Addendum operations at Parcel 80 were limited to photo-processing related activities and the temporary storage of recyclables. Neither of these are a likely source for arsenic. Anthropogenic sources of arsenic include nonferrous metal mining and smelting, pesticide application, coal combustion, wood combustion, and waste incineration; none of these are known to have existed at Parcel 80. Most anthropogenic releases of arsenic are to land or soil, primarily in the form of pesticides or solid wastes (ATSDR, 2007[5]).

- The arsenic concentrations are just above the RDCSRS (19 mg/kg), which is based on natural background mean concentrations of arsenic in New Jersey, and FTMM is located in an area with glauconitic soils known to have elevated natural arsenic concentrations, many of which are above the RDCSRS (Dooley, 2001[6]; and Barringer[7], et al. 2013).

- Arsenic concentrations at Parcel 80 are within the range found in glauconitic soils in the New Jersey Coastal Plain. Dooley (2001) analyzed 113 glauconitic (whole) soil samples from the Coastal Plain and found that the arsenic concentration ranged from <0.26 ppm to 92.3 ppm with a 9.5 ppm median and a 16.1 ± 18.8 ppm mean. Using the 371 ppm arsenic maximum reported for one of the duplicates yielded a median arsenic concentration of 9.8 ppm with a 19.4 ± 38.5 ppm mean. The maximum concentration of arsenic at Parcel 80 was 27.8 mg/kg, which is well within the range encountered by Dooley (2001).

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[5] ATSDR. Toxicological Profiled for Arsenic, 2007

[6] 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., on file at New Jersey Department of Environmental Protection

[7] Barringer, Julia L., Pamela A. Reilly, Dennis D. Eberl, Adam C. Mumford, William M. Benzel, Zoltan Szabo, Jennifer L. Shourds, and Lily Y. Young, 2013, 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.

- FTMM-wide, arsenic concentrations are similar to what was encountered by Dooley (2001), with most concentrations ranging from non-detect to about 100 mg/kg, as shown on **Figure 5**. The mean concentration of detected arsenic at FTMM is 17.89 mg/kg.

3.0 GROUNDWATER RESULTS AND DISCUSSION

One new monitoring well (PAR-80-GW-MW01) was installed adjacent to the former temporary well P80-SB/GW-1 to evaluate the beryllium exceedance from the 2008 SI (**Figure 1**). The well was constructed with a 10-foot-long screen placed in the shallow water-bearing zone from 2 to 12 feet bgs to intersect the water table (encountered at 3 feet bgs). Monitoring well and soil boring logs are provided in **Attachment B**, and well forms are provided in **Attachment C**. The monitoring well was developed using surge and purge methods in accordance with the procedure outlined in the NJDEP FSPM (NJDEP, 2005) on April 28, 2016. The elevations and horizontal coordinates of the new permanent well were surveyed.

Monitoring well PAR-80-GW-MW01 and existing well ECP-80MW01 were sampled on May 24, 2016 using low flow purge and sampling (LFPS) methods. The samples were collected only after the monitored parameters had achieved stabilization in accordance with the NJDEP FSPM (NJDEP, 2005). LFPS sampling records are provided in **Attachment D**. The groundwater samples were analyzed for total and dissolved beryllium. Groundwater sampling results are summarized in **Table 2**. Beryllium concentrations in all the samples from the two wells ranged from 2.1J to 4.5 µg/L, which only nominally exceeded the GWQS of 1 µg/L. Turbidities were low (ranging from 2.39 to 6.81 NTU at the time of sampling), and unfiltered and filtered sample results were similar.

Similar to vanadium and arsenic, the delineated beryllium concentrations in groundwater are not believed to be indicative of a release for the following reasons:

- There are no identified sources of beryllium based on the former operations at Parcel 80. Anthropogenic sources of beryllium include coal and fuel oil, ore processing, metal fabrication, beryllium oxide production and use, and municipal waste combustion (ATSDR, 2002[8]). The relatively low concentrations of beryllium found in groundwater at the Site are believed to be the result of elevated natural background concentrations (associated with glauconitic soils) and not a release, as there is no specific or practical source for beryllium identified at Parcel 80.

- Beryllium is a widely distributed in trace concentrations in common rock forming minerals, such as plagioclase feldspar and pyroxenes, which weather to clay that forms soils (Dooley, 2001). Beryllium naturally enters waterways through the weathering of rocks and soils (EPA, 1980[9]).

- A review of beryllium concentrations in groundwater at FTMM indicates that the

[8] ATSDR. Toxicological Profile for Beryllium, 2002.
[9] EPA. 1980. Ambient water quality criteria for beryllium. Washington, DC: Office of Water Regulations and Standards, Criteria and Standards Division, U.S. Environmental Protection Agency. EPA-440/5-80-024.

concentrations found at Parcel 80 are consistent with those found at other sites at FTMM where no apparent anthropogenic beryllium source was identified (**Figure 6**). **Figure 6** uses data from all parcels and sites at FTMM, and limits the data to detected concentrations only at monitoring wells sampled between 2011 and 2016. Based on these detections seen across FTMM, the background concentrations of beryllium are likely higher than determined by the Weston SI (2.1 µg/L), and the background concentrations are likely attributable to glauconitic soils, which are a known source of beryllium (Dooley, 2001). Concentrations at monitoring wells at Parcel 80 appear to be within the normal range seen throughout FTMM, and based on the lack of a known anthropogenic source for beryllium, these concentrations are likely the result of glauconitic soils found throughout FTMM. Additionally, there was no soil data to support a beryllium release at the site (e.g., no high concentrations and no observed soil concentration gradients).

4.0 RECOMMENDATIONS

The gaps that had remained in the SI have now been fully investigated in accordance with the NJDEP-approved work plan. Based on the results of the additional soil and groundwater sampling no further investigation is recommended.

In summary, metals concentrations encountered at Parcel 80 appear to be related to background, and are not the result of a release, therefore, the Army requests a No Further Action (NFA) designation for Parcel 80. 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

William R. Colvin, PMP, CHMM, PG
BRAC Environmental Coordinator

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

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 80 (Former Photo Processing)"

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

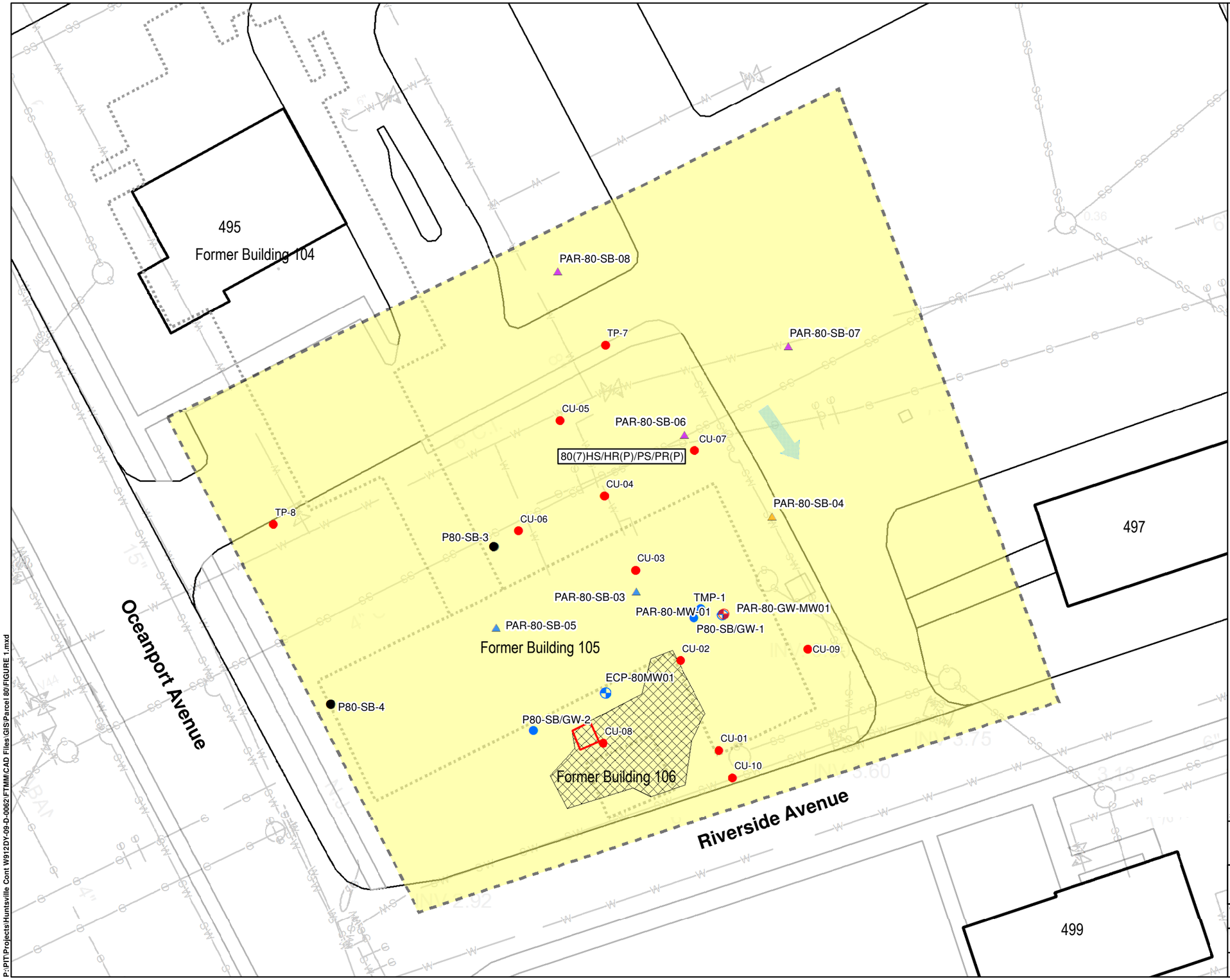
This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

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: William R Colvin Date: 27 October 2016

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

FIGURES



LEGEND:

- Surface/Subsurface Soil Sample Location (for analysis of Arsenic and Copper) (2016)
- Surface/Subsurface Soil Sample Location (for analysis of Vanadium and Arsenic) (2016)
- Surface/Subsurface Soil Sample Location (for analysis of Vanadium) (2016)
- Soil Sampling Location (2010)
- Groundwater Monitoring Well (for analysis of Beryllium) (2016)
- Soil Sample Location (2007)
- Temporary Well and Groundwater Sample Location (2007 or 2010)
- Limits of Excavation
- Oil Water Separator
- Parcel 80 Boundary
- Shallow Monitoring Well
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Inferred Groundwater Flow Direction
- Former Building (Demolished)

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description: HS – Hazardous Substance Storage; HR – Hazardous Substance Release; PS – Petroleum Storage; PR – Petroleum Release; (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 30 feet

0 15 30 60 Feet

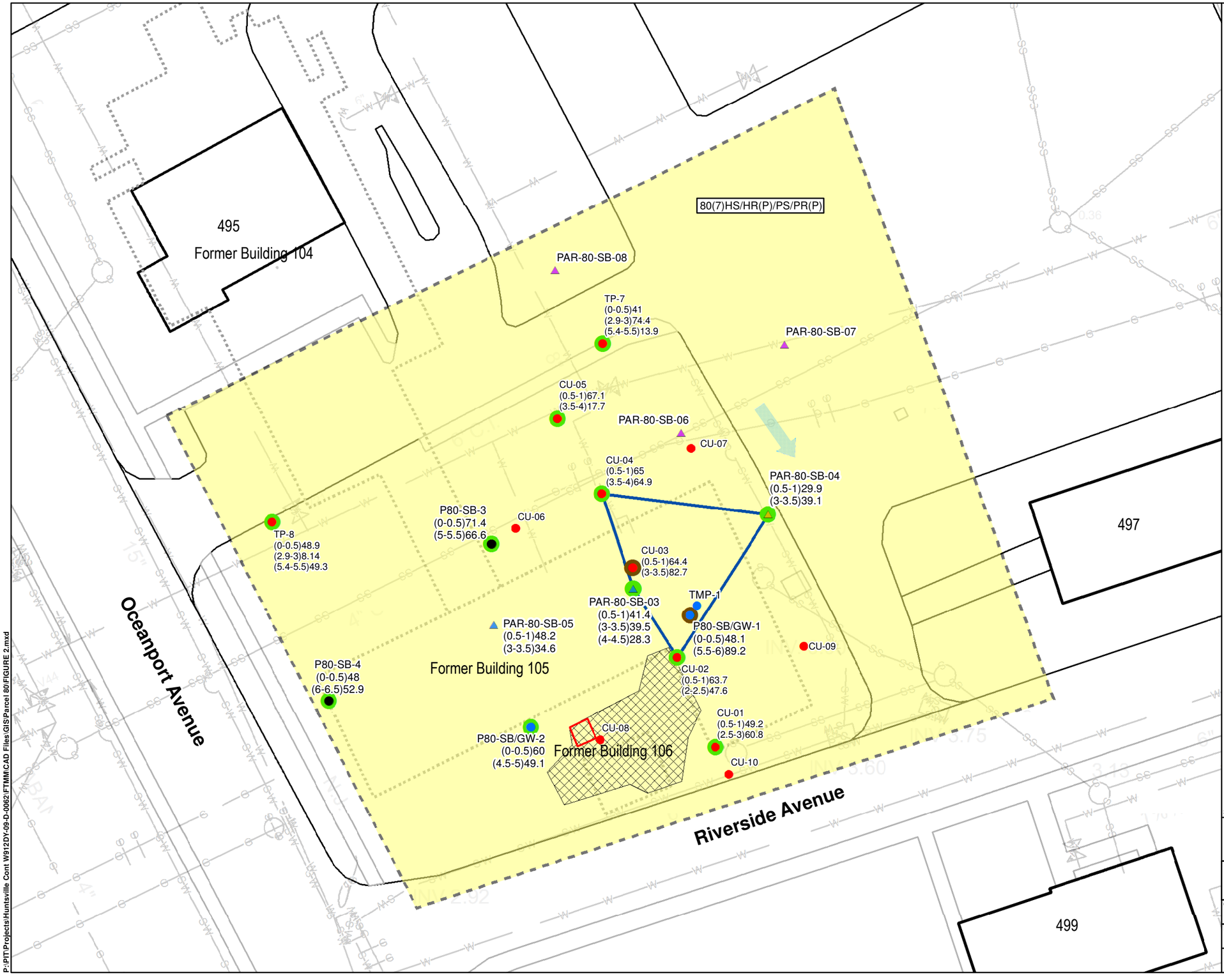
Source: FTMM Supplied CAD

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

LAYOUT OF PARCEL 80 AND SAMPLE LOCATIONS

CREATED BY: RR	REVIEWED BY: RF
DATE: AUG. 2016	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-06011	FILE: FIGURE 1.mxd

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 80\FIGURE 1.mxd



P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 80\FIGURE 2.mxd

LEGEND:

- Surface/Subsurface Soil Sample Location (for analysis of Arsenic and Copper) (2016)
- Surface/Subsurface Soil Sample Location (for analysis of Vanadium and Arsenic) (2016)
- Surface/Subsurface Soil Sample Location (for analysis of Vanadium) (2016)
- Soil Sampling Location (2010)
- Soil Sample Location (2007)
- Temporary Well and Groundwater Sample Location (2007 or 2010)
- Limits of Excavation
- Oil Water Separator
- Parcel 80 Boundary
- Generalized Groundwater Flow Direction
- Horizontal Extent of Vanadium
- Vanadium Concentration is Less Than NJ RDCSRS (78 mg/kg)
- Vanadium Concentration Exceeds NJ RDCSRS (78 mg/kg)

PAR-80-SB-04 — Boring ID
(0.5-1)29.9 — Concentration (mg/kg)
Depth — Depth

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description: HS – Hazardous Substance Storage; HR – Hazardous Substance Release; PS – Petroleum Storage; PR – Petroleum Release; (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 30 feet

0 15 30 60 Feet

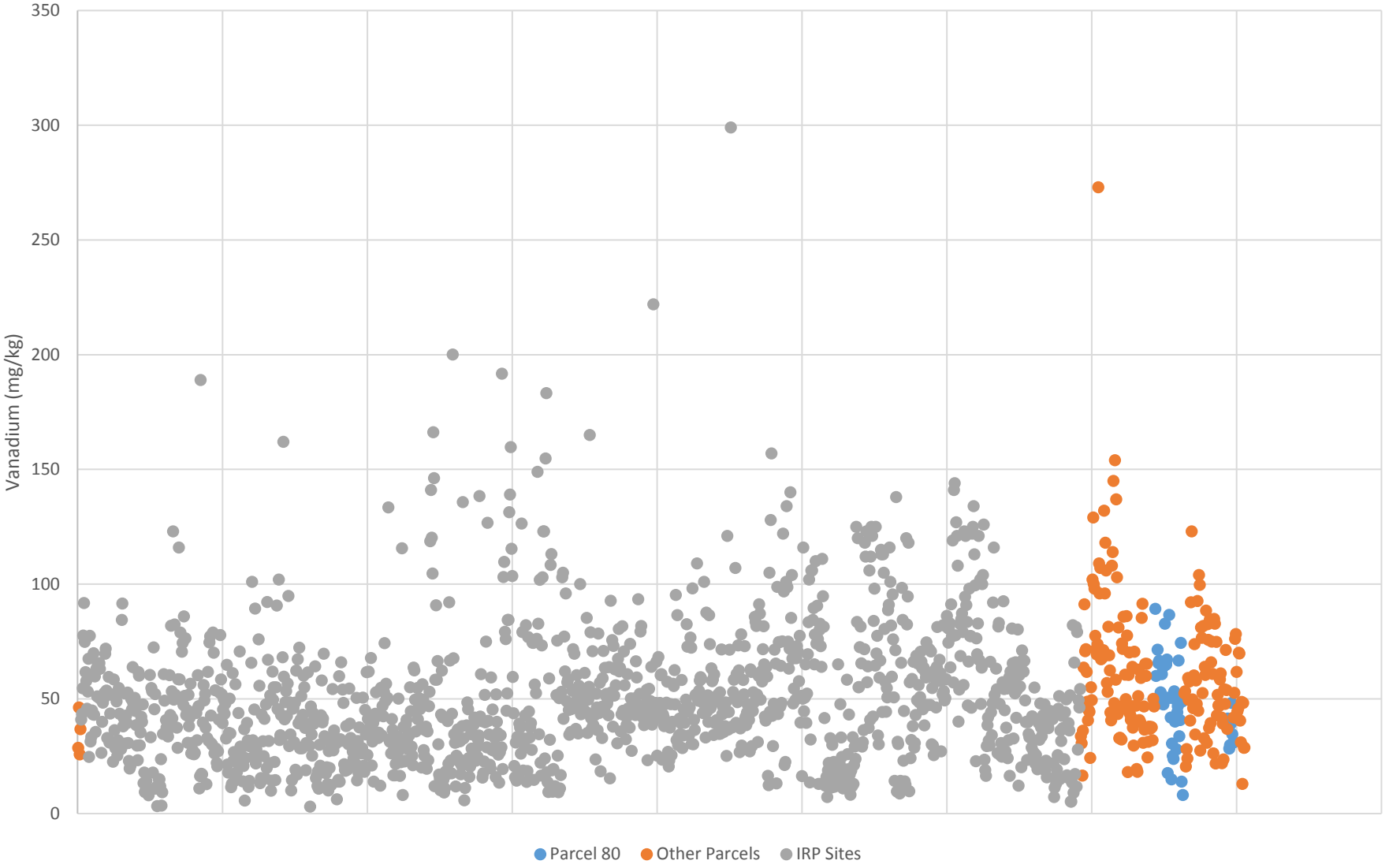
Source: FTMM Supplied CAD

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

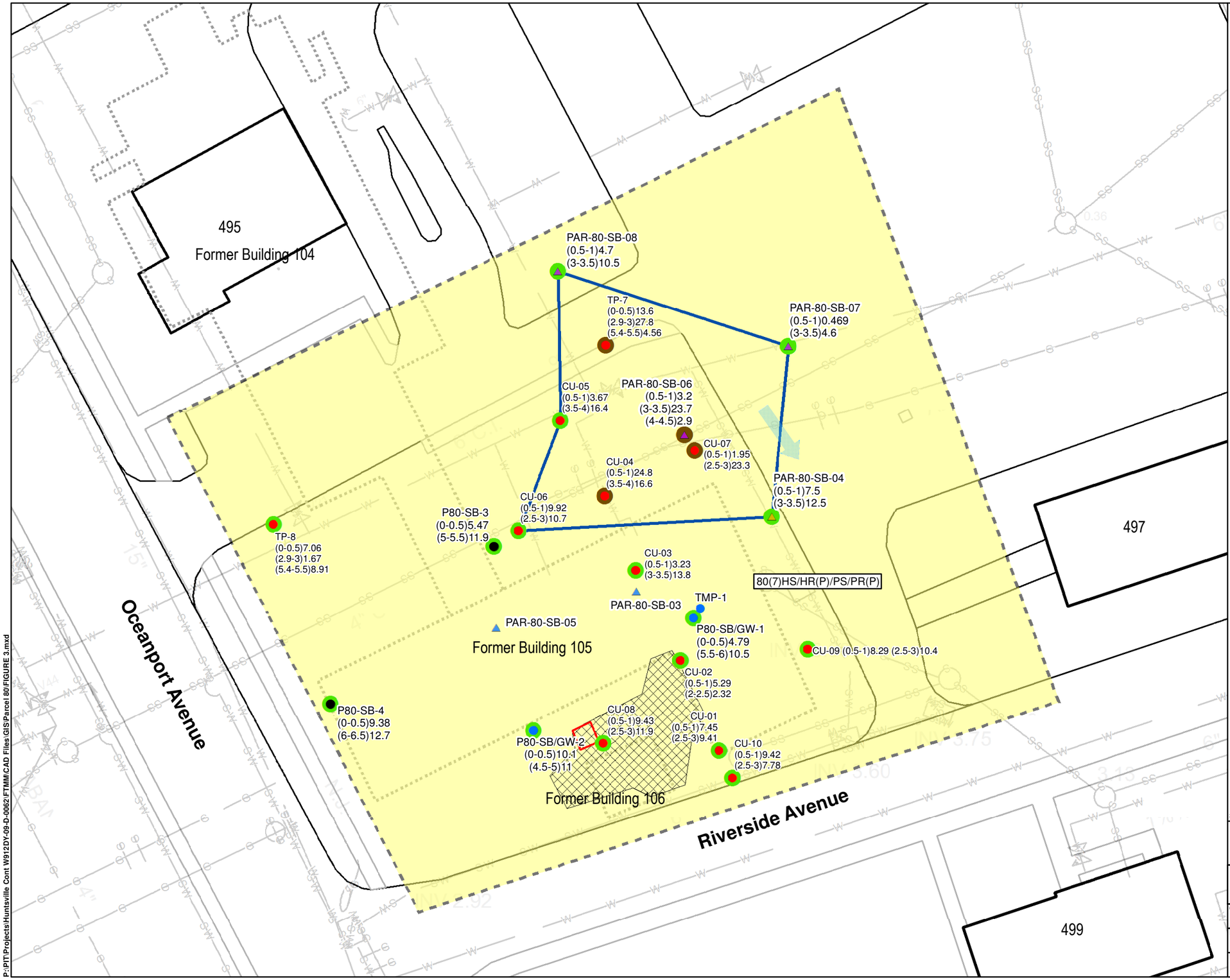
DELINEATION OF VANADIUM IN SOIL TO THE NJDEP RDCSRS

CREATED BY: RR	REVIEWED BY: RF
DATE: AUG. 2016	FIGURE NUMBER: FIGURE 2
PROJECT NUMBER: 748810-06011	FILE: FIGURE 2.mxd

Figure 3
Vanadium Concentrations in Soil at FTMM



Note: All detected concentrations are shown, except for one outlier concentration at Parcel 38 which was removed to improve the visibility of the data set



LEGEND:

- Surface/Subsurface Soil Sample Location (for analysis of Arsenic and Copper) (2016)
- Surface/Subsurface Soil Sample Location (for analysis of Vanadium and Arsenic) (2016)
- Surface/Subsurface Soil Sample Location (for analysis of Vanadium) (2016)
- Soil Sampling Location (2010)
- Soil Sample Location (2007)
- Temporary Well and Groundwater Sample Location (2007 or 2010)
- Limits of Excavation
- Oil Water Separator
- Parcel 80 Boundary
- Generalized Groundwater Flow Direction
- Horizontal Extent of
- Arsenic Concentration is Less Than NJ RDCSRS (19 mg/kg)
- Arsenic Concentration Exceeds NJ RDCSRS (19 mg/kg)

PAR-80-SB-04 — Boring ID
(0.5-1)29.9 — Concentration (mg/kg)
Depth

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description
  - HS – Hazardous Substance Storage
  - HR – Hazardous Substance Release
  - PS – Petroleum Storage
  - PR – Petroleum Release
  - (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 30 feet

0 15 30 60 Feet

Source: FTMM Supplied CAD

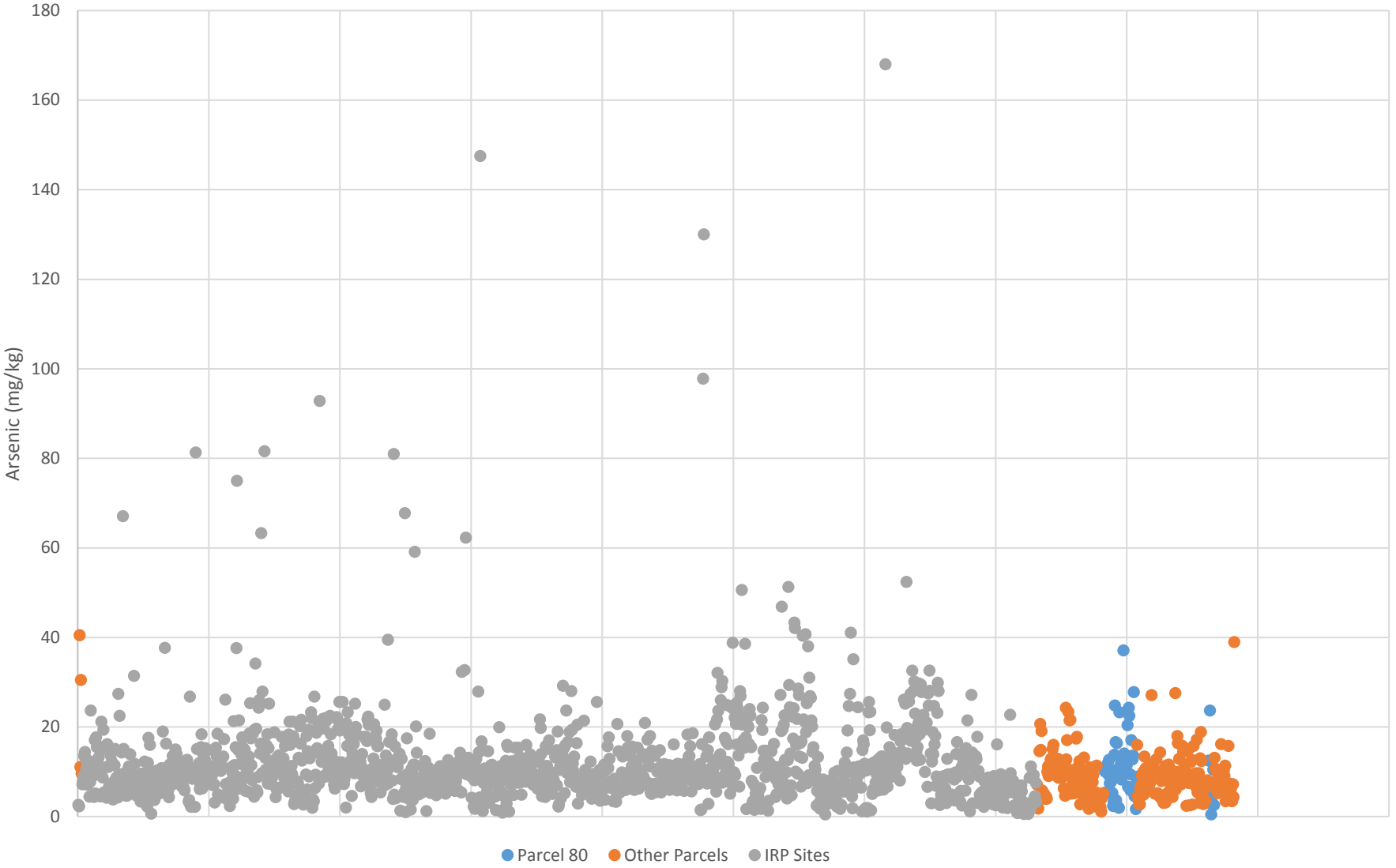
PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

DELINEATION OF ARSENIC IN SOIL TO THE NJDEP RDCSRS

CREATED BY: RR	REVIEWED BY: RF
DATE: AUG. 2016	FIGURE NUMBER: FIGURE 4
PROJECT NUMBER: 748810-06011	FILE: FIGURE 3.mxd

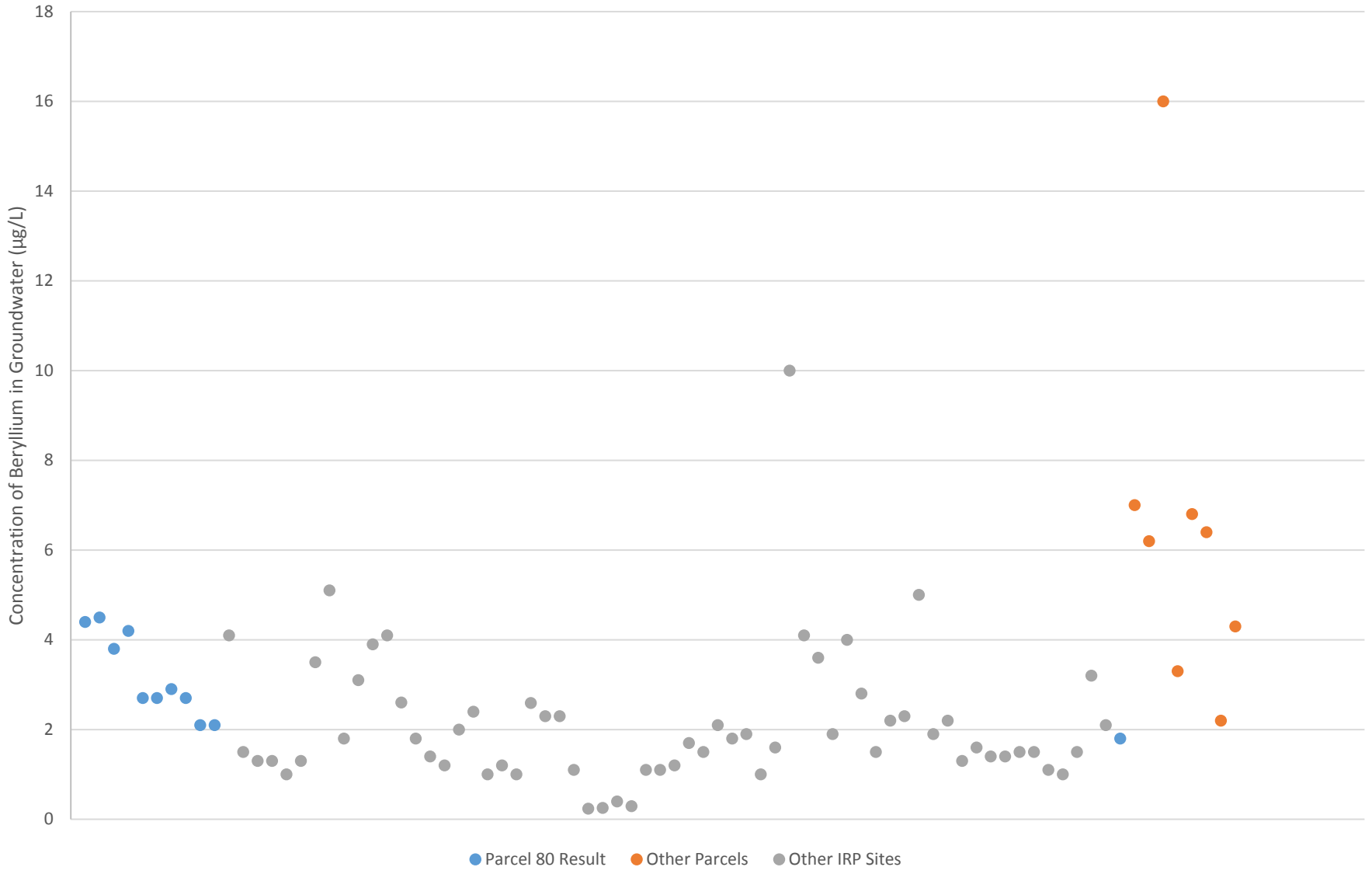
P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 80\FIGURE 3.mxd

Figure 5
Arsenic Concentrations in Soil at FTMM



Note: All detected concentrations are shown, except for four outlier concentrations at FTMM-03, FTMM-04, FTMM-05, and FTMM-08 which were removed to improve the visibility of the data set

Figure 6
Concentrations of Beryllium Detected in Groundwater Monitoring Wells between 2011 and 2016 throughout FTMM



TABLES

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

Table 2 – Ground Water Sampling Results - Comparison to NJDEP Ground Water Quality Standards

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	CU-01		CU-10		CU-02		CU-03	
Sample ID				P80-SS-CU-1-0.5-1.0	P80-SS-CU-1-2.5-3.0	P80-SS-CU-10-0.5-1.0	P80-SS-CU-10-2.5-3.0	P80-SS-CU-2-0.5-1.0	P80-SS-CU-2-2.0-2.5	P80-SS-CU-3-0.5-1.0	P80-SS-CU-3-3.0-3.5
				0.5-1	2.5-3	0.5-1	2.5-3	0.5-1	2-2.5	0.5-1	3-3.5
Sample Date				4/5/2010	4/5/2010	11/23/2010	11/23/2010	4/5/2010	4/5/2010	4/5/2010	4/5/2010
Inorganics (mg/kg)											
Arsenic	19	19	19	**7.45**	**9.41**	**9.42**	**7.78**	**5.29**	**2.32**	**3.23**	**13.8**
Beryllium	16	140	0.7	**0.926**	**1.29**	NA	NA	**0.827**	**0.804**	**0.605**	**1.4**
Copper	3,100	45,000	11,000	**25.2**	< 3.25	NA	NA	**9.15**	**9.81**	< 3.11	< 3.24

Footnote:

All historical data collected prior to 2013 are reported as provided by others.

NLE = no limit established.

NA = not analyzed

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

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

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

Chemical dectections are bolded.

Cell Shade values represent a result that is above the NJ Residential or Non-Residential Direct Contact Soil Remediation Standard.

Cell Shade values represent a result that is above the NJ Impact to Ground Water Soil Screening Level

Cell Shade values represent a result that is above both the NJ Residential, Non-Residential, AND NJ Impact to GW Soil Screening Level Direct Contact Soil Remediation Standard.

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

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

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	CU-04		CU-05		CU-06		CU-07	
Sample ID				P80-SS-CU-4-0.5-1.0	P80-SS-CU-4-3.5-4.0	P80-SS-CU-5-0.5-1.0	P80-SS-CU-5-3.5-4.0	P80-SS-CU-6-0.5-1.0	P80-SS-CU-6-2.5-3.0	P80-SS-CU-7-0.5-1.0	P80-SS-CU-7-2.5-3.0
				0.5-1	3.5-4	0.5-1	3.5-4	0.5-1	2.5-3	0.5-1	2.5-3
Sample Date				4/5/2010	4/5/2010	4/5/2010	4/5/2010	11/23/2010	11/23/2010	11/23/2010	11/23/2010
Inorganics (mg/kg)											
Arsenic	19	19	19	**24.8**	**16.6**	**3.67**	**16.4**	**9.92**	**10.7**	**1.95**	**23.3**
Beryllium	16	140	0.7	**1.51**	**0.933**	**0.6**	**0.955**	NA	NA	NA	NA
Copper	3,100	45,000	11,000	**76.4**	< 3.07	**3.9**	< 3.42	NA	NA	NA	NA

Footnote:

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Chemical dectections are bolded.

Cell Shade values represent a result that is above the NJ Residential or Non-Residential Direct Contact Soil Remediation Standard.

Cell Shade values represent a result that is above the NJ Impact to Ground Water Soil Screening Level

Cell Shade values represent a result that is above both the NJ Residential, Non-Residential, AND NJ Impact to GW Soil Screening Level Direct Contact Soil Remediation Standard.

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

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

TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	CU-08		CU-09		TP-7		
Sample ID				P80-SS-CU-8-0.5-1.0	P80-SS-CU-8-2.5-3.0	P80-SS-CU-9-0.5-1.0	P80-SS-CU-9-2.5-3.0	P80-SS-TP7-0-0.5	P80-SS-TP7-2.9-3	P80-SS-TP7-5.4-5.5
				0.5-1	2.5-3	0.5-1	2.5-3	0-0.5	2.9-3	5.4-5.5
Sample Date				11/23/2010	11/23/2010	11/23/2010	11/23/2010	8/28/2001	8/28/2001	8/28/2001
Inorganics (mg/kg)										
Arsenic	19	19	19	**9.43**	**11.9**	**8.29**	**10.4**	**13.6**	**27.8**	**4.56**
Beryllium	16	140	0.7	NA	NA	NA	NA	**1.04**	**1.33**	**0.386**
Copper	3,100	45,000	11,000	NA	NA	NA	NA	**45.6**	**9.75**	**10.7**

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TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	TP-8			P80-SB/GW-1			P80-SB/GW-2	
Sample ID				P80-SS-TP8-0-0.5	P80-SS-TP8-2.9-3	P80-SS-TP8-5.4-5.5	P80-SB1-A	P80-SB1-B	P80-SB1-C	P80-SB2-A	P80-SB2-B
				0-0.5	2.9-3	5.40000009536743-5.5	0-0.5	1.5-2	5.5-6	0-0.5	1.5-2
Sample Date				8/28/2001	8/28/2001	8/28/2001	12/13/2007	12/13/2007	12/13/2007	12/13/2007	12/13/2007
Inorganics (mg/kg)											
Arsenic	19	19	19	**7.06**	**1.67**	**8.91**	**4.79**	NA	**10.5**	**10.1**	NA
Beryllium	16	140	0.7	**0.597**	**0.143**	**0.866**	**0.518**	NA	**1.93**	**0.895**	NA
Copper	3,100	45,000	11,000	**11.1**	**5.17**	**8.05**	**11.8 B**	NA	**7.86 B**	**15.5 B**	NA

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TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	P80-SB/GW-2	P80-SB3				P80-SB4			PAR-80-SB-03
Sample ID				P80-SB2-C	P80-SB3-A	P80-SB3-B	P80-SB3-C	P80-SB3-C DUP	P80-SB4-A	P80-SB4-B	P80-SB4-C	PAR-80-SB-03-0.5-1
				4.5-5	0-0.5	1.5-2	5-5.5	5-5.5	0-0.5	1.5-2	6-6.5	0.5-1
Sample Date				12/13/2007	12/13/2007	12/13/2007	12/13/2007	12/13/2007	12/13/2007	12/13/2007	12/13/2007	4/1/2016
Inorganics (mg/kg)												
Arsenic	19	19	19	**11**	**5.47**	NA	**11.1**	**11.9**	**9.38**	NA	**12.7**	NA
Beryllium	16	140	0.7	**1.1**	**0.579**	NA	**1.5**	**1.45**	**0.582**	NA	**1.18**	NA
Copper	3,100	45,000	11,000	**7.78 B**	**8.78 B**	NA	**10.9 B**	**15.4 B**	**33.2 B**	NA	**7.31 B**	NA

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TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	PAR-80-SB-03			PAR-80-SB-04		PAR-80-SB-05		PAR-80-SB-06
Sample ID				PAR-80-SB-03-3-3.5	PAR-80-SB-03-4-4.5	PAR-80-SB-103-0.5-1	PAR-80-SB-04-0.5-1	PAR-80-SB-04-3-3.5	PAR-80-SB-05-0.5-1	PAR-80-SB-05-3-3.5	PAR-80-SB-06-0.5-1
				3-3.5	4-4.5	0.5-1	0.5-1	3-3.5	0.5-1	3-3.5	0.5-1
Sample Date				4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016
Inorganics (mg/kg)											
Arsenic	19	19	19	NA	NA	NA	**7.5**	**12.5**	NA	NA	**3.2**
Beryllium	16	140	0.7	NA	NA	NA	NA	NA	NA	NA	NA
Copper	3,100	45,000	11,000	NA	NA	NA	NA	NA	NA	NA	**8.9**

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TABLE 1
SOIL SAMPLING RESULTS - COMPARISON TO NJDEP STANDARDS
PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	PAR-80-SB-06			PAR-80-SB-07		PAR-80-SB-08	
Sample ID				PAR-80-SB-06-3-3.5	PAR-80-SB-06-4-4.5	PAR-80-SB-106-0.5-1	PAR-80-SB-07-0.5-1	PAR-80-SB-07-3-3.5	PAR-80-SB-08-0.5-1	PAR-80-SB-08-3-3.5
				3-3.5	4-4.5	0.5-1	0.5-1	3-3.5	0.5-1	3-3.5
Sample Date				4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016	4/1/2016
Inorganics (mg/kg)										
Arsenic	19	19	19	**23.7**	**2.9**	**2.6**	**0.469 J**	**4.6**	**4.7**	**10.5**
Beryllium	16	140	0.7	NA	NA	NA	NA	NA	NA	NA
Copper	3,100	45,000	11,000	**3.4**	**5.3**	**8.2**	**1.4 J**	**4**	**7.6**	**3.6**

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TABLE 2
DETECTED GROUNDWATER SAMPLING RESULTS - COMPARISON
TO NJDEP GROUND WATER QUALITY STANDARDS
SITE PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	ECP-80MW01						
Sample ID		P80-GW-ECP80MW01-0	ECP-80MW01-14.7	ECP-80MW01-14.7 DIS	ECP-80MW01-19.7	ECP-80MW01-19.7 DIS	ECP-80MW01-9.7	ECP-80MW01-9.7 DIS
Sample Date		3/15/2011	5/24/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016
Filtered		Total	Total	FILTERED	Total	FILTERED	Total	FILTERED
Inorganics (µg/l)								
Beryllium	1	**1.8**	**2.7 J**	**2.7 J**	**2.9 J**	**2.7 J**	**2.1 J**	**2.1 J**

Footnote:

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

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Cell Shade values exceed the NJ Ground Water Quality Criteria

The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards - Adopted July 22, 2010 http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf

TABLE 2
DETECTED GROUNDWATER SAMPLING RESULTS - COMPARISON
TO NJDEP GROUND WATER QUALITY STANDARDS
SITE PARCEL 80
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Ground Water Quality Criteria	P80-SB/GW-1		P80-SB/GW-2	PAR-80-GW-MW01			
Sample ID		PARCEL 80-GW-P80-GW-1-0	PARCEL 80-GW-P80-GW-1-0-Dup	PARCEL 80-GW-P80-GW-2-0	ECP-80-GW-MW01-7.9	ECP-80-GW-MW01-7.9 DIS	ECP-80-GW-MW01-12.9	ECP-80-GW-MW01-12.9 DIS
Sample Date		12/14/2007	12/14/2007	12/14/2007	5/24/2016	5/24/2016	5/24/2016	5/24/2016
Filtered		Total	Total	Total	Total	FILTERED	Total	FILTERED
Inorganics (µg/l)								
Beryllium	1	**5.67**	**5.71**	**2.02**	**3.8 J**	**4.2**	**4.4**	**4.5**

Footnote:

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Cell Shade values exceed the NJ Ground Water Quality Criteria

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ATTACHMENT A
Previous Parcel 80 Correspondence

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 22, 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 34, 50, 51, 52, 66/97, 80 and 83* 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; based upon the revisions included in the referenced submittal, the workplan is approved. Comments, however, are as follows:

Review of the revised document would have been more efficient if all modifications had been made discernible within the submittal in some manner. Although the correspondence which accompanied the workplan did note many areas of modifications and amendments, many others were found during a "side by side" comparison of the workplans, significantly slowing the review process.

As has been noted in previous correspondence, all material, including tables, figures and maps to be utilized in the review of a submittal are to be included in paper form. Referencing the material as included on the CD is insufficient.

Maps/figures are to include not just sample locations, but also analytical results, in accordance with the Technical Requirements (e.g. Figures B1, G1). This, again, costs review time, as the previous results must be plotted during review to ensure adequate delineation locations/depths are proposed.

It is understood upcoming property transfer needs have necessitated the creation of additional parcel designations to address various areas of contamination while allowing other areas to transfer. A map of the site with each of the parcels noted has previously been received. A narrative description of each of these newly designated parcels would be very beneficial, however, including each parcel's size.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

Linda S. Range

C: Joe Pearson, Calibre
James Moore, USACE
Rick Harrison, FMERA
Joe Fallon, FMERA
Frank Barricelli, RAB

ATTACHMENT B
Soil Boring and Monitoring Well Logs

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~3'
DATE: 4/1/16
TIME: 1615
MEAS. FROM:

INSPECTOR: CW/JM
DRILLER: JOE BARNAK
WEATHER: 70°F Overcast
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 1000
DATE/TIME FINISH: 4/1/16 1010
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-80-SB-03
LOCATION DESCRIPTION: Parcel 80
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			60/54		0-2" grass, roots, some m SAND, trace F gravel		
1010	0.5-1				2"-15" moist, Brown/MC SAND, loose, some M rock frags, some f gravel		
0 1							
0 2							
					15"-22" Moist, Brown/grey, MF Dense, SAND, some silt trace clay		▽
105 0 3	3-3.5						
0 4					22"-36" Moist, gray/green, MF M.Dense, SAND, some silt, trace clay		
1020	4-4.5						
0 5					36"-40" SAA, Saturated		
					40"-48" Saturated, Brown/grey, M. Dense MF, SAND, little silt, trace F gravel		
6							
7					48"-54" Saturated, Brown to Orange-Brown, MF, M.Dense SAND, some silt, some F. gravel, trace clay.		
8							
9							
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 3.75'
DATE: 4/1/16
TIME:
MEAS. FROM:

INSPECTOR: CW/JM
DRILLER: JOE BARNAK
WEATHER: 70°F RAIN
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R)7822DT
DATE/TIME START: 4/1/16 1100
DATE/TIME FINISH: 4/1/16 1120
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: Par-80-SB-04
LOCATION DESCRIPTION: Parcel 80
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/54		0-3" Topsoil, grass, roots, f gravel,		
1120	0.5-1				3-7" Brown, MC, loose SAND, little cinder frags, trace shell frags		
1							
2							
1125	3-3.5				7'-18" Brown and ORANGE, loose, mf SAND, some silt, little f gravel		
3							
1130	4-4.5				18-33" moist, light brown and grey, MF SAND, some silt, trace clay, trace f gravel		
4							
5					33"-44" moist, light brown/grey/ orange/brown, mf, M Dense, SAND, trace silt		
6					44-54" saturated, SAA		
7					end of Boring 5'		
8							
9							
10							

Remarks:

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

Consistency vs. Blowcount / Foot

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

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 3.4'
DATE: 4/1/16
TIME: 0946
MEAS. FROM:

INSPECTOR: CW / JM
DRILLER: JOE BARNAK
WEATHER: 70°F RAIN
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 0930
DATE/TIME FINISH: 4/1/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-BD-SB-07
LOCATION DESCRIPTION: Parcel 80
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/50	0	0-3" grass, roots, some MC SAND, trace f gravel		
0946	0.5-1				3-11" moist, brown, MC SAND, loose, some m Rock frags, some f gravel		
1	~~0-1~~				11"-20" moist, Brown, mf, m. Dense, SAND, some silt		
2							
0945	3-3.5						
0950	3.7-4.2				20"-31" moist, Brown/grey, Mf, Dense, SAND, some silt trace clay		
4							
5					31"-44" Moist, grey/green, MF M. Dense, SAND, some silt, trace clay		31-44" Interval saturated at 40"
6							
7					44"-50" Saturated, Brown and grey, MF, M Dense SAND, little silt, trace f gravel		
8							
9					end of Boring @ 5'		
10							

Remarks:

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

Consistency vs. Blowcount / Foot

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

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~3,4'
DATE: 4/1/16
TIME: 1200
MEAS. FROM: BGS

INSPECTOR: DU/SK
DRILLER: JOE BALNAIS
WEATHER: RAIN 70°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 1130
DATE/TIME FINISH: 4/1/16 1140
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-80 SB-06
LOCATION DESCRIPTION: Parcel 80
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/53	0	0-3" Topsoil, grass, trace oak frags		
1					3-8" Dark Brown, loose, MC SAND, little brick, trace wood		
2					8-14" Moist, light Brown-orange MC SAND, little f gravel, trace silt, little M gravel		
3					14-25" moist, Brown and grey Dense, MF SAND, some silt, little f gravel		
4							
5					25"-42" Moist, green/grey, mf, M. Dense SAND, little ~~some~~ silt, trace Clay		Saturated @ 40"
6							
7					42"-53" saturated, grey and Brown, mf SAND, little silt, trace f gravel		
8							
9					end of Boring @ 5'		
0							

Remarks:

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

Consistency vs. Blowcount / Foot

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

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: Water observed @ 5"
DATE:
TIME:
MEAS. FROM:

INSPECTOR: CW/JM
DRILLER: JOE BARNAK
WEATHER: 70°F RAIN
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 1215
DATE/TIME FINISH: 4/1/16 1225
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-80-SB-07
LOCATION DESCRIPTION: Parcel 80
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/53		0-3" Asphalt		
1300	0.5-1				3-5" Asphalt Millings, f gravel		
1					5"-15" Saturated, light grey/tan, MC SAND, trace silt, trace f. gravel.		
2					15"-24" saturated, grey/green, M. Orange MF SAND, little silt, trace clay		
1305 3	3-3.5				24"-32" saturated, Brown/orange, MC SAND, little f gravel, little silt		
1310 4	4-4.5				32"-53" saturated, Brown/grey, MF SAND, little f gravel, trace silt		
5							
6							
7					end of Boring 5'		
8							
9							
10							

Remarks:

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

Consistency vs. Blowcount / Foot

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

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 5'3"
DATE:
TIME:
MEAS. FROM:

INSPECTOR: CW/JM
DRILLER: JOE BARNAK
WEATHER: 70°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 1150
DATE/TIME FINISH: 4/1/16 1200
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-80-SB-08
LOCATION DESCRIPTION: Parcel 80
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	0-3" Topsoil, grass, roots		
					3-9" Moist, Brown-orange, MC SAND, little silt, little f gravel		
1							
					9"-22" Wet, Dark grey MC SAND, some f gravel, little silt		
2							
							▽
3					22"-34" Moist, grey/green, Stiff f SAND and silt, some clay		
4					34"-47" Saturated, GRAY/green, M.stiff f SAND and clay, little silt		
5					47"-55" Saturated, grey/green mf SAND, little silt, trace clay, trace f gravel		
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

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

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~3'
DATE: 4/1/16
TIME: 1440
MEAS. FROM:

INSPECTOR: CW
DRILLER: JOE BARNAK
WEATHER: 70° F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 1400
DATE/TIME FINISH: 4/1/16 1420
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-80-MW-01
LOCATION DESCRIPTION: Parcel 80
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/48		0-2" topsoil, grass, roots		
					2"-7.5" moist, MC, M. Dense, Brown, SAND, little Rock frags, Piece of terracotta pot		
1							
2							
					7.5"-23" moist, Brown/grey/orange Brown Mottled, F SAND, some silt,		▽
3							
4					23"-36" wet, Brown/grey/orange-Brown Mottled, F SAND, trace silt		
5			60/60		36"-47" saturated, Brown/grey/orange, mottled, mf SAND, little silt, trace clay		
					0-60" saturated, SAA		
6							
7							
8							
9							
10							

Remarks:

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

Consistency vs. Blowcount / Foot

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

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 3'
DATE: 4/1/16
TIME: 1410
MEAS. FROM:

INSPECTOR: CW
DRILLER: Joe Balnak
WEATHER: 70°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/1/16 1400
DATE/TIME FINISH: 4/1/16 1420
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-80-MW-01
LOCATION DESCRIPTION: Parcel 80
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-8" SAA 8"-60" moist, Black, M Dense F SAND and SILT, trace clay		
1							
2							
3							
4							
5					end of Boring @ 15'		
6							
7							
8							
9							
10							

Remarks:

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

Consistency vs. Blowcount / Foot

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

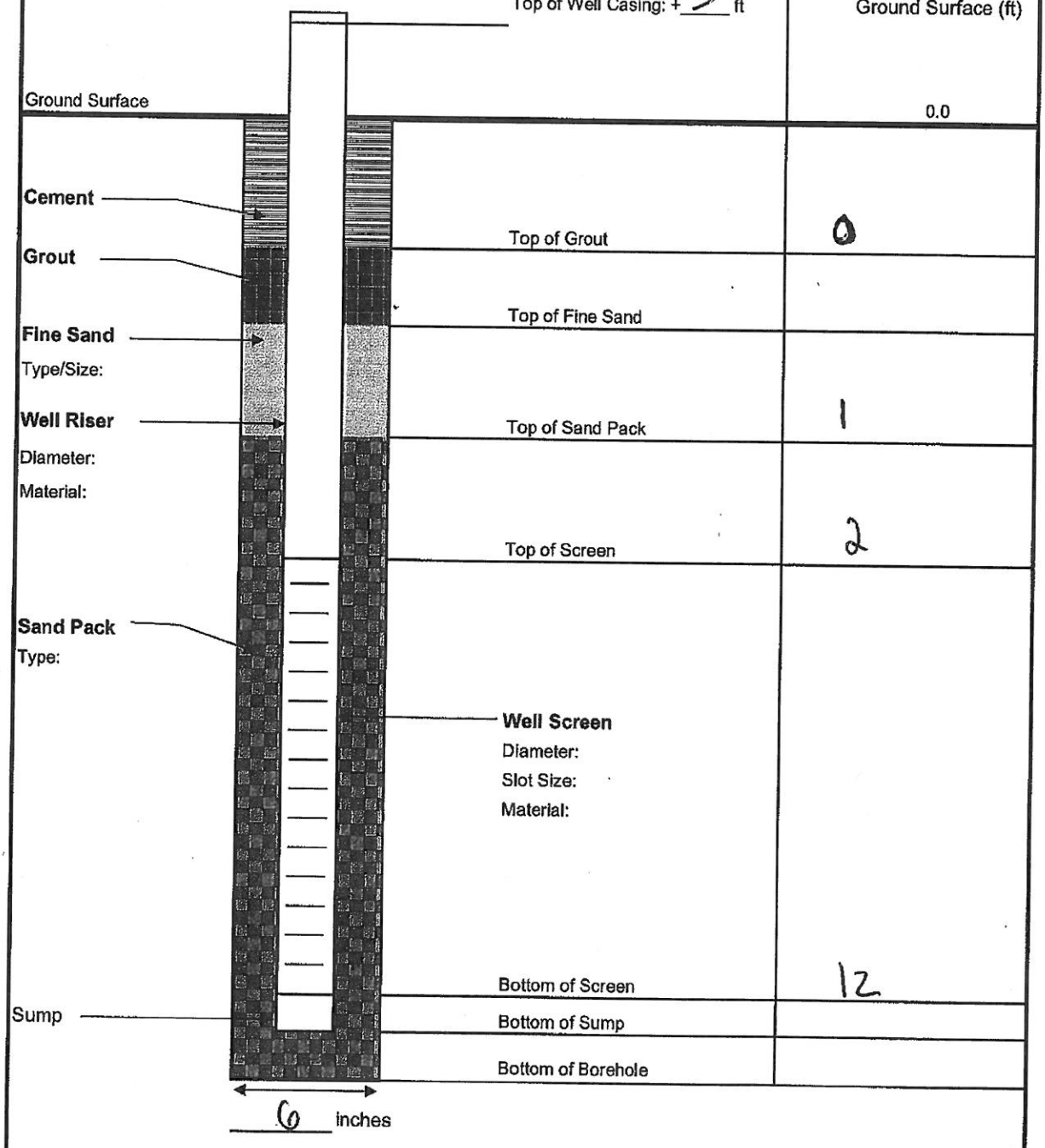
PARSONS

Well Construction Detail (Single Cased - Stickup)

Client: USACE

Well ID: PAR-20-MW-01 NJBWA Permit No.

Date Well Installed: 11/1/16 Location: Parcel 80



Top of Confining Unit (if present): _____

ATTACHMENT C
PAR-80-GW-MW01 Monitoring Well Forms

New Jersey State Department of Environmental Protection
Bureau of Water Allocation and Well Permitting
Mail Code 401-04Q PO BOX 420 Trenton, NJ 08625-0420 Tel: 609-984-6831

Well Permit Number
E201602886

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

Organization: US Gov

Address: US Army Seli EH-E

City: Fort Monmouth State: New Jersey Zip Code: 07703

PROPOSED WELL LOCATION

Facility Name: Fort Monmouth - Parcel 80

Address: Leonard Ave

County: Monmouth Municipality: Oceanport Boro Lot: 1 Block: 105

Easting (X): 622625 Northing (Y): 540403
Coordinate System: NJ State Plane (NAD83) - USFEET

Local ID: PAR-80-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

Terry D Pilawski

Terry Pilawski, Chief
Bureau of Water Allocation and Well Permitting

New Jersey State Department of Environmental Protection
Bureau of Water Allocation and Well Permitting
Mail Code 401-04Q PO BOX 420 Trenton, NJ 08625-0420 Tel: 609-984-6831

Well Permit Number
E201602886

MONITORING WELL RECORD

PROPERTY OWNER: US GOV

Company/Organization: US Gov

Address: US Army Seli EH-E Fort Monmouth, New Jersey 07703

WELL LOCATION: Fort Monmouth - Parcel 80

Address: Leonard Ave

County: Monmouth Municipality: Oceanport Boro Lot: 1 Block: 105

Easting (X): 622626 Northing (Y): 540404
Coordinate System: NJ State Plane (NAD83) - USFEET

DATE WELL STARTED: April 1, 2016

DATE WELL COMPLETED: April 1, 2016

WELL USE: MONITORING

Other Use(s):

Local ID: PAR-80-GW-MW-01

WELL CONSTRUCTION

Total Depth Drilled (ft.): 12 Finished Well Depth (ft.): 12 Well Surface: Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	12	8		
Casing	0	2	2	PVC	Sch 40
Screen	2	12	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	1	8	2	2.5	47	4
Gravel Pack	1	12	8	2	#0		

Grouting Method: Pressure method (Tremie Pipe) Drilling Method: Hollow Stem Augers

ADDITIONAL INFORMATION

Protective Casing: Yes
Static Water Level: 3 ft. below land surface
Water Level Measure Tool: M-Scope
Well Development Period: 1 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 - 10.5: Light Brown GW - Well-graded gravels and gravel-sand mixtures, little or no fines

10.5 - 12: Dark Gray 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 80

List all AKAs:

Street Address: Leonard Ave

Municipality: Oceanport Boro (Township, Borough or City)

County: Monmouth Zip Code: 07757

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

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner: US Gov
2. Well Location (Street Address): Leonard Ave
3. Well Location (Municipal Block and Lot) Block# 105 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing):	E201602886
2. Site Well Number as shown on application or plans):	PAR-80-GW-MW-01
3. Well Completion Date:	4/1/2016
4. Distance from Top of Casing (cap off) to ground surface (nearest 0.01'):	+3.00
5. Total Depth of Well to the nearest ½ foot:	12
6. Depth to Top of Screen (or top of open hole) from top of casing (nearest 0.01'):	2.00
7. Screen Length (or length of open hole) in feet:	10
8. Screen or Slot Size:	.010
9. Screen or Slot Material:	Sch. 40 PVC
10. Casing Material (PVC, steel, or other – specify):	Sch. 40 PVC
11. Casing Diameter (inches):	2
12. Static Water Level from top of casing at the time of installation (nearest 0.01'):	3.00
13. Yield (gallons per minute):	1
14. Development Techinque (specify):	Pump
15. Length of Time well is developed/pumped or bailed (hours and minutes):	1 Hour 00 Minutes

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) Leonard Ave
3. Well Location (Municipal Block and Lot) Block# 105 Lot # 1

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201602886
2. Site Well Number (As shown on application or plans): PAR-80-MW-01
3. Geographic Coordinate NAD 83 to nearest 1/100 of a second:
   Latitude: North 40° 18' 57.97" Longitude: West 74° 01' 55.15"
4. New Jersey State Plane Coordinates NAD 83 datum, US survey feet units, to nearest foot:
   North 540404 East 622626
5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 8.850'
   Elevation Top of Outer casing: 9.61 Elevation of ground: 6.190'
   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 D
Low Flow Purge and Sampling Records

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** ECP-SWMW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 80
SCREENED INTERVAL (TOC): 7.2 - 22.2
WELL DIAMETER (in.): 4

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. Watson
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
WELL DEPTH (TOC): 22.2
FEET OF WATER IN WELL (ft):
FEET OF SATURATED SCREEN (ft): 15
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 4.71
PUMP INTAKE DEPTH (ft below TOC): 9.7

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1505	X		3.43	NA	1.726	NA	352.2	NA	1.46	NA	3.74	NA	17.41	NA	200	4.87
1510	X		3.44	0.01	1.713	0.013	351.7	0.5	1.05	0.39	3.13	0.61	18.28	0.87	125	4.91
1515	X		3.46	0.02	1.728	0.015	352.0	0.3	0.98	0.07	3.29	0.16	19.24	0.96	125	4.92
1520	X		3.47	0.01	1.732	0.004	352.2	0.2	0.98	Ø	2.93	0.36	18.57	0.67	125	4.92
1525	X		3.46	0.01	1.731	0.001	352.0	0.2	0.98	Ø	3.06	0.13	18.48	0.09	125	4.93
1530		X	3.47	0.01	1.730	0.001	352.1	0.1	0.98	Ø	2.90	0.16	18.42	0.06	125	4.93

*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

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

20MW01

PARSONS	CLIENT: USACE	WELL #: ECP-~~20MW01~~ (20MW01)

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): ECP-20MW01-9.7

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Beryllium	1530	250	Clear	2.90	
Diss. Beryllium	1530	250	Clear	2.90	

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:

INVESTIGATION DERIVED WASTE (IDW): CAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** ECP-80MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 80
SCREENED INTERVAL (TOC): 7.2-22.2
WELL DIAMETER (in.): 4

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. Witton
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
WELL DEPTH (TOC): 22.2
FEET OF WATER IN WELL (ft):

FEET OF SATURATED SCREEN (ft): 15
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 4.71
PUMP INTAKE DEPTH (ft below TOC): 14.7

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1545	X		3.50	NA	1.730	NA	349.8	NA	1.86	NA	3.57	NA	19.26	NA	125	4.84
1550	X		3.48	0.02	1.760	0.030	349.6	0.2	0.85	1.01	3.43	0.14	17.85	1.41	125	4.87
1555	X		3.47	0.01	1.775	0.015	349.4	0.2	0.57	0.28	3.61	0.18	16.69	1.16	125	4.87
1600	X		3.47	0	1.781	0.006	349.1	0.3	0.52	0.05	3.56	0.05	16.39	0.30	125	4.87
1605	X		3.47	0	1.780	0.001	348.7	0.4	0.51	0.01	3.40	0.16	16.31	0.08	125	4.87
1610		X	3.47	0	1.779	0.001	348.3	0.4	0.51	0	3.47	0.07	16.28	0.03	125	4.87

*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 #: ECP-80MW01

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): ECP-80MW01-14.7

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Beryllium	1610	250	Clear	3.47	
Diss. Beryllium	1610	250	Clear	3.47	

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:

INVESTIGATION DERIVED WASTE (IDW): GAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: ECP-80MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling

AOC # (AREA): parcel 80

SCREENED INTERVAL (TOC): 7.2-22.2

WELL DIAMETER (in.): 4

WELL PERMIT #:

DATE: 5/24/16

SAMPLING PERSONNEL NAME: C. Watson

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

WELL DEPTH (TOC): 22.2

FEET OF WATER IN WELL (ft):

FEET OF SATURATED SCREEN (ft): 15

DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 4.71

PUMP INTAKE DEPTH (ft below TOC): ~~14.7~~ 19.7

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1625	X		3.47	NA	1.805	NA	347.3	NA	1.58	NA	2.16	NA	15.63	NA	125	4.85
1630	X		3.47	0	1.787	0.018	346.7	0.6	0.55	1.03	2.61	0.45	15.48	0.15	125	4.85
1635	X		3.47	0	1.784	0.003	345.6	0.1	0.40	0.15	2.78	0.17	14.98	0.50	125	4.86
1640	X		3.47	0	1.783	0.001	345.5	0.1	0.38	0.02	2.65	0.13	14.93	0.05	125	4.87
1645	X		3.47	0	1.783	0	345.0	0.5	0.38	0	2.71	0.06	14.90	0.06	125	4.88
1650		X	3.47	0	1.782	0.001	344.9	0.1	0.37	0.01	2.39	0.32	14.86	0.04	125	4.88

*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 #:** ECP-80MW01-19.7

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): ECP-80MW01-19.7

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Beryllium	1650	250	Clear	2.39	
Beryllium	1650	250	Clear	2.39	

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:

INVESTIGATION DERIVED WASTE (IDW): GAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: PAP-80-MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 80
SCREENED INTERVAL (TOC): 5.4-15.4
WELL DIAMETER (in.): 2

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. Watson
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
WELL DEPTH (TOC): 15.4
FEET OF WATER IN WELL (ft): 10.3

FEET OF SATURATED SCREEN (ft): ~~10.3~~ 10
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 5.10
PUMP INTAKE DEPTH (ft below TOC): ~~12.5~~ 7.9

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*		
1250	X		3.76	NA	1.405	NA	379.6	NA	1.00	NA	23.3	NA	18.30	NA	200	5.25
1255	X		3.73	0.03	1.417	0.012	383.8	4.2	0.94	0.06	20.8	2.5	18.12	0.18	125	5.36
1300	X		3.71	0.02	1.480	0.063	387.2	3.4	0.81	0.13	12.2	8.6	17.50	0.62	125	5.40
1305	X		3.72	0.01	1.520	0.040	383.2	4.0	0.70	0.11	8.76	3.44	18.06	0.56	100	5.41
1310	X		3.72	Ø	1.529	0.009	385.5	0.3	0.67	0.03	7.13	1.63	18.10	0.04	100	5.42
1315	X		3.72	Ø	1.530	0.001	385.5	Ø	0.64	0.03	6.97	0.16	18.14	0.04	100	5.42
1320		~~X~~	3.72	Ø	1.531	0.001	385.8	0.3	0.62	0.02	6.81	0.16	18.18	0.04	100	5.42

*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-80-GW-MW01-7

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-80-GW-MW01-7.9 + MW01-7.9-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Beryllium	1320	250	Clear	6.81	
Beryllium Diss	1320	250	Clear	6.81	

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:

INVESTIGATION DERIVED WASTE (IDW): GAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: PAR-80-MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 80
SCREENED INTERVAL (TOC): 5.4-15.4
WELL DIAMETER (in.): 2

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. Watson
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
WELL DEPTH (TOC): 15.4
FEET OF WATER IN WELL (ft): 10.3

FEET OF SATURATED SCREEN (ft): 10
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 5.10
PUMP INTAKE DEPTH (ft below TOC): 12.9

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1340	X		3.73	NA	1.757	NA	376.6	NA	2.45	NA	12.3	NA	19.80	NA	100	5.27
1345	X		3.61	0.12	1.809	0.051	386.6	10.0	0.91	1.54	8.63	3.67	18.64	1.16	100	5.34
1350	X		3.60	0.01	1.943	0.134	390.9	4.3	0.76	0.15	5.78	0.15	16.32	2.32	100	5.37
1355	X		3.63	0.03	1.920	0.023	387.8	3.1	0.68	0.08	5.74	0.04	16.42	0.10	100	5.39
1400	X		3.63	0.000	1.919	0.001	385.0	2.8	0.68	—	5.66	0.08	16.40	0.02	100	5.39
1405		X	3.63	0	1.918	0.001	383.4	1.6	0.67	0.01	5.80	0.14	16.38	0.02	100	5.40

*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-80-MW01**

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-80-GW-MW01-12.9 + MW01-12.9-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Beryllium	1405	250	clear	5.80	
Beryllium	1405	250	Clear	5.80	

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:

INVESTIGATION DERIVED WASTE (IDW): CAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									