



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

19 October 2017

Mr. Ashish Joshi
New Jersey Department of Environmental Protection
Division of Remediation Management & Response
Northern Bureau of Field Operations
7 Ridgedale Avenue (2nd Floor)
Cedar Knolls, NJ 07927-1112

**SUBJECT: Request for Concurrence
Site Investigation Report Addendum for Parcel 102 (Former Skeet Range)
Fort Monmouth, New Jersey
PI G000000032**

Dear Mr. Joshi:

The Fort Monmouth (FTMM) Team has prepared this addendum to the Site Investigation (SI) Report (Reference 1) to summarize relevant environmental investigations at Parcel 102 (Former Skeet Range; Figure 1) in support of the subject request. References, figures, and attachments mentioned in this addendum are listed at the end of this addendum.

Parcel 102 Background

As described in Attachment A, the Former Skeet Range was used from approximately 1940 to 1955 and, as shown on Attachment B, was comprised of four trap houses (T-50 through T-53). Army skeet ranges were shotgun ranges used for recreational or training purposes that involved target shooting from designated firing line positions at clay targets that were mechanically thrown into the air. The trap houses contained devices called "traps" that launched the targets. Potential environmental impacts may result at skeet ranges due to the distribution of lead shot pellets in the soil within an area known as the shot fall zone (Reference 5). Shot pellets from shotgun shells contain mostly lead but also contain antimony, arsenic, and other minor constituents, including zinc, copper, nickel, and cadmium. Polynuclear aromatic hydrocarbons (PAHs) were associated with the binder used in manufacturing the clay targets (Reference 3) and are likely to be found in skeet range soil.

The trap houses and the firing line for the Former Skeet Range were generally located within the rectangular area shown on Figure 1. Reference 2 identified a semi-circular area as the Surface Danger Zone (SDZ) located to the north of the firing line which represented the maximum extent of ground area that could be impacted by a skeet range. A military guidance manual indicates the standard skeet range danger zone to extend 900 feet from the firing position (Reference 4), which is slightly smaller than the Reference 2 SDZ (Figure 2). The firing line for the Former Skeet Range was likely along the southern edge of the range just north of North Avenue, and the firing direction was generally towards the north.

The orientation of the SDZ identified in Reference 2 suggests that impacts from shotgun firing could potentially range from west-southwest to east-northeast (Figure 2). Based on this configuration, clay targets could be thrown in any direction within this designated SDZ, resulting in clay target debris and shot fall areas within this range boundary. However other investigations (summarized in Reference 5) have shown that most clay target debris would be deposited approximately 180 to 200 feet from the firing position, while intact clay targets (i.e., missed targets) would deposit slightly further from the firing position. The bulk of the shot fall would be deposited 375 to 600 feet from the firing position (Reference 5). Based on these generalized dimensions, Figure 2 shows the potential area of maximum shot fall deposits within the SDZ.

The Former Skeet Range (closed in 1955) was used as a landfill from approximately 1959 to 1964. The Remedial Investigation Report for Landfill FTMM-03 (Reference 7) and subsequent decision documents specify the construction of a vegetated soil cap over Landfill FTMM-03 consistent with the NJDEP Solid Waste regulations. Landfills FTMM-05 and FTMM-08 also occupy portions of the area designated as the SDZ for the Former Skeet Range (Figure 2).

Reference 6 identified environmental carve-out designations for the Former Skeet Range that were identified as Parcel 102. Four discrete, non-contiguous carve-out areas were demarcated (Parcels 102A through 102D; see Figure 2) as the areas within the Reference 1 SDZ and outside of Landfills FTMM-03, FTMM-05 and FTMM-08.

Aerial Photograph Interpretation

Aerial photographs were evaluated to clarify the actual location of the Former Skeet Range and to determine the size and potential impacts of the shot fall zone on Parcels 102A, B, C, and D. Appendix A of Reference 7 included interpretation of historical aerial photographs that were used in the areal delineation of Landfill FTMM-03. As discussed above, the Former Skeet Range was reportedly closed by 1955 and the general area was subsequently used for landfilling. Therefore, the aerial photographs of Landfill FTMM-03 dating from 1947 to 1969 were reviewed again to identify site-specific features that could be attributed to the Former Skeet Range (Attachment C). A 1947 photograph clearly shows the T-51, T-52 and T-53 trap houses, as well as linear paths that appear to represent firing lines. The trap houses and firing areas are located within an area cleared of trees, which would allow unobstructed firing in an area towards the north and northwest of Parcel 102C, which is a more limited area than the SDZ identified in Reference 2. The 1947 aerial photograph also shows the Parcel 38 firing range in the area near Parcels 102A and 102B, which was separated from the Former Skeet Range Area by a more densely forested area. It is evident that Parcels 102A and 102B were well outside of the cleared area used as the Former Skeet Range, and therefore outside of the area potentially impacted by clay targets and shot fall (Figure 3).

The 1947 aerial photograph also shows barracks within the Parcel 102D area, which are also separated from the Former Skeet Range by trees. This suggests that Parcel 102D was outside the area directly impacted by the Former Skeet Range. Further, it is unreasonable to assume that the Army would have allowed shotgun firing towards occupied areas such as the barracks at Parcel 102D, due to the potential hazard to Army personnel. Therefore, it is evident that the Parcel 102D area is outside of the area impacted by clay targets and shot fall (Figure 3).

The 1957 aerial photograph (Attachment C) shows that additional trees have been cleared, suggesting that tree clearing for landfilling activities may have begun. The trap houses were no longer present in the 1957 photograph, although traces of the former firing lines are faintly visible. Landfilling activity and traces of the former firing lines were also evident in the 1963 and 1969 aerial photographs.

The evaluation of these aerial photographs indicates that Parcels 102A, B, and D are outside of the area potentially impacted by the Former Skeet Range, and that Parcel 102C is within Landfill FTMM-03 which will be addressed by the planned construction of a vegetative soil cover.

Soil and Sediment Analyses

In 1998 the Army characterized near-surface soils using Geoprobe soil borings installed throughout Landfill FTMM-03 and surrounding landfills (Figure 4). A total of 205 primary soil samples and 8 field duplicates were collected from 0.5 to 1 feet below ground surface for analysis of semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals. Laboratory analyses were conducted at the Fort Monmouth Environmental Testing Laboratory (FMETL), a New Jersey-certified laboratory (Certification No. 13461). The results of these analyses were reported in Reference 7.

Lead and PAHs are potential contaminants of concern for skeet ranges (References 3 and 5). The soil analytical results were compared to the 18 September 2017 amendment to the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS) for lead and seven key PAHs as presented in Attachment D. Sample locations where the RDCSRSs were exceeded for lead or PAHs within and near the site-specific Former Skeet Range area are shown in Figure 5. The exceedances of lead and PAHs are randomly distributed throughout Landfill FTMM-03 both within and beyond the site-specific Former Skeet Range area, and therefore are not indicative of skeet range contamination.

The Baseline Ecological Evaluation (BEE; Reference 8) conducted at Fort Monmouth in 2012 included the collection and analysis of sediment samples from Lafetra Creek adjacent to Landfills FTMM-03, -05, and -08 for lead and PAHs, in addition to other analytes. The distribution of lead in the BEE sediment results is presented in Figure 6. The BEE concluded that there were no ecological effects associated with the concentrations of lead and PAHs observed in the creek, presumably from the skeet range. Although some lead concentrations exceeded the lead sediment Ecological Screening Criterion (ESC), the maximum detected background concentration of lead was not exceeded. The BEE concluded that no further evaluation of lead in the sediment of Lafetra Creek was required (Reference 8). NJDEP (Reference 9) agreed that no additional ecological evaluation or assessment was necessary. Therefore, based on the results of the BEE, any potential impact from the Former Skeet Range to property off Fort Monmouth (as shown in Figure 3) is considered unlikely.

Summary

The review of historical documentation and aerial photographs summarized in this addendum indicates that the Former Skeet Range was in use prior to the creation of the surrounding landfills, thereby resulting in significant disturbance of all portions of the Former Skeet Range within Landfill FTMM-03. Historical aerial photographs indicate that Parcels 102A, 102B, 102C and 102D are

outside of the area potentially impacted by clay targets and shot fall shown on Figure 3. Please note that Parcel 102C will be included in the planned construction of a vegetated soil cover at Landfill FTMM-03. Previous soil sampling at Landfill FTMM-03 included analysis for lead and PAHs, which are the contaminants of potential concern associated with skeet range activity. The random distribution of PAHs and lead concentrations in soil and sediment within the Former Skeet Range vicinity are not indicative of skeet range contamination.

Based on the above evaluation of the Former Skeet Range, we request the Department's concurrence with the Army's determination that no action is needed at Parcels 102A, 102B, 102C, 102D, and the property off Fort Monmouth.

Thank you for reviewing this addendum and request; we look forward to your concurrence and/or comments. Our technical Point of Contact is Kent Friesen who you may contact directly at (732) 383-7201; kent.friesen@parsons.com. I can be reached at (732) 380-7064; william.r.colvin18.civ@mail.mil.

Sincerely,



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

Attachments:

- Figure 1 – Small Arms Firing Range Locations
- Figure 2 – Former Skeet Range Layout
- Figure 3 – Area Potentially Impacted by Former Skeet Range
- Figure 4 – Previous Sample Locations and Aerial Photograph Features
- Figure 5 – Soil Analytical Results at Former Skeet Range
- Figure 6 – Sediment Lead Concentrations Near Former Skeet Range
- Attachment A – Excerpt of Previous Report
- Attachment B – Historical Drawings
- Attachment C – Aerial Photographs
- Attachment D – FTMM-03 Soil Sampling Summary Results

cc: Ashish Joshi (e-mail and 2 hard copies)
William Colvin, BEC (e-mail and 1 hard copy)
Joseph Pearson, Calibre (e-mail)
James Moore, USACE (e-mail)
Jim Kelly, USACE (e-mail)
Cris Grill, Parsons (e-mail)

References:

1. U.S. Army Base Realignment and Closure (BRAC). 2008. *U.S. Army BRAC Site Investigation Report, Fort Monmouth*. Final. 21 July.
2. Malcolm Pirnie, Inc. 2006. *Final Historical Records Review, Fort Monmouth, Fort Monmouth, New Jersey*. Prepared for U.S. Army Corps of Engineers, Baltimore District. January.
3. U.S. Army Corps of Engineers. 2015. *Technical Guidance for Military Munitions Response Actions*. Engineering Manual EM-200-1-15. 30 October.
4. War Department. 1941. *Targets, Target Materials, and Rifle Range Construction*. Technical Manual TM 9-855. 19 June.
5. Interstate Technology & Regulatory Council (ITRC). 2005. *Environmental Management at Operating Outdoor Small Arms Firing Ranges*. Technical Guideline from the Small Arms Firing Range Team. February.
6. CALIBRE Systems, Inc. 2016. *Environmental Condition of Property Report Update, Fort Monmouth, New Jersey, Phase 2 Parcels*. Prepared for U.S. Army Base Realignment and Closure Office. March.
7. Parsons. 2016. *Final Remedial Investigation Report for Site FTMM-03, Fort Monmouth, Oceanport, Monmouth County, New Jersey*. February.
8. Shaw. 2012. *Final Fort Monmouth Main Post and Charles Wood Area Baseline Ecological Evaluation Report, U.S. Army Garrison Fort Monmouth, Fort Monmouth, New Jersey*. Prepared for U.S. Army Corps of Engineers, Baltimore District. Revision 1. June.
9. NJDEP. 2012. Letter to OACSIM – U.S. Army Fort Monmouth, Re: *Revised Baseline Ecological Evaluation Report, Dated May 2012, Fort Monmouth Main Post and Charles Wood Area, Fort Monmouth, New Jersey*. 27 August.

FIGURES

Figure 1 – Small Arms Firing Range Locations

Figure 2 – Former Skeet Range Layout

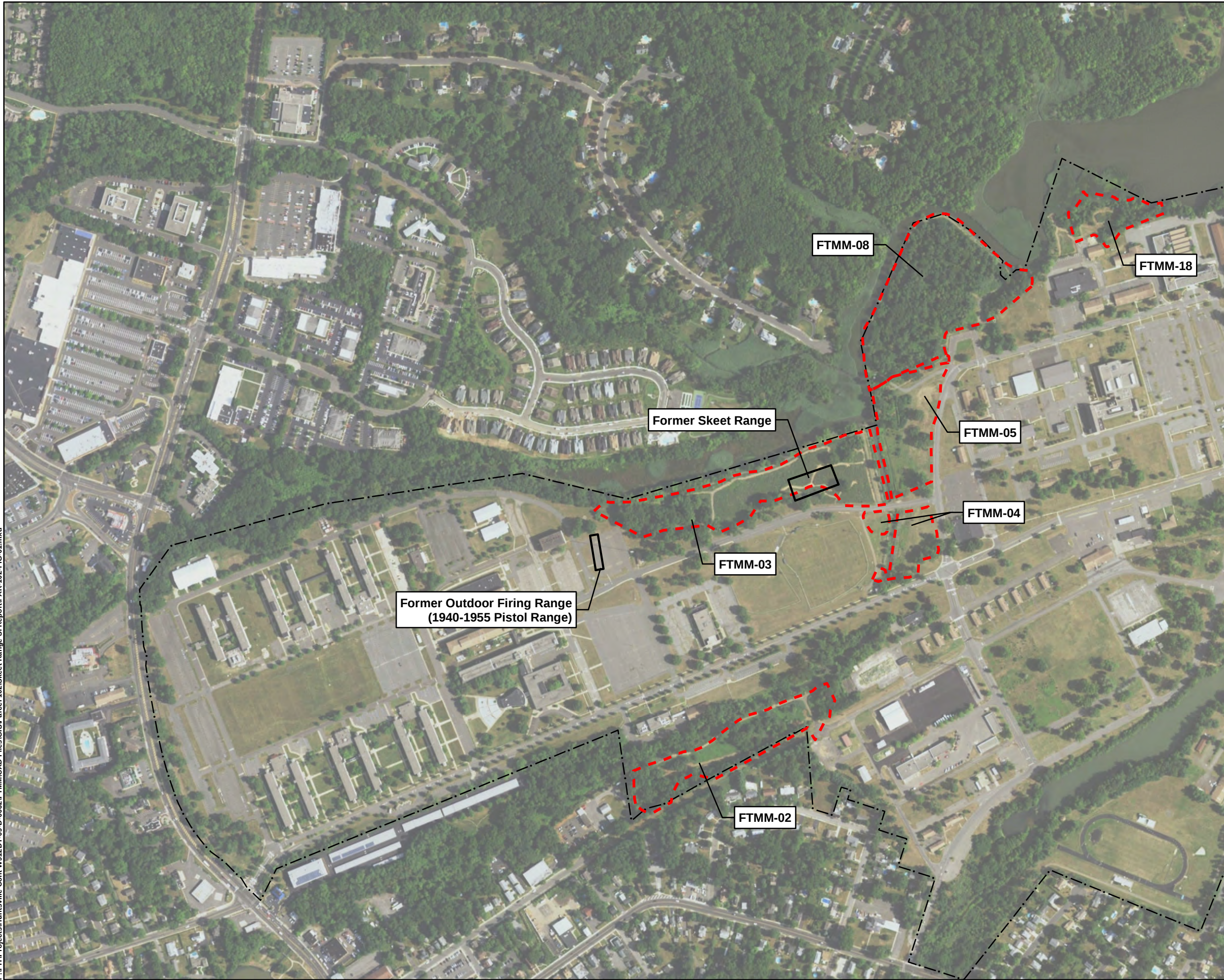
Figure 3 – Area Potentially Impacted by Former Skeet Range

Figure 4 – Previous Sample Locations and Aerial Photograph Features

Figure 5 – Soil Analytical Results at Former Skeet Range

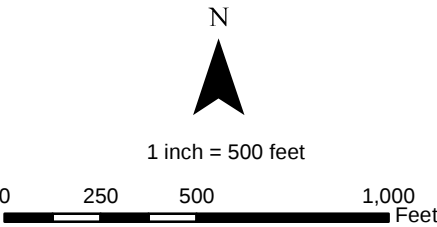
Figure 6 – Sediment Lead Concentrations Near Former Skeet Range

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LEGEND:

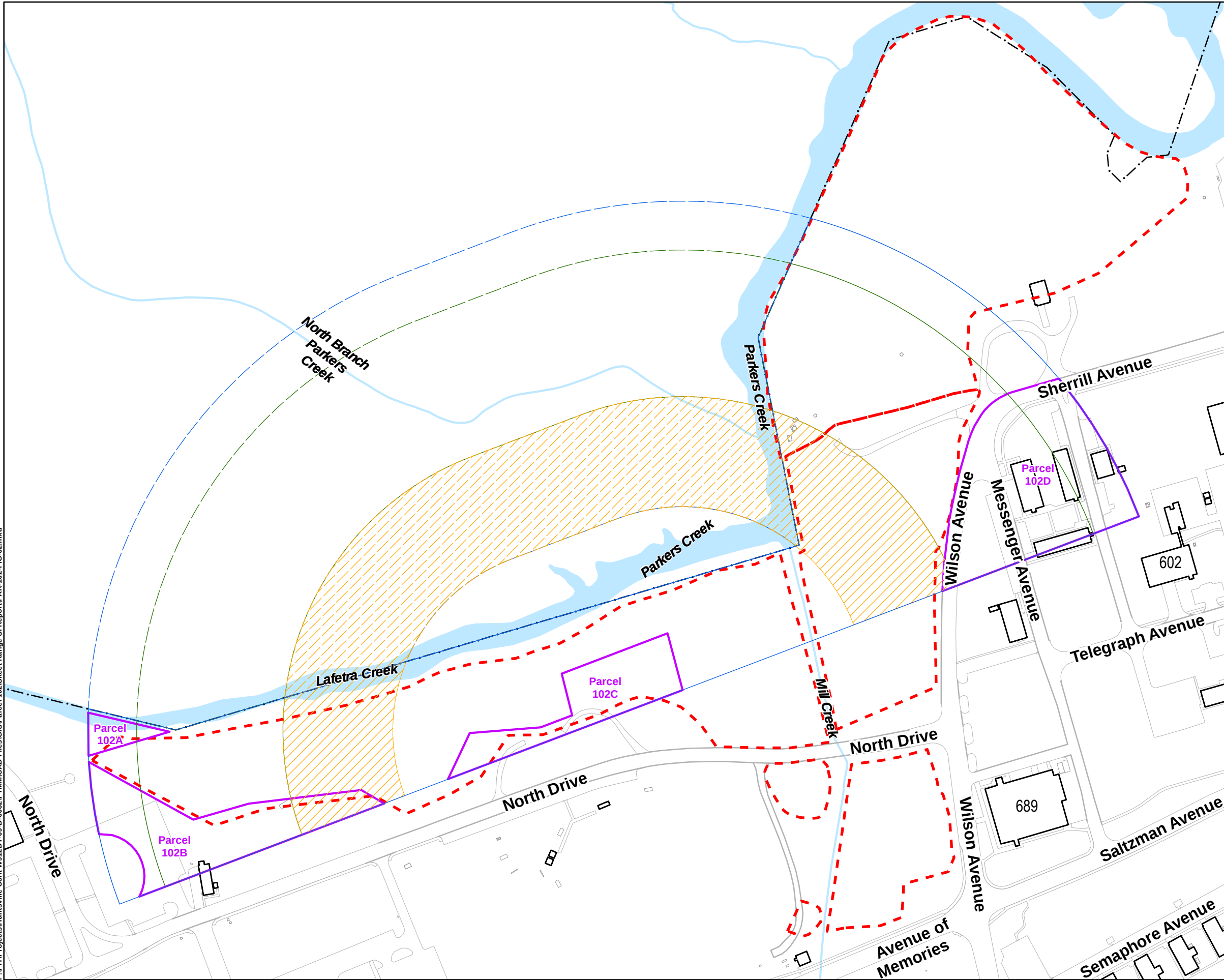
- Landfill Boundary
- Installation Boundary
- Munitions Areas Requiring Further Investigation



Source: FTMM Supplied CAD; ESRI Data and Maps 2011;
USGS NHD., 2006 Final Historical Records Review

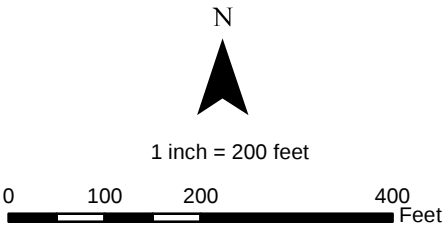
PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
SMALL ARMS FIRING RANGE LOCATIONS	
CREATED BY: RR	REVIEWED BY: KF
DATE: OCT. 2017	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-06031	FILE: PAR-102-FIG-01.mxd

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LEGEND:

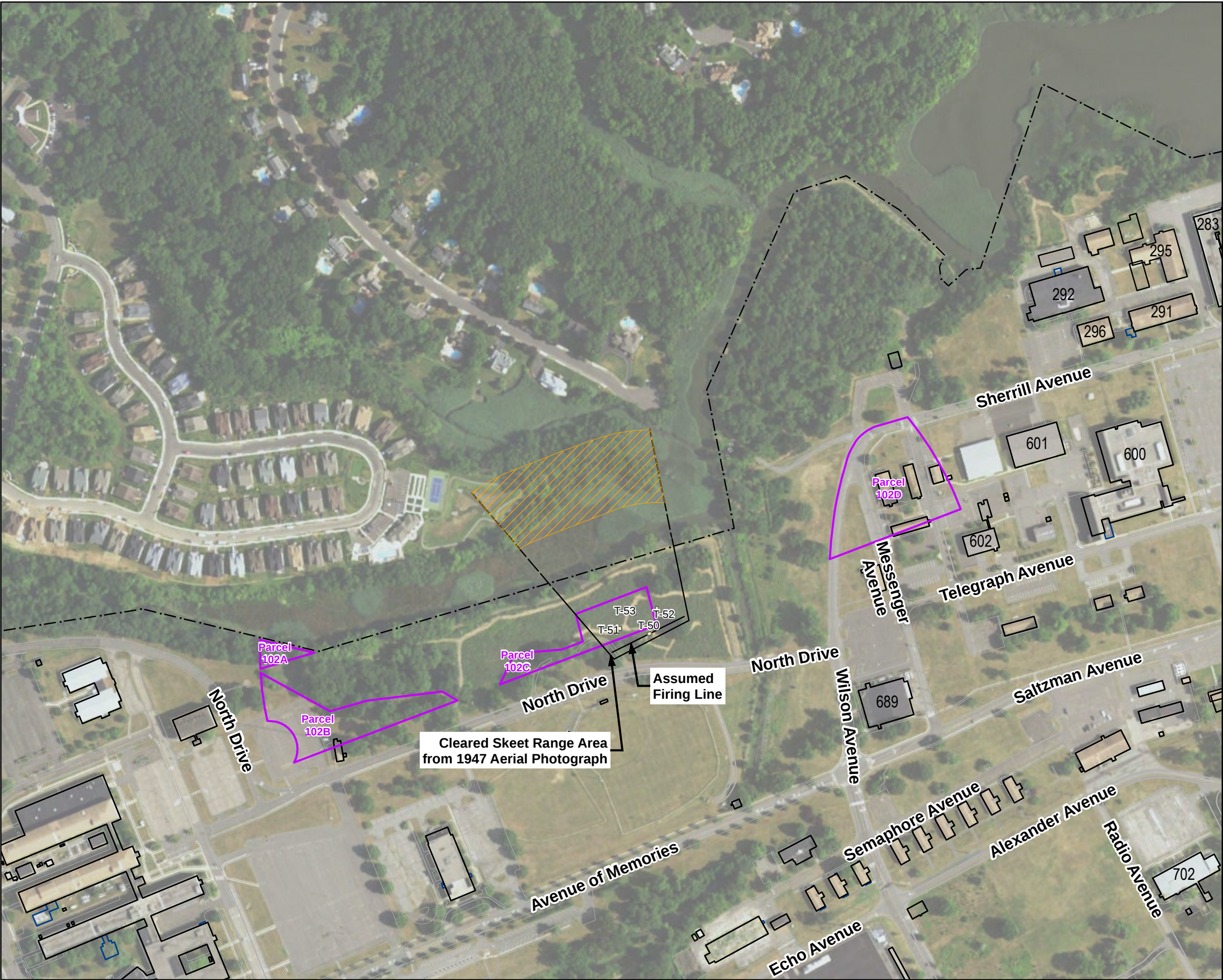
- Surface Water Feature
- Landfill Boundary
- Installation Boundary
- Parcel 102
- Area of Maximum Shot fall
- Standard Army Skeet Range
- Surficial Danger Zone (SDZ) from 2006 Historical Records Review



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

PARSONS 401 Diamond Drive NW, Huntsville AL		Fort Monmouth New Jersey	
FORMER SKEET RANGE LAYOUT			
CREATED BY: RR		REVIEWED BY: KF	
DATE: OCT. 2017		FIGURE NUMBER: FIGURE 2	
PROJECT NUMBER: 748810-02011		FILE: PAR-102-FIG-02.mxd	

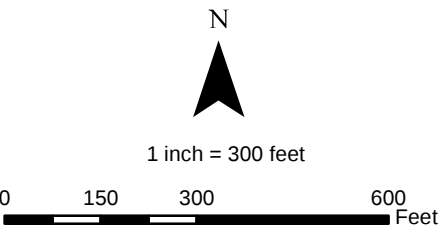
P:\PTT\Projects\Huntsville Cont W912\DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 102\Skeet Range SI Report\PAR-102-FIG-03.mxd



LEGEND:

- [---] Installation Boundary
- Parcel 102
- Area of Maximum Shot fall

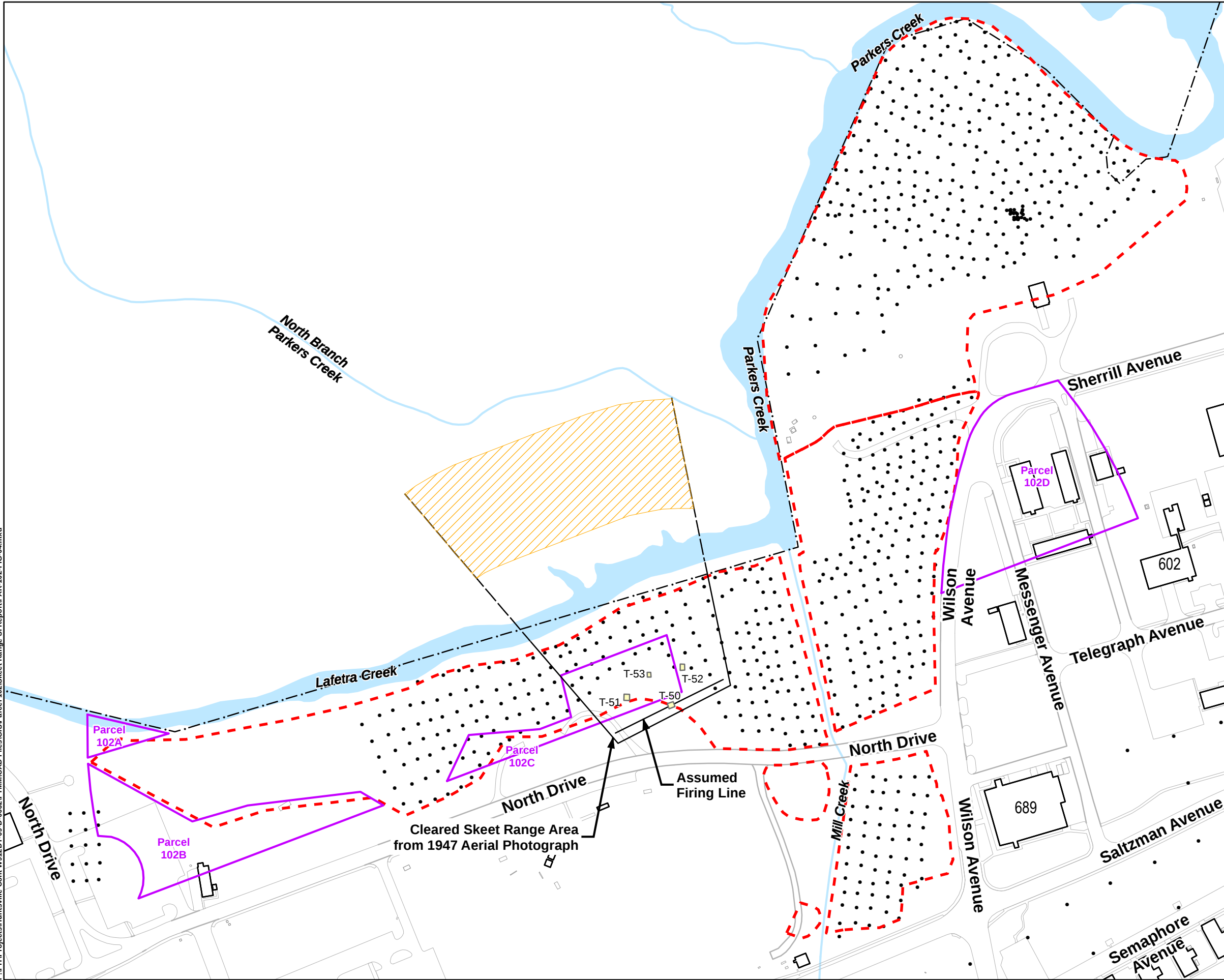
Imagery Source Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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

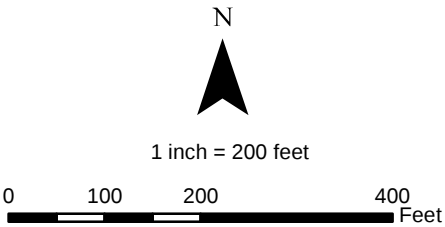
PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
AREA POTENTIALLY IMPACTED BY FORMER SKEET RANGE	
CREATED BY: RR	REVIEWED BY: KF
DATE: OCT. 2017	FIGURE NUMBER: FIGURE 3
PROJECT NUMBER: 748810-02011	FILE: PAR-102-FIG-03.mxd

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LEGEND:

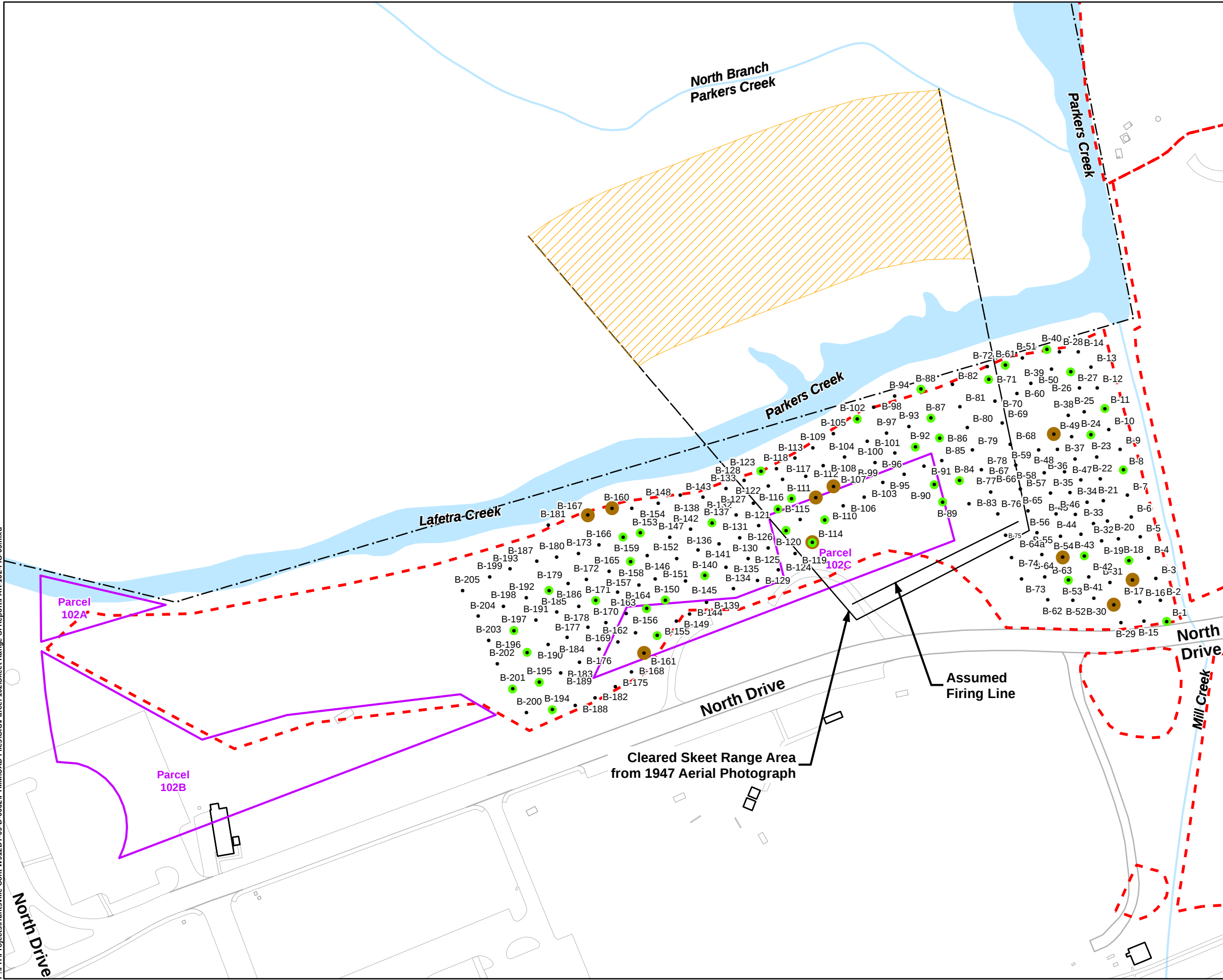
- Soil Boring Location
- Surface Water Feature
- - - Landfill Boundary
- - - Installation Boundary
- Parcel 102
- Area of Maximum Shot fall



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

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
PREVIOUS SAMPLE LOCATIONS AND AERIAL PHOTOGRAPH FEATURES	
CREATED BY: RR	REVIEWED BY: KF
DATE: OCT. 2017	FIGURE NUMBER: FIGURE 4
PROJECT NUMBER: 748810-02011	FILE: PAR-102-FIG-04.mxd

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LEGEND:

- Soil Boring Location
- Exceeds RDCSRS for PAHs
- Exceeds RDCSRS for Lead
- Surface Water Feature
- - - Landfill Boundary
- - - Installation Boundary
- ▭ Parcel 102
- ▨ Area of Maximum Shot fall



1 inch = 130 feet

0 65 130 260 Feet

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

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

**SOIL ANALYTICAL RESULTS
AT FORMER SKEET RANGE**

CREATED BY:
RR

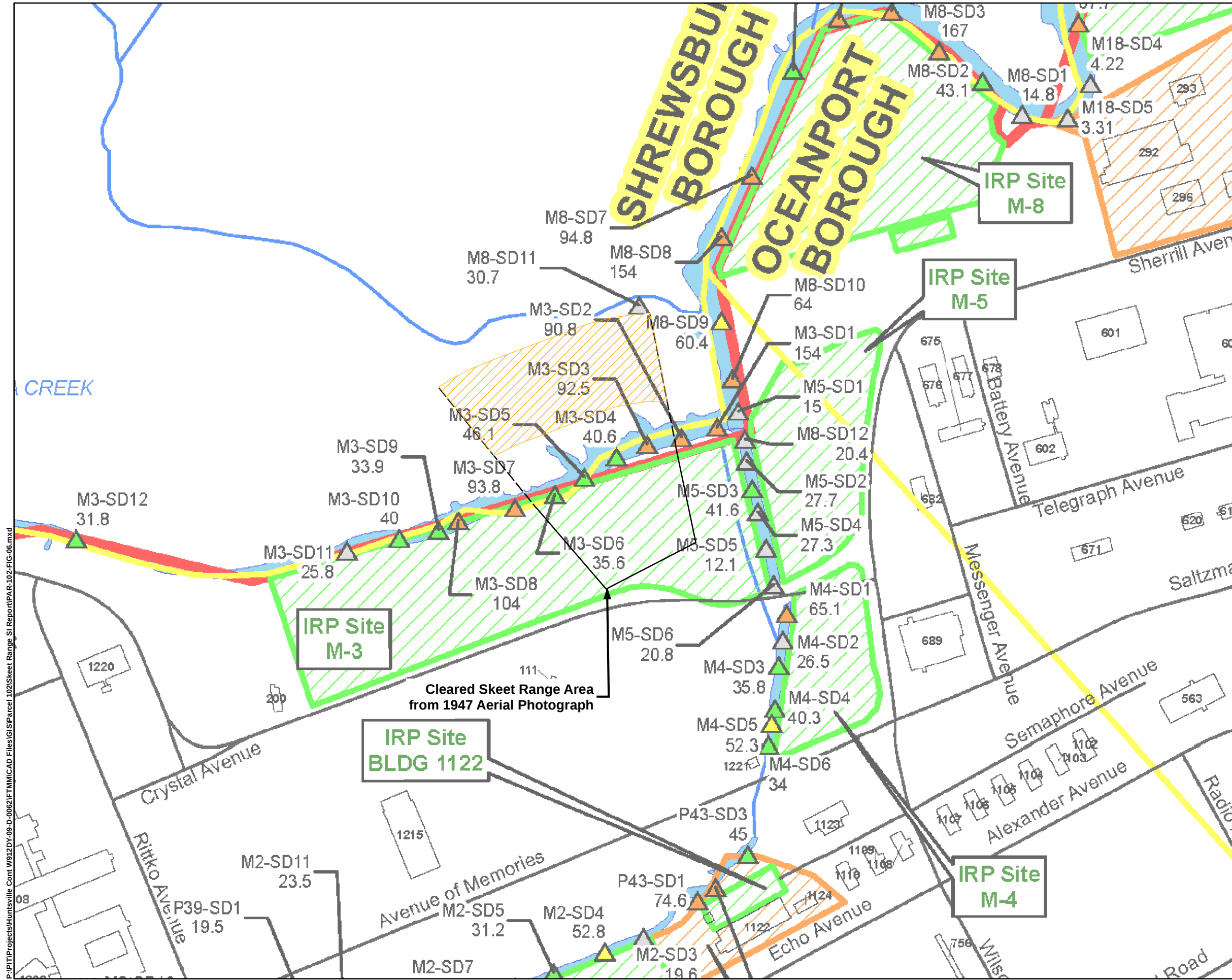
REVIEWED BY:
KF

DATE:
OCT. 2017

FIGURE NUMBER:
FIGURE 5

PROJECT NUMBER:
748810-02011

FILE:
PAR-102-FIG-05.mxd



Source: Figure 5.3 of Fort Monmouth Baseline Ecological Evaluation Report (Shaw, 2012)

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

**SEDIMENT LEAD CONCENTRATIONS
NEAR FORMER SKEET RANGE**

CREATED BY: RR
DATE: OCT. 2017
PROJECT NUMBER: 748810-06031

REVIEWED BY: KF
FIGURE NUMBER: FIGURE 6
FILE: PAR-102-FIG-06.mxd

1 inch = 250 feet

0 125 250 500 Feet

Attachment A
Excerpt of Previous Report

**FINAL
HISTORICAL RECORDS REVIEW
FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY**

JANUARY 2006

Prepared for:

UNITED STATES ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
P.O. Box 1715
Baltimore, Maryland 21203-1715

Prepared by:

MALCOLM PIRNIE, INC.
824 Market Street
Suite 820
Wilmington, Delaware 19801

recommended for groundwater and surface water, this area will not be discussed further in this HRR.

4.4.4 Former Skeet Range (MP)

The Former Skeet Range was located east of the Former Outdoor Firing Range (1940-1955 Pistol Range) and was used during the same time period (FTMM017 and FTMM024). The Former Skeet Range and four trap houses (Buildings T-50 – T-53) were identified on a 1941 map (FTMM017). Figure 4-24 depicts a portion of this map that presents the location and layout of the Former Skeet Range. According to AR 750-

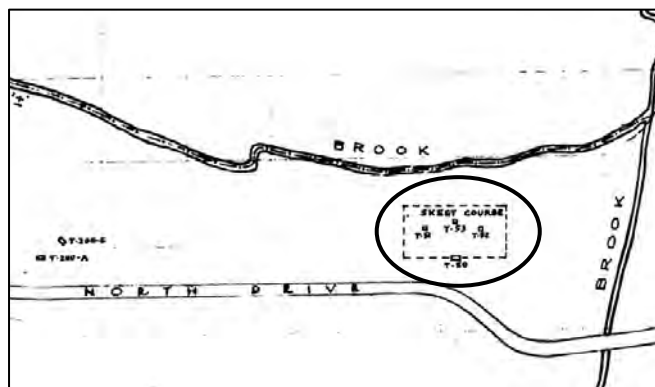


Figure 4-24: Former Skeet Range (FTMM017)

10 and TM 9-855, the typical shooting field (i.e., firing arc) for a skeet range (shotgun range) was historically laid out as a 63-foot radius semi-circle with concrete/asphalt walkways. According to AR 750-10 and TM 9-855, the SDZ (which includes the downrange hazard area and safety fan) historically consisted of a semi-circle with a 900-foot radius that utilized the same apex as the shooting field. Figure 4-25 depicts a typical SDZ for a skeet range (shotgun range). According to AR 750-10 and TM 9-855, for a single field range, the acreage of the SDZ was historically approximately 30 acres. The actual size of the Former Skeet Range at FTMM is approximately 41.2 acres, which encompasses the firing arc, target area, and impact area (Map 4-2) where the lead shot and broken clay targets would most likely be found. The acreage for the Former Skeet Range was based on a 1941 map that depicted the layout of the range (FTMM017). Map 4-2 depicts the dimensions of the Former Skeet Range, along with the typical SDZ for a skeet range (shotgun range).

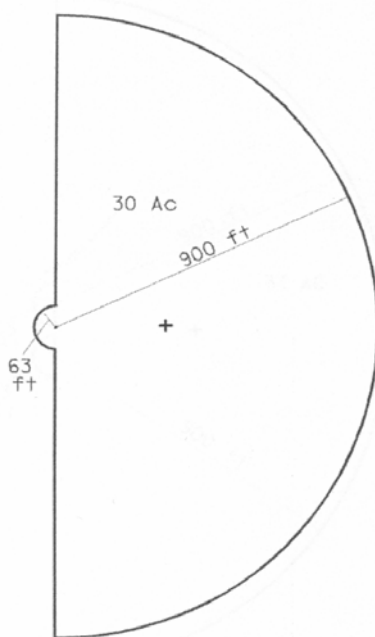
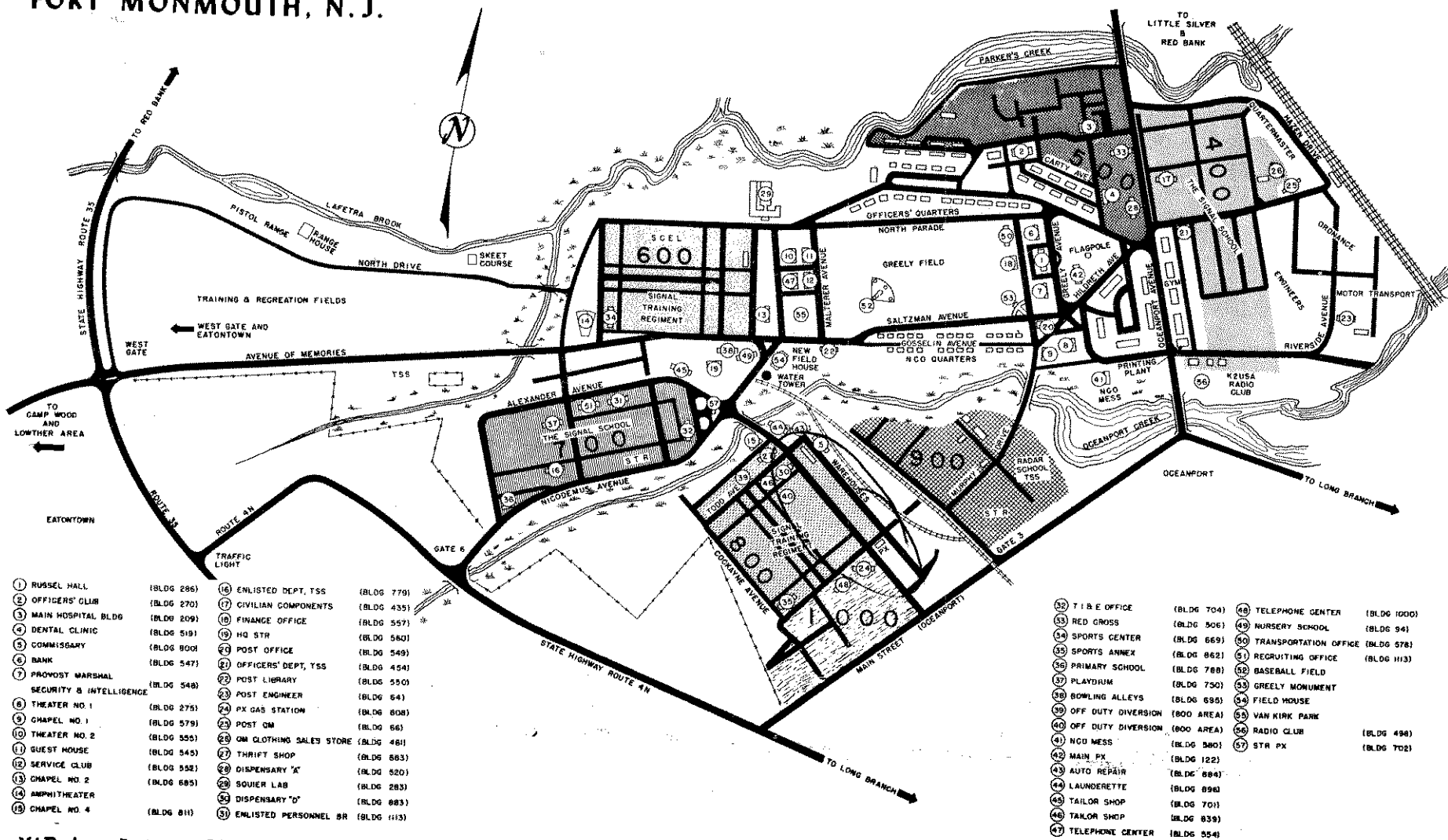


Figure 4-25: Typical SDZ for a single field shotgun range (AR 750-10 and TM 9-855)

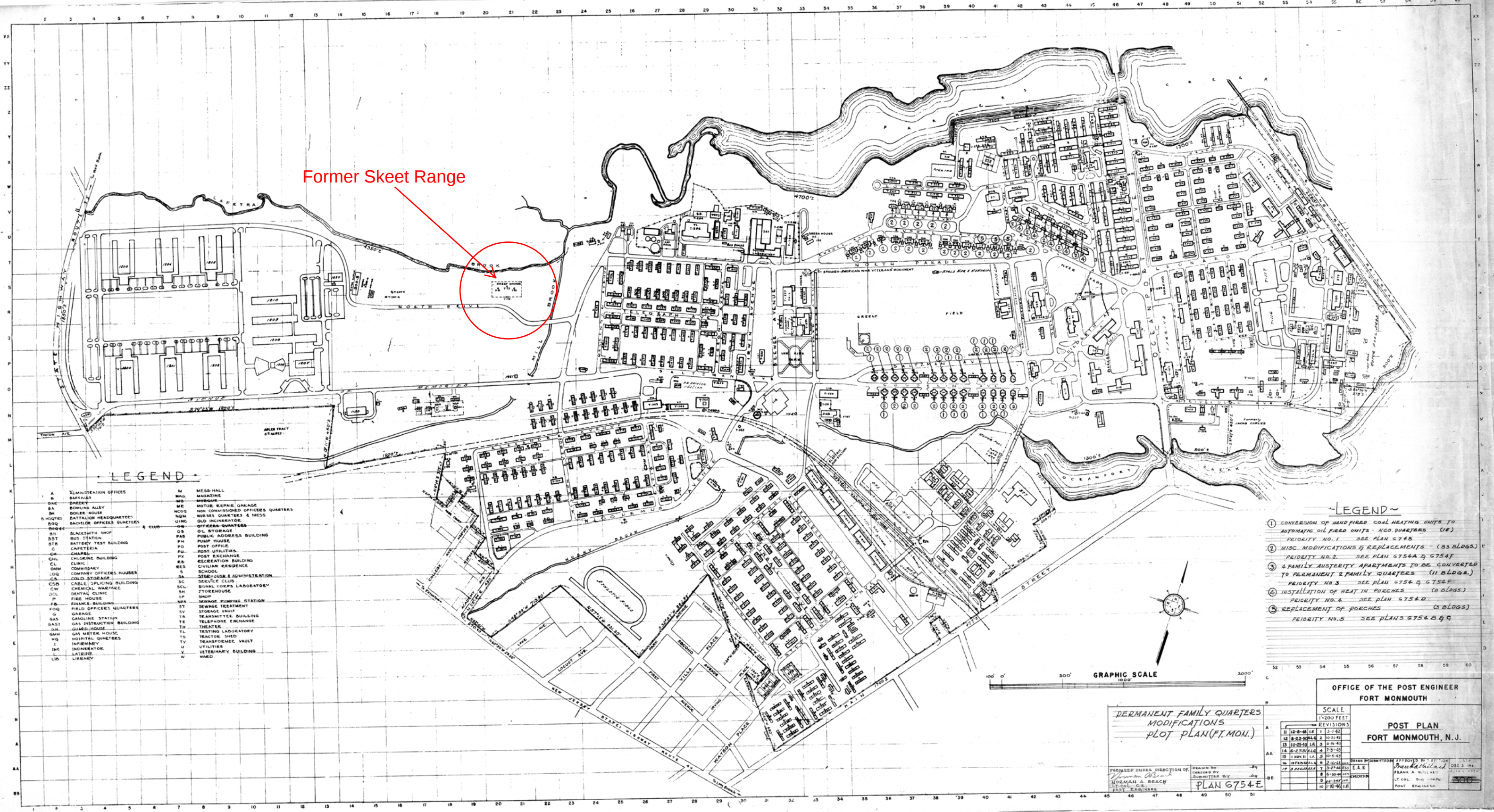
Based on historical documents and information obtained during the data collection process, munitions usage at the Former Skeet Range is assumed to be limited to small arms (FTMM013, FTMM014, FTMM016, FTMM018 through FTMM023). The primary MC of concern is lead. Other MC of concern include antimony, arsenic, nickel, and lead styphnate/leads azide. It is assumed that clay targets were used in conjunction with the Former Skeet Range; therefore, polycyclic aromatic hydrocarbons (PAHs) associated with the targets may also be present (PAHs are a component used to manufacture clay targets) (FTMM033). The concentration of PAHs in clay targets varies from one manufacturer to the next, but may be as high as 1000 milligrams/kilogram (FTMM033). However, existing studies show that PAHs are bound within the limestone matrix of the target and are, therefore, not bioavailable (this statement is site-specific and may not hold true for the Former Skeet Range) (FTMM033). A CSM for the Former Skeet Range is presented in Section 5.3.

FORT MONMOUTH, N.J.



MAP A - 1 June 1950

Attachment B
Historical Drawings



Former Skeet Range

LEGEND

- | | | | |
|------|-----------------------------|-----|------------------------------------|
| A | ADMINISTRATION OFFICES | M | MESS HALL |
| B | BARBERS | MA | MAGAZINE |
| BA | BOWLING ALLEY | MO | MOTOR |
| BM | BOILER HOUSE | ME | MOTOR, REPAIR, GARAGE |
| BHQ | BATTALION HEADQUARTERS | MCQ | NON COMMISSIONED OFFICERS QUARTERS |
| BQ | BATTALION OFFICERS QUARTERS | NQ | NURSES QUARTERS & MESS |
| BO | BLACKSMITH SHOP | Q | OLD INCINERATOR |
| BS | BUS STATION | Q | OFFICERS QUARTERS |
| BT | BATTERY TEST BUILDING | PA | PUBLIC ADDRESS BUILDING |
| C | CAPTAIN'S | PH | PUMP HOUSE |
| CH | CHAPEL | PO | POST OFFICE |
| CHL | CHILDREN'S BUILDING | PU | POST UTILITIES |
| CL | CLINIC | PE | POST EXCHANGE |
| CM | COMMISSARY | RE | RECREATION BUILDING |
| CO | COMPANY OFFICERS HOUSES | RES | CIVILIAN RESIDENCE |
| CS | COLD STORAGE | S | SCHOOL |
| CSB | CABLE (SPlicing) BUILDING | SA | STOREHOUSE & ADMINISTRATION |
| CW | CHEMICAL WAREHOUSE | SC | SERVICE CLUB |
| DCL | DENTAL CLINIC | SCL | SIGNAL CORPS LABORATORY |
| F | FIRE HOUSE | SH | STOREHOUSE |
| FB | FINANCE BUILDING | SP | SHIP |
| FOQ | FIELD OFFICERS QUARTERS | SPS | SEWAGE PUMPING STATION |
| G | GARAGE | ST | SEWAGE TREATMENT |
| GAS | GASOLINE STATION | SV | STORAGE VAULT |
| GAS1 | GAS INSTRUCTION BUILDING | TD | TELETYPE BUILDING |
| GM | GUNHOUSE | TE | TELEPHONE EXCHANGE |
| GMH | GAS METER HOUSE | TL | TESTING LABORATORY |
| HQ | HOSPITAL QUARTERS | TS | TRANSFORMER VAULT |
| I | INFIRMARY | TV | UTILITIES |
| INC | INCINERATOR | U | UTILITIES |
| L | LATRINE | V | VETERINARY BUILDING |
| LID | LIBRARY | W | WAREHOUSE |

LEGEND

- CONVERSION OF HAND FIRED COAL HEATING UNITS TO AUTOMATIC OIL FIRED UNITS - NCO QUARTERS (16) PRIORITY NO. 1 SEE PLAN G74B
- MISC. MODIFICATIONS & REPLACEMENTS (83 BLDGS.) PRIORITY NO. 2 SEE PLAN G754A & G754F
- 4 FAMILY AUSTERITY APARTMENTS TO BE CONVERTED TO PERMANENT 2 FAMILY QUARTERS (11 BLDGS.) PRIORITY NO. 3 SEE PLAN G754 & G754F
- INSTALLATION OF HEAT IN PORCHES (3 BLDGS.) PRIORITY NO. 4 SEE PLAN G754D
- REPLACEMENT OF PORCHES (3 BLDGS.) PRIORITY NO. 5 SEE PLANS G754B & C

GRAPHIC SCALE

PERMANENT FAMILY QUARTERS
MODIFICATIONS
PLOT PLAN (FT. MON.)

PREPARED UNDER DIRECTION OF
NORMAN A. BEACH
ST. COL. U.S. ARMY
POST ENGINEER

PLAN G754E

OFFICE OF THE POST ENGINEER
FORT MONMOUTH

POST PLAN
FORT MONMOUTH, N. J.

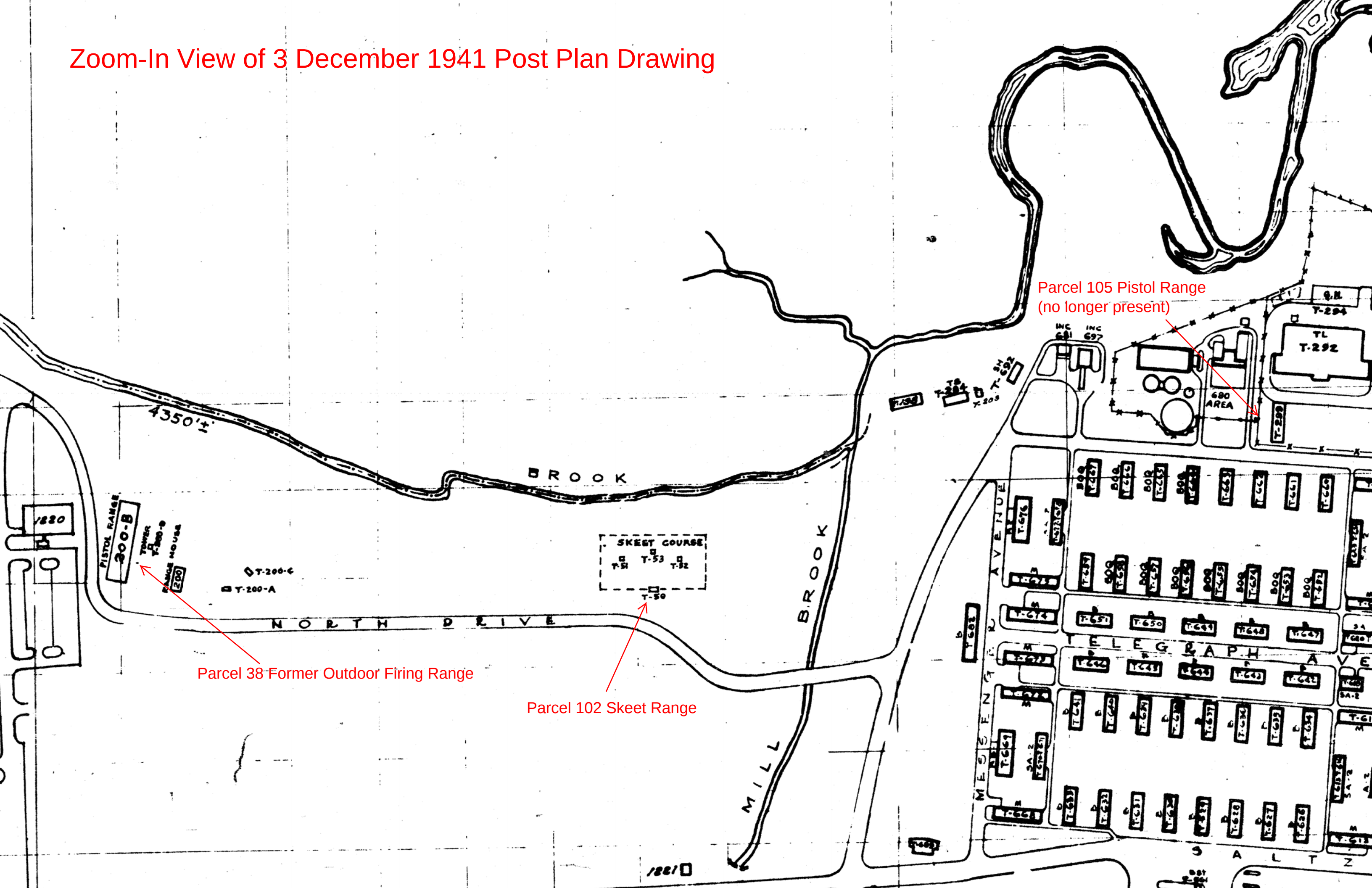
SCALE		REVISIONS	
200 FEET			
A	1	10-8-40	1-3-40
	2	8-22-40	10-22-40
	3	10-25-40	6-16-41
	4	6-27-41	7-31-41
	5	1 NOV 41	10-5-41
AA	6	2-24-42	
	7	3-27-42	
BB	8	1-10-45	
	9	1-10-45	

POST PLAN	
FORT MONMOUTH, N.J.	
</	

APPROVED BY
FRANK A. WILLARD
ST. COL. U.S. ARMY
POST ENGINEER

DEC 3 1941

Zoom-In View of 3 December 1941 Post Plan Drawing



Attachment C
Historical Aerial Photographs

FTMM-3 in 1947

Source (Date): USDA (1947-07-03 - 1947-10-20)

Obtained from <http://www.historicaerials.com>

Stand of trees; no
landfill present

Lafetra Creek

Tree line which will
disappear in later
years

Lafetra Creek

Trap houses T-51,
T-52 and T-53

Cleared area is
interpreted as the
Parcel 102 Skeet
Range

Cleared area is
interpreted as the
Parcel 38 Former
Outdoor Firing
Range

Ditching for
possible
drainage
improvements

North Drive



FTMM-3 in 1957
Source (Date): USDA (1957-05-01 - 1957-09-25)
Obtained from <http://www.historicaerials.com>

Landfill activities
have filled in area;
previous stands of
trees are gone.

Lafetra Creek

Line of trees gone

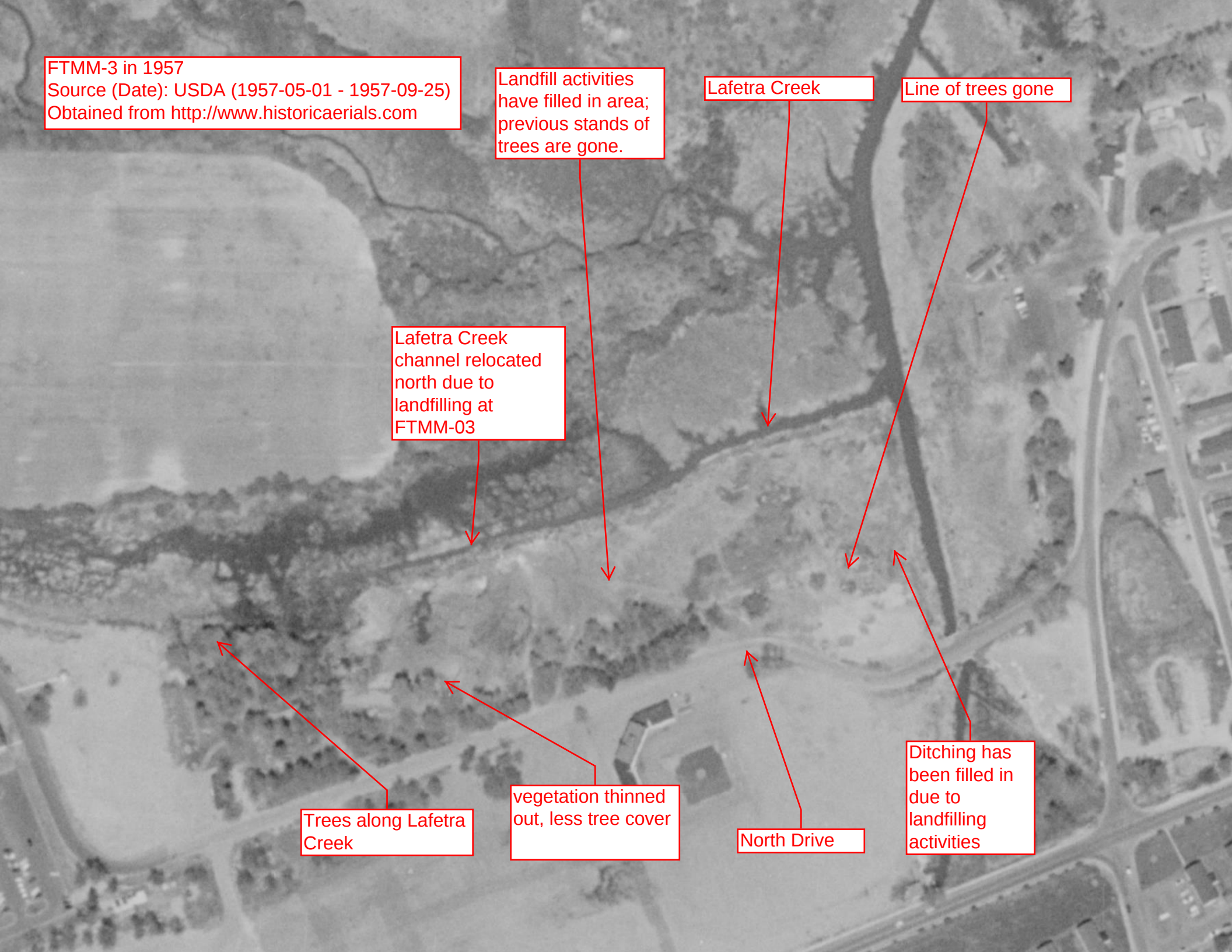
Lafetra Creek
channel relocated
north due to
landfilling at
FTMM-03

Trees along Lafetra
Creek

vegetation thinned
out, less tree cover

North Drive

Ditching has
been filled in
due to
landfilling
activities



FTMM-3 in 1963
Source (Date): USDA (1963-05-04 - 1963-08-16)
Obtained from <http://www.historicaerials.com>

Landfill activities at
FTMM-03 have
continued to filled in
area.

Lafetra Creek

Traces of trap
houses?

Tree line thinned
near Lafetra Creek,
remaining trees form
acute angle with
Lafetra Creek

land looks
reworked and filled

North Drive



FTMM-3 in 1969
Source (Date): USGS (1969-11-26 - 1969-12-13)
Obtained from <http://www.historicaerials.com>

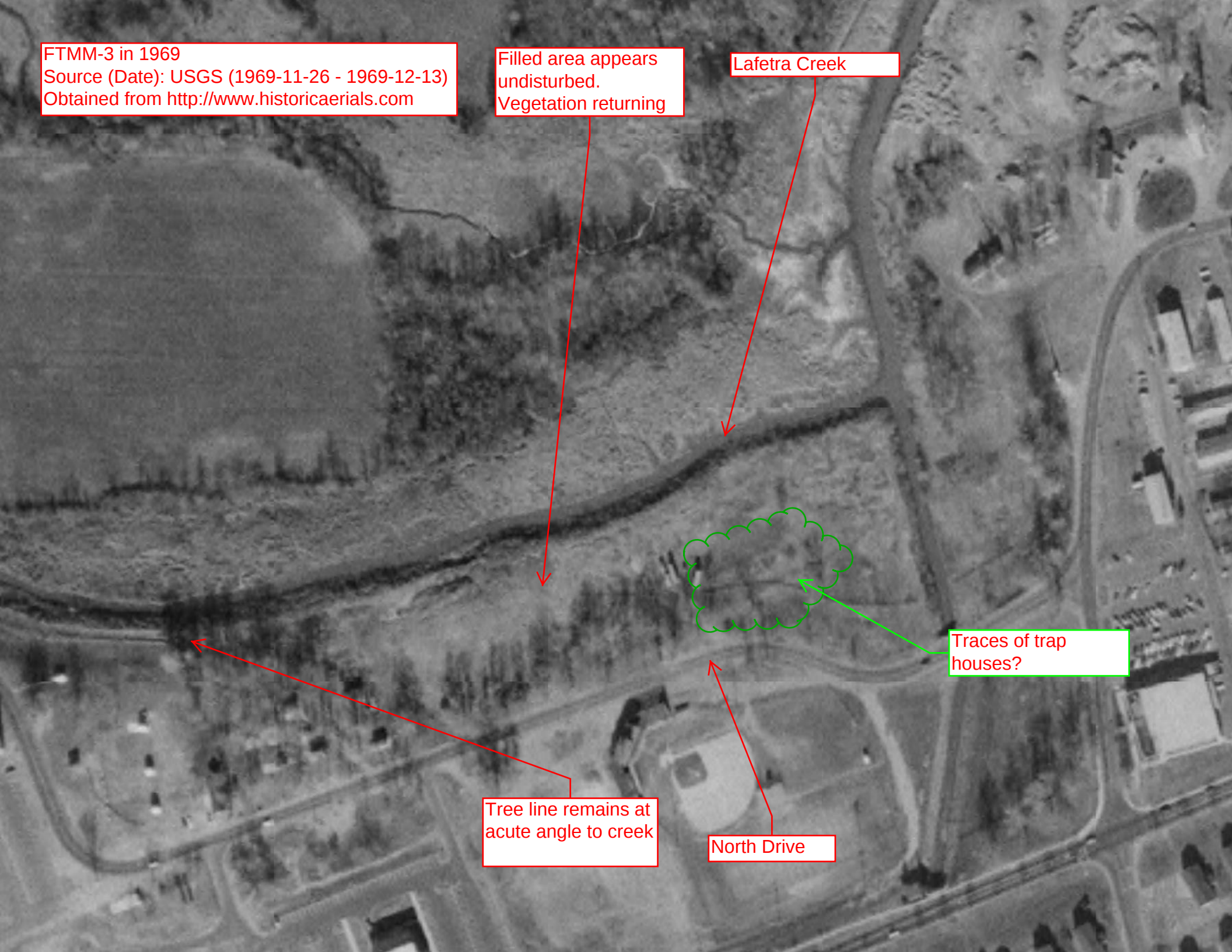
Filled area appears
undisturbed.
Vegetation returning

Lafetra Creek

Traces of trap
houses?

Tree line remains at
acute angle to creek

North Drive



Attachment D
FTMM-03 Soil Sampling Summary Results

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-03
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background ⁽³⁾ (Main Post)	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10	B-11	B-12	B-13	B-14	B-15	B-16	B-17
Sample Date					09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/29/98	09/30/98	
METALS (mg/kg)																					
Aluminum	78000	NA	6000	15200	7700	9100	10300	2700	5190	3590	1940	9660	2900	4560	4710	1140	8050	8920	14500	12300	12700
Antimony	31	450	6	ND	1.25	1.27	1.23	< 0.221	< 0.22	0.82	1.13	0.255	0.618	< 0.247	< 0.242	< 0.199	< 0.23	1.11	0.749	0.577	1.4
Arsenic	19	19	19	22.9	10.5	16	16.3	6.07	6.33	20.3	18.4	7.27	2	3.14	4.25	2.35	6.21	14.9	18.5	14.1	18.4
Barium	16000	59000	2100	32.3	40.4	49	28.7	119	141	63.1	29.8	31.7	32.6	30.7	32.2	22.4	81.7	25.3	18	24.7	60
Beryllium	16	140	0.7	2	1.27	1.17	1.1	0.594	0.716	0.515	0.416	0.685	0.355	0.498	0.811	0.166	0.791	1.05	0.828	0.731	1.06
Cadmium	78	78	2	ND	0.173	0.277	0.125	0.0827	0.495	0.265	0.128	0.127	< 0.051	0.304	0.249	0.158	< 0.057	< 0.052	< 0.052	0.146	0.824
Calcium	NLE	NLE	NLE	921	766	738	1050	1530	2020	1380	464	876	751	325	449	586	604	122	845	799	1360
Chromium	NLE	NLE	NLE	269	85	104	106	8.15	10.5	30.4	9.25	49.3	10.8	17.9	14.8	3.16	19.5	103	93.2	81.8	125
Cobalt	1600	590	90	2.5	3.15	1.99	1.07	1.62	2.7	2.76	2.9	2.09	3.32	2.98	4.73	1.68	5.15	1.27	1.04	1.07	1.46
Copper	3100	45000	11000	8	24.2	76.9	51.6	16.7	12.2	63.6	37.7	19.3	26	46.4	58.5	10.6	97	33.6	16.2	22.8	160
Iron	NLE	NLE	NLE	55800	27200	25100	25900	5850	8180	21800	12000	16400	4230	5470	3260	1330	6450	28100	25000	24400	26500
Lead	400	800	90	19.5	35.6	89.5	106	5.72	5.29	49	37.1	36.9	355	42.9	35.2	6.89	31.9	40	13.5	28.6	471
Magnesium	NLE	NLE	NLE	7230	3130	3100	3400	253	273	945	165	1860	196	620	213	87.8	418	3580	3170	2870	3740
Manganese	11000	5900	65	90.7	17.8	136	63.6	14.6	14.2	31.1	31.3	73.5	11.6	22.4	8.06	8.88	19.3	30	45.4	41.5	224
Mercury	23	65	0.1	ND	0.108	0.157	0.091	0.557	0.487	0.027	0.064	0.065	0.085	0.035	0.282	0.028	0.045	0.109	0.022	< 0.011	0.159
Nickel	1600	23000	48	8.4	8.28	5.75	5.4	4.77	7.53	12.4	10.6	6.66	9.7	10.1	14.8	4.35	16.8	4.65	4.38	4.43	7.89
Potassium	NLE	NLE	NLE	15400	6860	5880	6320	641	564	2500	412	5190	468	1560	731	129	1350	7680	4880	4150	6700
Selenium	390	5700	11	1.9	< 0.368	< 0.344	< 0.312	< 0.332	< 0.33	4.72	10.7	< 0.280	0.32	< 0.371	1.29	< 0.299	1.46	< 0.315	< 0.309	< 0.348	< 0.316
Silver	390	5700	1	1.1	< 0.368	< 0.344	< 0.312	< 0.332	< 0.33	< 0.329	< 0.342	< 0.28	< 0.303	< 0.371	< 0.362	< 0.299	< 0.345	< 0.315	< 0.309	< 0.348	< 0.316
Sodium	NLE	NLE	NLE	51.6	114	68.4	77.8	111	160	119	65.6	160	161	127	129	71.9	287	121	76.4	68.5	105
Thallium	5	79	3	ND	< 0.368	< 0.344	< 0.312	< 0.332	< 0.33	< 0.329	< 0.342	< 0.28	< 0.303	< 0.371	< 0.362	< 0.299	< 0.345	< 0.315	< 0.309	< 0.348	< 0.316
Vanadium	78	1100	NA	94.1	35.1	34.5	41.4	12.4	13.9	19.2	14.5	34.5	13.9	17.9	18.1	5.7	24.8	43.2	51.5	45.3	53.4
Zinc	23000	110000	930	81.4	115	172	82.8	12.4	14.2	48.7	26	58.2	417	31.8	21.7	12.2	25.6	40.8	63.3	79.9	481

Notes:

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Sample Date					09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	09/30/98	10/21/98	09/30/98	09/30/98	10/19/98	10/19/98	10/19/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	9080	8020	8140	11300	2480	4110	3010	4340	2340	5000	6680	14600	14300	11400	15100	9790	8360	2220
Antimony	31	450	6	ND	0.838	1.24	1.23	1.6	< 0.235	< 0.221	0.645	< 0.233	0.611	0.363	0.866	1.15	1.26	1.52	3.29	1.36	1.09	< 0.23
Arsenic	19	19	19	22.9	18.8	17.8	18.3	21.2	2.8	3.23	3.73	4.7	7.96	7.26	7.52	13.1	20.6	20.2	551	21.6	12.5	4.19
Barium	16000	59000	2100	32.3	54.9	44.5	28.7	27.9	27.5	41.5	65.4	56.8	85.5	40.2	62.8	114	40.7	202	35.3	50.2	53.3	21.2
Beryllium	16	140	0.7	2	0.834	0.748	0.9	1.33	0.424	0.509	0.487	0.711	0.315	0.698	1.12	1.07	1.21	0.899	1.67	1.03	1.19	0.41
Cadmium	78	78	2	ND	0.395	0.405	0.253	0.364	0.114	0.205	0.166	0.54	0.656	0.209	0.0998	0.931	0.302	1.71	0.728	0.366	0.286	0.0583
Calcium	NLE	NLE	NLE	921	1350	1710	1770	1760	562	1320	1110	1110	657	1310	2360	22300	1830	2070	1340	1500	1940	681
Chromium	NLE	NLE	NLE	269	91.4	78.2	89.9	139	7.64	7.51	5.09	11	24.8	27.7	62.5	73.2	125	99.8	198	108	84.4	8.96
Cobalt	1600	590	90	2.5	1.2	0.767	1.2	1.12	4.85	3.27	2.12	3.93	1.86	3.59	3.67	3.48	1.56	6.02	0.659	1.19	1.96	2.97
Copper	3100	45000	11000	8	126	53.8	40.9	46.5	24.4	24.6	17.2	35.9	47.8	31.3	52.5	25.7	50.4	235	436	56.2	28	18
Iron	NLE	NLE	NLE	55800	21800	20300	21700	30200	3090	2810	3720	4900	4790	11500	20700	26700	35500	45100	66400	23500	30500	3350
Lead	400	800	90	19.5	206	114	78.8	77.6	5.63	23.7	122	41.1	70.8	66.8	24.9	52.8	71	961	145	89.2	46.2	20.3
Magnesium	NLE	NLE	NLE	7230	2660	2280	2750	4420	189	301	155	265	396	1140	2480	3840	4170	2850	4930	3090	3100	221
Manganese	11000	5900	65	90.7	140	50.7	79.8	84	25.6	17.5	12.3	34.5	11.3	25.7	40.8	138	97.8	489	159	112	121	12.2
Mercury	23	65	0.1	ND	0.07	0.089	0.048	< 0.012	< 0.011	0.044	0.069	0.562	2.043	0.12	0.033	0.27	< 0.012	< 0.012	< 0.011	0.059	0.091	0.018
Nickel	1600	23000	48	8.4	5.66	4.77	5.61	6.17	14.7	10.3	8.91	13.1	6.97	10.6	10.8	11.4	7.62	25.7	6.43	5.83	8.61	10.2
Potassium	NLE	NLE	NLE	15400	4490	5720	4780	8120	338	683	311	787	891	3080	6330	6420	7290	4600	9730	8340	6530	512
Selenium	390	5700	11	1.9	< 0.323	< 0.347	< 0.328	< 0.337	0.61	0.741	0.446	0.794	0.827	0.892	< 0.326	< 0.268	< 0.366	< 0.329	< 0.328	< 0.364	< 0.354	0.489
Silver	390	5700	1	1.1	< 0.323	0.426	< 0.328	< 0.337	< 0.352	< 0.332	< 0.331	0.8	2.75	< 0.331	< 0.326	< 0.268	< 0.366	0.785	< 0.328	< 0.364	< 0.354	< 0.346
Sodium	NLE	NLE	NLE	51.6	84.2	53.7	89.4	106	120	121	88.6	167	105	228	174	388	116	151	87.1	93.6	97.2	107
Thallium	5	79	3	ND	< 0.323	< 0.347	< 0.328	< 0.337	< 0.352	< 0.332	< 0.331	< 0.35	< 0.327	< 0.331	< 0.326	< 0.268	< 0.366	< 0.329	< 0.328	< 0.364	< 0.354	< 0.346
Vanadium	78	1100	NA	94.1	31.1	28.4	3.06	46.7	15.5	16.5	12.1	18.4	10.8	30	20.8	42.8	58	39.8	69.7	33.7	33	17.6
Zinc	23000	110000	930	81.4	311	280	130	149	6.58	46.2	24.8	67.4	26.2	56	119	180	202	752	378	173	111	13.3

Notes:

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Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-35	B-36	B-37	B-38	B-39	B-40	B-41	B-42	B-43	B-44	B-45	B-46	B-46 Dup	B-47	B-48	B-49	B-50	B-51
Sample Date					10/19/98	10/19/98	10/19/98	10/19/98	10/19/98	10/19/98	10/19/98	10/19/98	10/19/98	10/19/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	4220	3440	2060	5980	12500	7750	8800	12600	6790	9660	8540	13200	12900	2640	2820	2310	12800	8490
Antimony	31	450	6	ND	< 0.225	< 0.233	< 0.206	< 0.231	2.13	1.08	1	1.59	0.634	1.14	1.28	2.04	1.85	< 0.198	< 0.247	1.14	1.42	0.569
Arsenic	19	19	19	22.9	2.67	3.73	5.76	4.43	9.43	18	14.6	19.4	8.97	13	13.7	23.3	22	1.95	3.81	3.44	26.8	9.32
Barium	16000	59000	2100	32.3	30.3	71.3	53.8	42.1	39.1	26.3	41.4	43.5	45.6	42.1	37.9	49.6	38.2	23.2	17.6	311	32.9	59.6
Beryllium	16	140	0.7	2	0.55	0.415	0.456	0.873	2.17	0.795	0.847	1.36	0.676	1.21	1.18	1.65	1.61	0.307	0.921	0.498	1.31	0.919
Cadmium	78	78	2	ND	< 0.056	0.164	0.107	0.14	0.126	0.99	0.26	0.233	0.298	0.199	0.148	0.14	0.164	0.588	0.065	9.73	0.337	0.597
Calcium	NLE	NLE	NLE	921	457	1340	1330	970	2390	125	1440	1430	1390	2250	1600	2930	2600	1600	515	1080	13380	14000
Chromium	NLE	NLE	NLE	269	18.4	4.4	4.53	19.8	152	91.9	71.7	132	48.7	84	88.8	163	156	5.22	10.4	101	139	58
Cobalt	1600	590	90	2.5	3.92	2.18	3.1	4.52	2.96	0.789	1.64	1.58	1.94	1.9	1.76	2.26	1.99	3.56	3.08	3.72	1.26	2.98
Copper	3100	45000	11000	8	18.8	10.2	37.3	31.2	17.1	13.5	30.1	56.8	38.9	20.2	20.1	6.46	7.83	11.9	16.2	76.9	24	31.2
Iron	NLE	NLE	NLE	55800	4440	3070	2140	5080	48900	25600	22900	32000	20100	29100	29300	43500	43200	1580	2710	8290	29200	18200
Lead	400	800	90	19.5	17.9	8.91	12.6	25.6	59.7	53.2	80.2	76	44	42	44.7	13.8	9.05	17.5	6.6	560	38	113
Magnesium	NLE	NLE	NLE	7230	403	129	138	443	6130	2390	2440	4530	1490	3400	3200	5760	5490	197	248	722	4280	2870
Manganese	11000	5900	65	90.7	15.3	10.1	12.1	9.05	22.6	28.3	61.3	85.6	42.1	63.7	46	31.2	26.4	22	9.21	61.9	35.5	59.6
Mercury	23	65	0.1	ND	0.015	0.028	0.085	0.021	0.184	0.222	0.125	0.245	0.29	0.178	0.175	0.129	0.034	0.09	0.123	0.209	0.161	4.363
Nickel	1600	23000	48	8.4	12.2	6.05	8.22	16.1	10.9	4.4	6.2	6.89	6.77	7.68	6.95	9.21	8.31	11	8.94	17.5	6.44	10.5
Potassium	NLE	NLE	NLE	15400	1250	301	264	1700	16200	4840	6450	8710	3910	6200	6790	12400	11700	785	815	2290	8130	6690
Selenium	390	5700	11	1.9	0.743	0.526	0.537	1.26	< 0.384	< 0.352	< 0.339	< 0.296	< 0.316	< 0.354	< 0.342	< 0.367	< 0.31	0.332	0.934	0.362	0.676	< 0.356
Silver	390	5700	1	1.1	< 0.338	< 0.349	< 0.309	< 0.347	< 0.384	0.363	< 0.339	< 0.296	< 0.316	< 0.354	< 0.342	< 0.367	< 0.31	< 0.297	< 0.37	< 0.309	< 0.333	< 0.356
Sodium	NLE	NLE	NLE	51.6	183	161	98.1	227	122	67.4	81	115	121	172	96.1	111	130	154	135	124	97.7	196
Thallium	5	79	3	ND	< 0.338	< 0.349	< 0.309	< 0.347	< 0.384	< 0.352	< 0.339	< 0.296	< 0.316	< 0.354	< 0.342	< 0.367	< 0.31	< 0.297	< 0.37	< 0.309	0.743	< 0.356
Vanadium	78	1100	NA	94.1	20.2	12.8	10.1	27.2	19.9	30.6	31.4	54.3	27.6	36.2	32.4	32.4	30.5	6.22	13.9	14.7	59.9	32.4
Zinc	23000	110000	930	81.4	11.7	9.38	17.9	17.7	130	40.3	116	130	93	83.3	76.5	72.2	66.5	54.3	12.8	990	62.9	139

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DUP = field duplicate sample.

TABLE 4.1
SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-03
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-52	B-53	B-54	B-55	B-56	B-57	B-58	B-59	B-60	B-61	B-62	B-63	B-64	B-64 Dup	B-64A	B-65
Sample Date					10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/20/98	10/28/98	10/21/98	10/21/98
METALS (mg/kg)																				
Aluminum	78000	NA	6000	15200	15800	8020	13700	14300	7570	4010	7350	10600	8740	9600	15400	9050	8260	12900	7610	6880
Antimony	31	450	6	ND	1.84	0.792	1.26	1.06	0.297	0.446	0.655	1.61	1.45	1.27	1.06	1.32	1.23	1.85	0.858	0.982
Arsenic	19	19	19	22.9	18.7	15.3	19.4	20.4	7.35	92.8	8.46	13.9	12.2	21.8	19.7	9.14	8.92	22	12.7	21.5
Barium	16000	59000	2100	32.3	43	45.4	45.3	48.9	19.1	50	27.6	23.6	108	128	24.2	18.5	17.9	38.2	48.5	21.5
Beryllium	16	140	0.7	2	2.07	1	0.907	0.955	0.481	0.584	0.683	1.31	1.36	0.914	0.895	1.54	1.49	1.61	1.01	1.36
Cadmium	78	78	2	ND	0.197	0.253	0.346	0.148	0.115	0.165	0.265	0.132	0.48	0.291	0.289	0.587	0.537	0.164	0.317	0.258
Calcium	NLE	NLE	NLE	921	1540	1080	1500	1090	863	1160	1930	1480	3010	1680	1140	800	747	2600	1130	1230
Chromium	NLE	NLE	NLE	269	147	75.4	113	104	49	46.5	56.5	129	111	92.5	106	99.3	90.7	156	70.3	75.5
Cobalt	1600	590	90	2.5	2.69	1.35	1.33	0.781	0.938	1.01	2.08	1.23	2.87	1.16	0.825	1.59	1.5	1.99	1.58	1.23
Copper	3100	45000	11000	8	14.7	345	69.4	11.4	6.59	11.4	11.3	3.93	53.7	927	18.8	8.61	3.38	7.83	79	2.47
Iron	NLE	NLE	NLE	55800	57400	25100	24100	25500	15000	17200	16500	34200	32500	25900	23900	39800	36900	43200	22900	32800
Lead	400	800	90	19.5	32.3	237	535	17.4	5.59	3	12	7.83	106	276	17.8	5.97	5.44	9.05	109	5.44
Magnesium	NLE	NLE	NLE	7230	6280	2860	3320	3060	1370	35.9	1550	4600	4200	2700	3730	4200	3680	5490	2470	3220
Manganese	11000	5900	65	90.7	55.9	118	115	31.5	12.3	17.4	25.5	40.9	54.8	64.7	25.9	22.9	22	26.4	113	25.3
Mercury	23	65	0.1	ND	0.142	0.102	0.039	0.028	0.024	0.044	0.044	0.04	0.231	0.086	0.035	0.031	0.026	0.034	0.107	0.025
Nickel	1600	23000	48	8.4	10.1	5.57	5.7	5.32	5.24	5.13	6.66	5.98	11.7	5.6	3.89	7.08	6.72	8.31	5.28	5.77
Potassium	NLE	NLE	NLE	15400	15400	5810	5550	7620	3470	4580	4870	10200	9790	4800	5550	9460	8370	11700	4600	6550
Selenium	390	5700	11	1.9	< 0.344	< 0.361	0.342	0.623	< 0.352	0.723	< 0.342	< 0.337	< 0.332	< 0.344	< 0.344	< 0.328	< 0.334	< 0.31	< 0.292	< 0.34
Silver	390	5700	1	1.1	< 0.344	< 0.361	< 0.324	< 0.383	< 0.352	< 0.324	< 0.342	< 0.337	< 0.332	< 0.344	< 0.344	< 0.328	< 0.334	< 0.31	< 0.292	< 0.34
Sodium	NLE	NLE	NLE	51.6	184	114	131	144	68.1	160	94.2	60	91.8	140	176	71.4	63.1	130	120	93.4
Thallium	5	79	3	ND	< 0.344	< 0.361	< 0.324	< 0.383	< 0.352	< 0.324	< 0.342	< 0.337	< 0.332	< 0.344	0.488	< 0.328	< 0.334	< 0.31	< 0.292	< 0.34
Vanadium	78	1100	NA	94.1	65.9	31.7	54.1	48.2	21.5	19.1	18.7	38.1	21.1	30.2	54.5	39.2	33	30.5	29.4	27
Zinc	23000	110000	930	81.4	92.2	160	241	47.5	24.7	38.6	34	69.7	275	214	30.3	56.5	56.4	66.5	105	54.7

Notes:

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9/18/17 RDCSRS

Fort Monmouth, BRAC 05 Facility
Contract Number W912DY-09-D-0062, Task Order 0012

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SITE FTMM-03
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Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-66	B-67	B-68	B-69	B-70	B-71	B-72	B-72 Dup	B-73	B-74	B-75	B-76	B-77	B-78	B-79	B-80	B-81	B-82
Sample Date					10/21/98	10/21/98	10/21/98	10/21/98	10/21/98	10/21/98	10/21/98	10/21/98	10/21/98	10/21/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	10500	8280	8730	7410	13900	9170	8830	15500	7760	6040	5210	5510	11700	7890	5860	11300	12900	6360
Antimony	31	450	6	ND	1.55	5.96	1.19	0.228	0.761	1.04	1.51	2.67	1.33	0.823	< 0.334	0.41	< 0.27	< 0.362	< 0.334	< 0.378	< 0.34	< 0.344
Arsenic	19	19	19	22.9	13.6	15.8	10.7	10.2	22.5	14.1	8.78	11.8	9.27	7.13	6.23	6.89	12.3	22.2	21.7	19.6	25.6	19.2
Barium	16000	59000	2100	32.3	13.6	56	32.7	463	40	120	53.3	51.1	18.1	12.2	28.5	23.6	30.5	23	10.8	59.3	118	79.5
Beryllium	16	140	0.7	2	1.71	1.36	1.6	0.666	0.885	1.14	1.46	2.65	1.23	0.938	1.04	1.05	2.23	0.75	0.654	1.34	1.59	0.698
Cadmium	78	78	2	ND	0.33	0.465	0.628	0.526	0.531	1.18	0.347	0.377	0.15	0.209	0.104	0.158	0.112	0.224	0.199	0.312	1.2	0.437
Calcium	NLE	NLE	NLE	921	1910	1520	703	2660	1410	3650	527	486	674	347	913	1060	1410	1100	916	2070	2860	2050
Chromium	NLE	NLE	NLE	269	128	398	103	41.4	103	84.5	111	173	93.2	74.1	61.5	65.5	129	128	86.6	162	185	74.7
Cobalt	1600	590	90	2.5	2.27	2.98	1.5	4.02	0.97	2.74	2.47	3.5	1.68	1.48	1.59	1.34	2.68	0.624	0.403	1.15	1.69	1.29
Copper	3100	45000	11000	8	30.1	66.2	10.4	50.7	47.4	64.9	67.2	58.8	1.81	1.91	3.41	3.38	2.61	41.9	13.5	61.2	109	76
Iron	NLE	NLE	NLE	55800	39300	83400	35500	13200	25100	25400	34900	64200	32500	24000	24400	26800	53000	23600	12700	29500	42400	19500
Lead	400	800	90	19.5	69.4	99.2	12.9	107	22.8	178	152	128	5.37	5.26	5.54	5.67	5.85	51	11.2	72.4	134	59.4
Magnesium	NLE	NLE	NLE	7230	5130	3700	3710	1540	3330	3570	3710	7960	3040	2120	2130	2250	5800	2670	1900	4400	5400	1910
Manganese	11000	5900	65	90.7	32	172	20.4	90.9	33.5	114	37.3	39.7	32.4	38.2	42.1	33.3	41.1	36.8	16.1	27.6	84	83.5
Mercury	23	65	0.1	ND	0.035	0.12	0.058	0.414	0.033	0.657	1.971	2.832	0.031	0.017	0.053	0.034	0.022	0.026	0.018	0.295	0.794	0.14
Nickel	1600	23000	48	8.4	8.12	10.8	7.18	14.6	5.17	11.4	9.18	13.1	6.85	5.33	5.3	5.91	9.11	3.3	3.26	6.53	7.82	5.86
Potassium	NLE	NLE	NLE	15400	11600	9060	8650	3940	5410	6310	9410	21800	6840	4570	5430	3730	12700	4200	4670	7730	9790	4340
Selenium	390	5700	11	1.9	< 0.36	< 0.354	< 0.359	0.633	< 0.353	0.541	< 0.345	< 0.306	< 0.276	< 0.332	0.604	0.58	0.537	1.22	< 0.501	0.878	2.01	0.987
Silver	390	5700	1	1.1	< 0.36	< 0.354	< 0.359	< 0.334	< 0.353	2.28	< 0.345	< 0.306	< 0.276	< 0.332	< 0.501	< 0.533	< 0.405	< 0.543	< 0.501	< 0.567	4.25	0.629
Sodium	NLE	NLE	NLE	51.6	91.7	126	97.2	184	153	198	125	69.9	104	117	115	120	147	122	159	210	178	220
Thallium	5	79	3	ND	< 0.36	< 0.354	< 0.359	< 0.334	< 0.353	< 0.358	< 0.345	< 0.306	< 0.276	< 0.332	< 0.501	< 0.533	< 0.405	<0.543	< 0.501	< 0.567	< 0.51	< 0.516
Vanadium	78	1100	NA	94.1	24	20.8	26.7	21.6	50.4	31.6	17.7	37.6	28.6	27.5	26.2	28.5	50.5	20.9	18.2	45.2	61.6	25.6
Zinc	23000	110000	930	81.4	141	274	77.2	250	174	251	145	163	48.5	36.3	45.3	48	75.2	106	25.1	174	237	191

Notes:

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SITE FTMM-03
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Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-83	B-84	B-85	B-86	B-87	B-88	B-89	B-90	B-91	B-92	B-93	B-94	B-94 Dup	B-95	B-96	B-97	B-98	B-99
Sample Date					10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/26/98	10/27/98	10/27/98	10/27/98	10/27/98	10/27/98	10/27/98	10/27/98	10/27/98	10/27/98	10/27/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	9910	12100	7880	7970	14900	5120	7770	9080	10100	10400	11300	12100	10600	8130	12500	11500	7970	14100
Antimony	31	450	6	ND	< 0.304	< 0.367	< 0.228	0.513	0.506	< 0.284	< 0.218	< 0.357	< 0.406	< 0.449	0.49	0.77	0.388	0.302	< 0.312	< 0.218	< 0.285	0.685
Arsenic	19	19	19	22.9	11.1	12.1	9.95	25.6	20.4	7.27	8.4	10.1	20.8	15.8	23.3	19.8	18.2	12.3	19.4	10.2	4.6	14.1
Barium	16000	59000	2100	32.3	24.3	24.3	28	92.4	219	15.3	18.9	26.7	73.7	120	214	45.8	48.8	103	69.8	61.6	24	182
Beryllium	16	140	0.7	2	1.95	2.31	1.42	0.904	1.86	0.597	1.41	1.63	1.3	1.92	1.17	1.6	1.32	1.06	2.01	1.37	1.24	2.17
Cadmium	78	78	2	ND	0.155	< 0.092	0.129	0.791	0.388	0.114	< 0.055	1140	0.583	3.8	0.827	0.128	0.233	0.658	0.951	0.31	0.178	3.18
Calcium	NLE	NLE	NLE	921	1000	1360	1900	1780	312	987	1130	0.161	1410	1100	431	4310	5600	2650	2060	1110	3060	1850
Chromium	NLE	NLE	NLE	269	109	131	92.7	98	168	49.6	90.8	104	129	142	122	156	132	95.9	160	117	109	184
Cobalt	1600	590	90	2.5	2.27	2.77	2.42	1.85	2.41	0.914	1.65	1.94	1.99	3.07	2.69	2.51	2.45	2.24	3.64	2.69	4.07	4.13
Copper	3100	45000	11000	8	3.66	6.12	7.07	204	92.8	4.62	2.91	4.58	125	195	98.6	12.2	11.1	104	21	11.8	4.24	134
Iron	NLE	NLE	NLE	55800	47600	58800	36100	27100	49200	17800	35100	44800	34400	47600	51000	44100	37600	26500	48200	32200	27700	51000
Lead	400	800	90	19.5	59.5	23.4	60.5	202	147	12.3	10.6	25.8	226	293	187	127	118	119	30.2	21.7	9.54	162
Magnesium	NLE	NLE	NLE	7230	4960	6780	3750	2770	5670	1490	3480	4390	3880	4450	3920	5280	4310	3100	6190	3970	3710	6800
Manganese	11000	5900	65	90.7	38.7	34.5	34.8	121	25.8	26.6	27.4	28.7	105	34.2	34	32.7	41.2	190	43.3	62.2	11.8	48.1
Mercury	23	65	0.1	ND	0.013	0.04	0.041	0.148	3.539	0.067	0.038	0.037	0.697	3.81	0.408	0.135	0.106	0.082	0.232	0.131	0.036	1.5
Nickel	1600	23000	48	8.4	7.61	8.42	5.84	6.67	8.08	3.32	5.25	6.03	7.43	12.1	13.8	7.75	7.17	6.2	13.5	8.16	15.8	13
Potassium	NLE	NLE	NLE	15400	11100	15000	7650	4380	12900	3780	7350	9180	7100	9940	8900	10100	7890	5020	13500	8000	9930	15500
Selenium	390	5700	11	1.9	< 0.456	0.574	0.484	1.11	1.13	0.614	0.539	0.665	1	1.59	1.11	0.994	1.05	0.773	0.845	0.747	< 0.427	1.26
Silver	390	5700	1	1.1	< 0.456	< 0.551	< 0.342	< 0.559	16	< 0.427	< 0.327	< 0.535	1.36	12.2	1.81	< 0.56	< 0.541	< 0.428	0.783	< 0.327	< 0.427	15.2
Sodium	NLE	NLE	NLE	51.6	105	150	105	120	170	63.3	109	135	148	178	382	126	138	125	158	131	139	245
Thallium	5	79	3	ND	< 0.456	< 0.551	< 0.342	< 0.559	< 0.352	< 0.427	< 0.327	< 0.535	< 0.609	< 0.674	< 0.594	< 0.56	< 0.541	< 0.428	< 0.468	< 0.327	< 0.427	< 0.49
Vanadium	78	1100	NA	94.1	41.3	61.9	35.6	38	67.8	21	31.4	39.5	42	43.5	52.9	42.3	34.9	32.9	35.2	52.9	43.2	12.2
Zinc	23000	110000	930	81.4	66.2	81.4	74.3	410	93.6	33	53.2	61.2	167	178	132	84.1	78.7	350	190	105	104	204

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Sample Date					10/27/98	10/27/98	10/27/98	10/27/98	10/27/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98	11/02/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	5150	10500	15700	6380	7030	13600	7230	6840	6340	15500	7520	6420	15700	4830	18600	5710	7270	4250
Antimony	31	450	6	ND	0.362	< 0.344	< 0.33	< 0.341	< 0.282	< 0.329	0.37	1.34	0.439	< 0.214	0.318	0.622	< 0.325	< 0.349	< 0.319	0.471	< 0.319	< 0.284
Arsenic	19	19	19	22.9	7.22	15.4	13.4	18.5	4.96	11.9	13	10.6	10.2	12.6	11.2	13.4	17.3	4.59	26.1	7.25	5.09	4.9
Barium	16000	59000	2100	32.3	96	97	29.4	45.6	43	68.9	41.1	88.3	34.1	327	73	34.6	45.7	54.7	232	182	59.2	98.1
Beryllium	16	140	0.7	2	1.06	1.07	2.52	0.998	1.1	1.56	1.18	1.47	1.07	1.85	1.46	1.1	2.44	0.712	3.18	0.976	1.7	0.654
Cadmium	78	78	2	ND	0.491	< 0.086	0.096	0.128	0.177	< 0.082	0.284	0.487	0.168	0.123	0.235	0.156	0.267	0.197	0.817	0.52	0.3	0.139
Calcium	NLE	NLE	NLE	921	1290	401	1500	1230	1760	333	2080	871	1800	578	2150	1880	2490	528	3190	1260	876	1020
Chromium	NLE	NLE	NLE	269	65.7	108	200	89.9	105	140	87.3	74.9	91.6	163	95	90	194	33.6	202	48	48.9	20.8
Cobalt	1600	590	90	2.5	2.52	2.15	5.5	2.61	2.63	2.14	2.88	3.95	3.17	2.39	3.24	1.68	4.52	2.1	5.12	2.7	4.75	2.37
Copper	3100	45000	11000	8	28.5	23	4.58	3.15	11.8	13.5	11	357	6.07	30.8	13.8	23.4	12	21.1	38.9	50.7	35.4	44.4
Iron	NLE	NLE	NLE	55800	21000	34800	55900	25400	27800	40500	27000	70100	26000	42300	32500	36300	58400	10300	73500	17200	13800	9560
Lead	400	800	90	19.5	214	399	11.9	26.7	11.1	23.5	79	515	12.4	119	96.9	454	25.4	17.8	779	241	74.7	96.6
Magnesium	NLE	NLE	NLE	7230	2080	3100	8570	2660	3330	4760	2930	2340	3000	5300	2990	2830	8370	1120	8790	1770	1740	656
Manganese	11000	5900	65	90.7	34.7	21.9	24.3	19.7	13.2	22.1	43.7	140	17.6	16.7	46.5	32.7	34.6	38.2	83.2	22.4	21.5	14.2
Mercury	23	65	0.1	ND	0.238	0.176	0.021	0.024	0.056	0.061	0.032	16.1	0.083	0.068	0.065	0.159	0.128	0.062	0.286	0.097	0.3	0.772
Nickel	1600	23000	48	8.4	9.17	6.24	16.3	6.05	12.6	6.31	8.52	20.5	8.93	7.16	8.42	5.62	11.7	10.2	16.6	10.1	18.2	8.73
Potassium	NLE	NLE	NLE	15400	4660	6010	20900	6300	8480	9490	5450	5690	6990	11900	6720	5890	19700	2630	21500	3570	5090	1650
Selenium	390	5700	11	1.9	0.693	1.24	< 0.495	< 0.511	< 0.424	1.16	0.731	1.17	< 0.514	1.07	0.415	1.04	1.02	1.08	0.877	1.34	0.799	1.53
Silver	390	5700	1	1.1	< 0.516	< 0.515	< 0.495	< 0.511	< 0.424	< 0.494	< 0.536	43.2	< 0.514	7.83	< 0.342	< 0.54	< 0.487	< 0.524	< 0.479	< 0.515	< 0.479	< 0.426
Sodium	NLE	NLE	NLE	51.6	104	129	148	85.1	116	164	198	144	103	204	97.3	204	210	209	198	259	206	156
Thallium	5	79	3	ND	< 0.516	< 0.515	< 0.495	< 0.511	< 0.424	< 0.494	< 0.536	< 0.566	< 0.514	< 0.321	< 0.342	< 0.54	< 0.487	< 0.524	< 0.479	< 0.515	< 0.479	< 0.426
Vanadium	78	1100	NA	94.1	21.4	50.1	34.9	11.5	12.9	23	26.8	14.4	56.4	24.4	26.6	43.8	20.8	70.7	29.2	25.5	21.9	
Zinc	23000	110000	930	81.4	130	88.9	133	82.3	101	59.1	109	393	98.5	63.4	172	94.6	121	28.4	480	150	105	27.4

Notes:

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SITE FTMM-03
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-118	B-119	B-120	B-121	B-122	B-123	B-123 Dup	B-124	B-125	B-126	B-127	B-128	B-129	B-130	B-131	B-132	B-133	B-134
Sample Date					11/02/98	11/02/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98	11/03/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	2220	5020	4850	5740	7550	1500	9370	4270	3620	6830	6730	12700	16600	2850	9880	17300	3080	6380
Antimony	31	450	6	ND	0.517	< 0.24	< 0.218	0.361	< 0.31	< 0.362	< 0.248	< 0.289	< 0.218	0.599	< 0.309	< 0.331	< 0.295	1.9	< 0.375	< 0.293	0.275	< 0.242
Arsenic	19	19	19	22.9	3.68	7.22	7.52	6.28	7.81	11.1	9.79	4	21.3	11.5	9.16	15.5	37.6	75	14.8	21.5	8.33	11.8
Barium	16000	59000	2100	32.3	65.8	59.2	38.3	143	37.9	39.4	37	163	76.1	129	86.3	98.1	96.3	42.1	55.8	91.1	101	95.3
Beryllium	16	140	0.7	2	0.36	0.965	0.486	0.73	0.843	1.03	0.824	0.46	0.557	0.923	0.776	1.72	2.18	0.76	1.34	1.74	0.842	0.859
Cadmium	78	78	2	ND	0.505	0.276	0.326	0.411	0.156	0.163	< 0.062	0.198	0.126	0.375	0.116	< 0.083	0.074	0.158	0.238	< 0.073	0.177	0.254
Calcium	NLE	NLE	NLE	921	247	2170	2290	2410	894	1090	629	3640	1780	1810	1810	283	210	924	2340	331	487	1530
Chromium	NLE	NLE	NLE	269	12.2	38.3	35.7	37.8	71.1	97.3	77.8	6.11	58.5	39.6	67.9	149	200	28.5	145	134	26.2	81.7
Cobalt	1600	590	90	2.5	2.28	5.2	4.35	2.98	1.54	2.36	1.63	2.42	1.1	4.08	1.55	3.44	3.51	2.03	2.86	3.41	2.09	2
Copper	3100	45000	11000	8	36.5	28	56.9	53.3	10	7.36	6.76	14.1	7.91	56.2	6.24	44.6	26.7	35.5	14.8	23.5	56.7	211
Iron	NLE	NLE	NLE	55800	10800	13100	14000	15300	23200	28400	23500	3510	14800	13600	21500	53400	75600	11000	28800	60500	13400	21000
Lead	400	800	90	19.5	27.2	52.7	239	85.4	16.3	10.1	9.33	13.8	10.8	101	42.1	193	167	155	89.3	95.9	69.4	48.1
Magnesium	NLE	NLE	NLE	7230	137	1600	2010	1530	2340	2980	2160	382	1510	1170	1950	5530	7320	684	4010	5140	496	2030
Manganese	11000	5900	65	90.7	16.4	65	51.1	34.6	26.2	56.2	28.1	19.6	22.3	19.7	18.8	24.8	22.3	18.2	25.9	26.6	17.7	25.1
Mercury	23	65	0.1	ND	0.219	16.199	0.187	0.45	0.089	0.031	0.039	0.552	0.031	0.331	0.104	0.122	0.164	0.024	0.07	0.134	0.106	0.12
Nickel	1600	23000	48	8.4	7.87	13.2	11.3	11.8	5.74	6.17	5.17	7.94	4.32	15.3	4.11	10.1	9.88	7.76	9.66	9.88	6.29	7.38
Potassium	NLE	NLE	NLE	15400	371	3030	2550	3920	3920	5000	3540	451	3000	2860	3460	13100	19000	1931	7110	12300	1610	4010
Selenium	390	5700	11	1.9	1.64	1.23	0.656	0.799	0.524	0.735	0.471	< 0.434	1.79	4.29	1.26	1.01	1.26	19.3	1.33	1.16	1.63	1.39
Silver	390	5700	1	1.1	< 0.497	< 0.36	< 0.327	< 0.448	< 0.466	< 0.544	< 0.372	< 0.434	< 0.328	< 0.422	< 0.463	< 0.496	< 0.443	< 0.475	< 0.563	< 0.439	< 0.393	0.548
Sodium	NLE	NLE	NLE	51.6	133	138	343	174	258	89	237	203	131	223	81.6	182	222	135	119	333	137	145
Thallium	5	79	3	ND	< 0.497	< 0.36	< 0.327	< 0.448	< 0.466	< 0.544	< 0.372	< 0.434	< 0.328	< 0.422	< 0.463	< 0.496	< 0.443	< 0.475	< 0.563	< 0.439	< 0.393	< 0.364
Vanadium	78	1100	NA	94.1	14	20.7	36.8	24.2	29.6	39.5	31.9	11.6	14.3	30.4	29.2	65.7	101	32	45.4	89.4	21.8	28
Zinc	23000	110000	930	81.4	19.7	81.4	105	80.2	49.3	50.2	39.5	62.9	47.1	78.3	36.6	82.9	94.2	43.2	91.2	79.7	29.5	65.6

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Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-135	B-136	B-137	B-138	B-139	B-140	B-141	B-142	B-143	B-144	B-145	B-146	B-147	B-148	B-149	B-149 Dup	B-150	B-151
Sample Date					11/04/98	11/04/98	11/04/98	11/04/98	11/04/98	11/04/98	11/04/98	11/04/98	11/04/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	5410	20300	15400	8420	4500	4720	4790	6570	5440	13700	2940	12800	3390	15800	18200	10800	5670	1760
Antimony	31	450	6	ND	< 0.234	< 0.249	0.581	0.378	< 0.304	< 0.249	< 0.281	< 0.298	< 0.214	0.383	0.565	< 0.408	0.722	< 0.450	0.538	< 0.316	0.388	0.551
Arsenic	19	19	19	22.9	6.9	13.8	17.7	15.4	8.43	8.98	5.73	11	10.2	10.1	5.54	13.4	18.6	25.3	17.5	11.5	8.15	5.08
Barium	16000	59000	2100	32.3	86.3	30.4	90.2	75.8	114	34	189	58	72.2	29.3	74.2	133	172	153	37	32.9	68.3	54.4
Beryllium	16	140	0.7	2	1.04	3.18	1.82	1.23	0.622	0.713	0.488	0.797	0.375	2.23	0.846	1.58	0.61	1.47	2.95	1.72	0.395	0.25
Cadmium	78	78	2	ND	0.117	0.117	0.134	0.196	0.422	0.276	0.119	0.965	0.083	0.591	0.189	1.28	0.264	0.725	0.779	0.5	1.71	0.259
Calcium	NLE	NLE	NLE	921	1670	2270	789	548	2580	8030	873	420	280	280	793	1770	372	359	1230	1160	1650	443
Chromium	NLE	NLE	NLE	269	39.8	39.8	138	83.4	24.8	23.1	23.4	50.8	52	140	6.66	71.3	11.3	152	186	115	41.3	4.1
Cobalt	1600	590	90	2.5	2.93	2.93	3.7	3.38	3.26	3.51	2.35	3.32	1.94	2.81	3.05	7.75	2.57	3.26	3.47	2.12	3.79	1.79
Copper	3100	45000	11000	8	29.3	29.3	29.7	28.3	18.5	170	57.7	26.2	17.1	3.89	23.1	36.3	126	23.5	8.34	6.95	28.6	14.6
Iron	NLE	NLE	NLE	55800	16600	15900	49300	43100	10400	19000	9080	23800	22300	53800	4260	20900	6730	68900	70900	41300	10200	1780
Lead	400	800	90	19.5	86.6	86.6	297	105	70.8	34	53.1	112	79.5	66.8	12.1	41.1	32.5	270	167	159	264	7.52
Magnesium	NLE	NLE	NLE	7230	1500	1500	5050	2360	806	935	685	1420	1140	7020	173	2000	257	5250	9650	4740	1410	123
Manganese	11000	5900	65	90.7	34.2	34.2	56.7	24.4	26.5	45.5	18.1	17.8	18.4	16.5	12.9	44.1	18.2	31.2	58.9	31.3	37.3	7.78
Mercury	23	65	0.1	ND	0.243	0.028	0.15	0.09	0.745	0.333	0.079	0.088	0.098	0.037	0.024	0.117	0.048	0.145	0.057	0.05	18.3	0.509
Nickel	1600	23000	48	8.4	8.36	8.36	10.5	10.4	9.28	10.3	8.48	10.2	6.6	7.65	10.3	23.2	9.31	9.7	9.73	6.38	10.2	6.04
Potassium	NLE	NLE	NLE	15400	3210	3210	10400	5190	2170	1580	1520	4130	2360	15300	419	5550	744	12300	22000	9380	1480	213
Selenium	390	5700	11	1.9	0.931	0.931	1.03	1.18	1.94	0.668	1.88	1.02	1.88	0.705	0.924	1.99	1.08	1.53	1.28	0.733	0.838	2.22
Silver	390	5700	1	1.1	< 0.352	< 0.374	< 0.515	< 0.469	< 0.455	< 0.374	1.2	< 0.447	< 0.32	< 0.52	< 0.491	< 0.612	0.75	< 0.676	< 0.524	< 0.474	2.1	< 0.568
Sodium	NLE	NLE	NLE	51.6	147	147	228	300	290	131	518	249	342	133	106	544	253	733	419	202	213	114
Thallium	5	79	3	ND	< 0.352	< 0.374	< 0.515	< 0.469	< 0.455	< 0.374	< 0.422	< 0.447	< 0.32	< 0.52	< 0.491	< 0.612	< 0.632	< 0.676	< 0.524	< 0.474	< 0.569	< 0.568
Vanadium	78	1100	NA	94.1	24.9	24.9	75.9	55.7	13.3	15.5	14.6	31.5	25	41.3	15.5	47.6	19.9	92.2	67	31.6	21.9	9.96
Zinc	23000	110000	930	81.4	35.6	35.6	125	73.2	63.5	61.1	39.3	61.3	42.7	106	23.1	74.4	21.1	88.6	115	80.7	162	19.1

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Sample Date					11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/09/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98	11/10/98
METALS (mg/kg)																							
Aluminum	78000	NA	6000	15200	5380	10500	11300	17200	5270	2740	6910	16800	7770	18200	7790	6620	10800	9470	12700	33200	17700	11600	11000
Antimony	31	450	6	ND	0.689	< 0.349	1.01	0.559	< 0.348	0.473	< 0.254	< 0.319	4.37	0.381	1.59	< 0.354	< 0.368	< 0.293	< 0.256	11.4	< 0.358	< 0.313	< 0.371
Arsenic	19	19	19	22.9	4.45	19.4	34.2	19.6	5.9	5.39	8.85	24.3	26	16.3	63.3	9.71	27.9	13.8	16	81.6	13.1	10.5	15.9
Barium	16000	59000	2100	32.3	63.2	83.4	176	57.9	35.2	46.9	43	70.2	849	111	124	42.3	44.6	59.1	48.8	164	38.5	41.8	34.5
Beryllium	16	140	0.7	2	0.476	1.03	1.55	2.56	0.383	0.456	0.583	1.55	0.619	1.28	0.73	0.721	0.72	0.732	1.39	2.12	3.04	1.29	1.03
Cadmium	78	78	2	ND	0.61	0.678	1.32	0.828	0.45	0.198	1.01	0.481	31.5	0.693	0.198	0.41	0.411	0.402	0.461	0.274	0.449	0.28	0.215
Calcium	NLE	NLE	NLE	921	1470	1480	3150	5180	21200	752	4070	540	7000	8230	590	1260	1670	2100	1040	435	247	930	1630
Chromium	NLE	NLE	NLE	269	25.3	105	69.8	193	30.3	8.43	42.5	144	367	159	47.7	56.4	85.3	78.5	122	231	197	98.7	105
Cobalt	1600	590	90	2.5	2.35	2.18	14.8	4.85	1.39	1.7	5.98	2.8	18.1	3.27	2.14	2.01	1.42	1.45	2.15	5.25	3.25	2.4	1.53
Copper	3100	45000	11000	8	28.6	25.9	193	24.3	19.7	37.3	38.2	55.6	495	31.8	88.1	20.6	14	120	26	32.6	3	51.9	32.7
Iron	NLE	NLE	NLE	55800	8990	51800	35900	63400	10500	5310	22700	60500	34100	31600	13800	20400	28400	17200	39100	77200	64900	32400	26100
Lead	400	800	90	19.5	5.48	84.6	162	133	31.5	87.6	261	93.2	2580	480	238	47.4	24.1	61.4	62.9	2550	4.78	11.2	29.6
Magnesium	NLE	NLE	NLE	7230	1300	3370	1980	8180	1990	187	3230	5700	2880	4390	1260	1820	2610	2250	4400	8330	8920	3660	3290
Manganese	11000	5900	65	90.7	17.3	33.6	173	80.9	55.8	6.73	122	27.6	< 0.076	69.1	20.9	40.9	43.2	41.3	31.8	41.5	30.8	68.6	45.7
Mercury	23	65	0.1	ND	0.077	0.101	0.61	0.213	0.07	0.086	0.062	0.073	0.115	0.605	0.114	0.063	0.033	0.369	0.062	0.421	0.025	0.035	0.083
Nickel	1600	23000	48	8.4	6.16	7.8	25.2	12	4.93	6.93	12	11.9	44.2	14	7.52	5.88	3.99	5.02	6.26	14.9	7.92	7.46	4.6
Potassium	NLE	NLE	NLE	15400	2120	7190	5070	18700	2230	390	3470	13300	1360	7320	2950	4450	5150	3150	8840	16500	20300	5850	5260
Selenium	390	5700	11	1.9	0.438	1.44	2.23	1.23	0.59	0.833	0.552	1.25	13.4	1.03	8.52	0.903	0.924	0.775	1.02	3.26	0.941	1.08	1
Silver	390	5700	1	1.1	< 0.432	< 0.523	1.93	< 0.504	< 0.522	< 0.414	< 0.381	< 0.478	< 0.459	< 0.55	0.127	< 0.531	< 0.552	< 0.44	< 0.383	< 0.79	< 0.537	< 0.469	< 0.556
Sodium	NLE	NLE	NLE	51.6	189	567	265	175	106	109	278	413	473	354	222	111	217	91.2	314	351	163	85.5	348
Thallium	5	79	3	ND	< 0.432	< 0.523	< 0.454	< 0.504	< 0.522	< 0.414	< 0.381	< 0.478	< 0.459	< 0.55	< 0.567	< 0.531	< 0.552	< 0.44	< 0.383	< 0.79	< 0.537	< 0.469	< 0.556
Vanadium	78	1100	NA	94.1	14.4	61.9	49.7	55.1	22.5	14.6	55.1	90.7	45.6	102	32.1	34.2	43	33.2	68.1	162	59.7	41.1	48.6
Zinc	23000	110000	930	81.4	98	75.3	557	141	45.4	38.4	112	81.6	31900	269	67.4	100	83.7	231	74.7	134	97.9	57.7	75.6

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SOIL SAMPLING SUMMARY RESULTS - COMPARISON TO NJDEP STANDARDS
SITE FTMM-03
FORT MONMOUTH, NEW JERSEY

Field Sample Location	NJDEP Residential DCSRS ⁽¹⁾	NJDEP Non-Residential DCSRS ⁽¹⁾	NJDEP Impact to Ground Water ⁽²⁾	Weston 1995 Background (Main Post) ⁽³⁾	B-171	B-172	B-173	B-175	B-175 Dup	B-176	B-177	B-178	B-179	B-180	B-181	B-182	B-183	B-184	B-185	B-186	B-187	B-188
Sample Date					11/10/98	11/10/98	11/10/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98	11/16/98
METALS (mg/kg)																						
Aluminum	78000	NA	6000	15200	6310	11100	15800	8880	13300	10100	2240	5820	7980	9090	9020	4960	15700	3090	14900	11900	16900	9290
Antimony	31	450	6	ND	0.448	< 0.333	1.11	0.54	< 0.345	< 0.367	0.357	0.45	< 0.41	< 0.404	< 0.411	0.353	< 0.268	0.622	< 0.314	< 0.296	< 0.315	< 0.288
Arsenic	19	19	19	22.9	7.35	15.3	25.2	8.45	11.3	9.4	7.22	8.76	12.4	11.5	11.9	4.35	13	5.88	12.7	12.8	13.7	6.44
Barium	16000	59000	2100	32.3	55.8	59.9	83.5	73.1	72.4	41.5	44.5	68.7	33.4	33.2	44.2	88.5	42.5	78	49.5	34.2	51	42.2
Beryllium	16	140	0.7	2	0.631	1.2	1.59	1.32	2.03	1.13	0.403	0.437	0.886	1.21	0.933	0.277	1.81	0.504	1.65	1.25	1.84	1.32
Cadmium	78	78	2	ND	0.447	0.37	0.653	0.329	0.243	0.326	0.402	0.171	0.604	0.27	0.266	0.779	0.248	0.281	0.221	0.145	0.327	0.204
Calcium	NLE	NLE	NLE	921	2080	1590	445	405	406	1000	840	672	947	693	300	3400	1440	973	1500	726	1640	263
Chromium	NLE	NLE	NLE	269	64.6	113	145	109	165	83.1	5.51	9.02	90.4	90.1	99.1	24.7	148	16.1	131	129	140	107
Cobalt	1600	590	90	2.5	2.35	1.97	2.53	1.27	1.81	1.72	2.32	2.33	2.32	1.99	1.51	2.61	2.46	3.28	2.22	1.44	2.8	0.858
Copper	3100	45000	11000	8	40.3	11.6	25.1	2.92	2.48	4.95	12.4	18.3	22.4	7.85	16.4	155	3.95	44.7	9.74	4.78	8.74	1.94
Iron	NLE	NLE	NLE	55800	17900	43400	67000	32000	48200	28100	4040	6170	24400	34000	36100	12100	45900	4320	40700	33800	49500	29600
Lead	400	800	90	19.5	109	32.5	191	54.5	50	13.1	7.34	14.5	73	21.2	52.6	97.5	8.27	59.9	21.2	5.6	23.1	3.01
Magnesium	NLE	NLE	NLE	7230	2110	4400	5800	3760	6650	3000	138	263	2860	3180	3260	1340	6040	388	5420	4070	5700	3710
Manganese	11000	5900	65	90.7	34.2	47.3	23.2	17.6	23.2	53.4	6.5	9.75	83	38.8	20.4	53.2	65.9	16	57.5	32.7	100	21.1
Mercury	23	65	0.1	ND	0.087	0.06	0.075	0.026	< 0.024	0.03	0.026	0.025	0.033	0.076	0.155	0.103	0.026	0.75	0.066	0.058	0.027	< 0.023
Nickel	1600	23000	48	8.4	6.74	6.46	8.62	3.87	5.32	6.63	7.16	7.05	5.36	8.19	5.48	6.75	6.99	9.84	7.61	4.84	9.96	3.02
Potassium	NLE	NLE	NLE	15400	3110	8580	14400	6720	13700	4560	333	786	4650	5950	6280	1490	13600	823	11300	7460	11500	6290
Selenium	390	5700	11	1.9	0.708	1.12	1.92	0.613	0.655	0.789	1	0.868	1.05	0.775	1.05	0.584	1.25	1.33	0.978	0.933	0.965	0.57
Silver	390	5700	1	1.1	< 0.426	< 0.5	< 0.45	< 0.634	< 0.518	< 0.55	< 0.497	15	< 0.615	< 0.605	< 0.617	0.715	< 0.402	< 0.596	< 0.472	< 0.443	< 0.473	< 0.432
Sodium	NLE	NLE	NLE	51.6	338	315	492	265	133	203	146	248	264	200	190	198	240	135	185	104	203	110
Thallium	5	79	3	ND	< 0.426	< 0.5	< 0.45	< 0.634	< 0.518	< 0.55	< 0.497	< 0.56	< 0.615	< 0.605	< 0.617	< 0.479	< 0.402	< 0.596	< 0.472	< 0.443	< 0.473	< 0.432
Vanadium	78	1100	NA	94.1	42.5	56.7	94.9	29.4	48.4	34.5	10.1	14.6	45.7	46	48.3	19.1	62.3	17	67.2	39.3	72.3	28.4
Zinc	23000	110000	930	81.4	143	71.8	80.9	66.7	83.2	68.6	77	23.3	90	68.2	56.6	183	61.5	21.7	73.2	48.2	77.4	71.5

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Sample Date					11/16/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/17/98	11/18/98
METALS (mg/kg)																					
Aluminum	78000	NA	6000	15200	10400	14000	10700	11100	10100	10300	3700	8200	11200	14600	9150	8050	10400	11800	10500	8240	13100
Antimony	31	450	6	ND	< 0.265	< 0.295	< 0.379	< 0.326	< 0.383	< 0.403	0.617	< 0.431	< 0.337	< 0.229	< 0.378	< 0.371	< 0.266	< 0.357	< 0.25	< 0.253	< 0.306
Arsenic	19	19	19	22.9	10.7	13.4	9.76	12	13	8.59	15.8	10.3	9.31	16.3	10.6	5.61	7.15	11.3	9.51	21.2	17.9
Barium	16000	59000	2100	32.3	46.4	27.1	37.9	37.2	25.9	59.1	131	44.6	71.5	50	31.7	53.5	69.2	36.5	28	27	31.7
Beryllium	16	140	0.7	2	1.06	1.59	1.21	1.22	1.35	1.4	0.706	1.14	1.53	1.6	1.09	1.1	1.36	1.29	1.11	0.874	1.48
Cadmium	78	78	2	ND	0.221	0.117	0.202	0.651	0.343	0.706	0.416	0.45	0.327	0.441	0.354	0.333	0.306	0.241	0.175	0.467	0.589
Calcium	NLE	NLE	NLE	921	1200	896	1500	1810	1000	3220	1870	3310	16400	1850	434	781	19300	990	516	1380	1290
Chromium	NLE	NLE	NLE	269	114	145	92.2	117	114	126	14.8	88.5	68.3	140	89.5	99.3	49.4	102	112	77.4	128
Cobalt	1600	590	90	2.5	1.18	1.85	1.9	3.22	1.8	1.1	3.29	3.22	3.06	2.38	1.54	0.822	2.3	2.08	1.23	1.58	2.21
Copper	3100	45000	11000	8	6.94	4.92	7.83	25.9	10.7	2.94	34.4	29.9	26.2	10.7	8.63	1.84	14.3	4	4.9	5.73	6.4
Iron	NLE	NLE	NLE	55800	27100	41600	29400	34600	40100	35200	8750	24900	19900	41600	29300	25900	16000	33600	28800	23200	39200
Lead	400	800	90	19.5	16.2	9.83	24.5	50	34.3	7.5	16.8	34.8	35.5	25.6	20.1	3.07	27.2	10.4	6.44	20.2	17.8
Magnesium	NLE	NLE	NLE	7230	3610	5310	3490	4040	3510	5310	644	3500	5790	5450	2960	3280	7830	4000	3660	3090	5030
Manganese	11000	5900	65	90.7	24.2	39.2	60	130	37.1	42	23.6	48.2	155	58.6	36.1	29.3	234	53.4	33.9	40.6	35.5
Mercury	23	65	0.1	ND	0.034	< 0.024	0.049	0.05	0.059	0.022	0.362	0.065	0.04	0.065	0.055	< 0.025	0.054	0.044	0.042	0.026	0.077
Nickel	1600	23000	48	8.4	5.47	5.3	7.16	7.36	6.58	4.12	8.62	7.93	7.83	7.62	5.31	2.77	4.58	6.06	4.41	4.65	6.26
Potassium	NLE	NLE	NLE	15400	6100	11400	5880	7350	6420	8110	1090	6150	5260	11700	5460	5290	4480	7110	7060	4670	9700
Selenium	390	5700	11	1.9	1.14	0.913	0.825	0.799	1.09	0.616	1.19	1.14	0.797	1.24	0.959	0.505	0.704	0.802	1.27	0.819	0.753
Silver	390	5700	1	1.1	< 0.398	< 0.443	< 0.568	< 0.488	< 0.575	< 0.604	< 0.623	1.2	< 0.506	< 0.344	< 0.566	< 0.557	< 0.399	< 0.535	< 0.374	< 0.379	< 0.46
Sodium	NLE	NLE	NLE	51.6	103	134	133	177	162	113	181	142	392	198	173	116	409	119	128	164	111
Thallium	5	79	3	ND	< 0.398	< 0.443	< 0.568	< 0.488	< 0.575	< 0.604	< 0.623	< 0.646	< 0.506	< 0.344	< 0.566	< 0.557	< 0.399	< 0.535	< 0.374	< 0.379	< 0.46
Vanadium	78	1100	NA	94.1	40.9	51.2	43.1	60.1	55.1	37.3	18.9	30.8	30.1	61.5	39.1	29.5	25.2	43.9	39.1	42.3	64.2
Zinc	23000	110000	930	81.4	47.9	52.3	60.3	85.9	66.8	74.1	49.5	98.5	81.2	75.5	54.9	38.5	70.5	48.6	41.2	43.6	57.8

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