

FINAL

Remedial Investigation Report And Sediment Quality Evaluation

CW-3A Landfill Site

**U. S. Army Installation Fort Monmouth
Fort Monmouth, New Jersey**



Directorate of Public Works



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Fort Monmouth, New Jersey

**Remedial Investigation Report and
Sediment Quality Evaluation
for the
CW-3A Landfill Site**

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February 10, 2004

**REMEDIAL INVESTIGATION REPORT AND
SEDIMENT QUALITY EVALUATION
FOR THE CW-3A LANDFILL SITE
FORT MONMOUTH, NEW JERSEY**



PREPARED FOR:

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EXECUTIVE SUMMARY

VERSAR, Inc. (VERSAR) has been contracted by the United States (U.S.) Army Installation, Fort Monmouth (Fort Monmouth), Directorate of Public Works (DPW), Fort Monmouth, New Jersey, to prepare a Remedial Investigation Report (RIR) for data collected during recent sediment sampling events at the CW-3A Landfill Site. This report describes the remedial investigation activities performed at the site on April 10, 2000.

The site is located at the Charles Wood Area, west of the main CW-3 area and north of Building No. 2707 (Pulse Power). The Site occupies approximately 2.6 acres. An unnamed tributary of Wampum Brook flows along approximately 600 feet of the north side of the site. According to the Roy F. Weston, Inc. (Weston) report, *Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, Site Investigation Report* (December 1995), the CW-3A site was historically used for the disposal of construction debris, reportedly consisting of buried metallic debris. The Weston Site Investigation (SI) Report states that between 1955 and 1956, 90 buildings were demolished at the Charles Wood Area. The possibility exists that the demolition debris was disposed of in the CW-3A area. In 1995, Weston conducted Electromagnetic (EM), Magnetometer (MAG), and Ground Penetrating Radar (GPR) surveys (Weston, 1995), which reportedly indicated buried metallic debris at the Site. In 1998, the DPW excavated test pits at the site, identifying waste materials consisting of concrete, asphalt, brick, wood, glass and assorted scrap metals. Coal ash was also observed within the test pits. Soil and groundwater sampling was also performed at the time the test pits were conducted. Four monitoring wells were installed, and soil samples were collected from 0-6 inches, 18-24 inches, and immediately above the groundwater table. The soil and groundwater samples were analyzed by Fort Monmouth Environmental Laboratory for various combinations of the following parameters: Target Compound List (TCL) + 30; Target Analyte List (TAL) metals; Volatile Organic Analysis (VOA), including a GC/MS library search; and Cyanide. The results of these investigations have been reported by others.

Other studies conducted at similar Main Post landfill sites (M-2 and M-8) found polychlorinated biphenyl (PCB) -containing materials (e.g., electrical ballasts) disposed of in each landfill. In addition, PCBs were detected in soil and/or groundwater at both the M-2 and M-8 Landfill sites. Therefore, assuming that other landfills on the Main Post had received similar waste materials, the DPW initiated a sediment sampling investigation in the second quarter of 2000 to evaluate potential impacts to stream sediments in creeks and/or brooks running adjacent to the Main Post and Charles Wood (CW-3A only) landfill sites. The CW-3A Landfill Site was included in the sediment sampling program to supplement the Weston findings related to soil and groundwater matrices.

To determine potential PCB-related impacts to sediments in the unnamed tributary of Wampum Brook, the DPW collected 12 sediment samples on April 10, 2000 from the surface and near-surface sediments of the Wampum Brook tributary. The samples were

obtained along the 600-foot section of the tributary that flows along the northern perimeter of the CW-3A Landfill site. All 12 sediment samples were analyzed for PCBs and compared to the New Jersey Department of Environmental Protection (NJDEP) sediment sampling guidance concentrations defined in the NJDEP *Guidance for Sediment Quality Evaluations* (November 1998). The analytical data is summarized in table form in this RIR. VERSAR developed this RIR based on the evaluation of these sediment data.

Data presented in **Section 3.0** of this RIR indicate that no PCBs were detected above the laboratory Method Detection Limit (MDL) in any of the 12 samples obtained from the unnamed tributary of Wampum Brook. Based on NJDEP guidance criteria, there are no documented PCB-related impacts to sediments in the tributary of Wampum Brook associated with the adjacent CW-3A Landfill site.

Based on the results of this sediment quality evaluation, no PCBs were detected above the MDL in any sample. Therefore, No Further Action (NFA) is recommended for the CW-3A Landfill site related to potential PCB impacts to the sediments of the unnamed tributary of Wampum Brook.

1.0 INTRODUCTION

VERSAR has been contracted by the U.S. Army Installation, Fort Monmouth DPW, Fort Monmouth, New Jersey to prepare an RIR and sediment quality evaluation for the CW-3A Landfill site located at the Fort Monmouth Charles Wood Area. This report addresses the remedial investigation activities performed at this site on April 10, 2000.

1.1 Objectives

Other studies conducted at similar Main Post landfill sites (M-2 and M-8) found PCB-containing materials (e.g., electrical ballasts) disposed of in each landfill. In addition, PCBs were detected in soil and/or groundwater at both the M-2 and M-8 Landfill sites. Therefore, assuming that other landfills on the Main Post had received similar waste materials, the DPW initiated a sediment sampling investigation in the second quarter of 2000 to evaluate potential impacts to stream sediments in creeks and/or brooks running adjacent to the Main Post and Charles Wood (CW-3A only) landfill sites. The CW-3A Landfill Site was included in the sediment sampling program to supplement the earlier Weston findings related to the soil and groundwater matrices.

The objective of this RIR is to determine potential PCB-related impacts to stream sediments in an unnamed tributary of Wampum Brook, which flows along the northern perimeter of the CW-3A Landfill site. The remedial investigation was conducted in accordance with New Jersey Administrative Code (NJAC) 7:26E - *Technical Requirements for Site Remediation* (July 1999) and NJDEP *Guidance for Sediment Quality Evaluations* (November 1998).

The remedial investigation encompassed the following:

- Obtaining surface and near-surface sediment samples every 100 feet along the tributary of Wampum Brook that is adjacent to the northern boundary of the CW-3A Landfill site.
- Analyzing the samples for PCBs by United States Environmental Protection Agency (USEPA) Method 8082.
- Comparing the analytical results to the screening level criteria, as defined in the NJDEP *Guidance for Sediment Quality Evaluations* (November 1998).

1.2 Report Organization

This report is organized to minimize repetition. **Section 2.0** provides background information and a general description of the CW-3A Landfill site located at Fort Monmouth Charles Wood Area. **Section 3.0** describes and summarizes the sampling procedure and activities. **Section 4.0** presents the analytical results and compares those results to NJDEP guidance criteria. **Section 5.0** provides a summary of the findings of the remedial investigation, and requests an NFA determination from the NJDEP.

2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING

The following sections describe the site background and environmental setting of the area surrounding Fort Monmouth and the CW-3A Landfill site. Included is a description of the site location, background, current conditions and environmental setting.

2.1 Site Location and Description

Fort Monmouth is located in the central-eastern portion of New Jersey in Monmouth County, approximately 45 miles south of New York City and 70 miles northeast of Philadelphia (**Figure 2-1**). In addition to the Main Post, the installation includes two subposts, the Charles Wood Area and the Evans Area. The Main Post encompasses approximately 630 acres and is generally bounded by State Highway 35, Parkers Creek, Lafetra Creek, the New Jersey Transit Railroad and a residential area to the south. The post was established in 1918 during World War I (WWI) as an Army Signal Corps training center. The Main Post currently provides administrative, training, and housing support functions, as well as providing many of the community facilities for Fort Monmouth. The Charles Wood Area is located one mile west of the Main Post and is comprised of approximately 511 acres. Charles Wood is used primarily for research and development, testing and personnel housing units. The primary mission of Fort Monmouth is to provide command, administrative and logistical support for Headquarters, U.S. Army Communications and Electronics Command (CECOM). CECOM is a major subordinate command of the U.S. Army Materiel Command (AMC) and is the host tenant at Fort Monmouth.

The CW-3A Landfill site is located west of CW-3 in the Charles Wood Area (**Figure 2-2**). It is bounded by Pearl Harbor Avenue to the west, an unnamed tributary of Wampum Brook to the north, a wooded area to the east, and the Pulse Power Facility (Building No. 2707) to the south. The approximate area of the CW-3A Landfill site is 116,000 ft² (2.6 acres). The unnamed tributary of Wampum Brook flows along the northern boundary of the CW-3A Landfill site for a distance of approximately 600 feet. The tributary is choked with thick vegetation and fallen trees with man-made debris scattered along its banks. Since the tributary is located farther inland than the Main Post Area, there are no localized tidal effects.

2.2 Site Background

The Weston report, *Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, Site Investigation Report* (December 1995), indicated that the CW-3A Landfill site was originally planned to be sampled as part of Weston's field investigation activities at the Main Post and Charles Wood areas between November 1994 and March 1995. These activities included surface geophysical investigations, sediment and surface-water sampling, transformer sampling, surface and subsurface soil sampling, groundwater monitoring well installation and sampling, and tidal monitoring. However, the 1995 Weston SI report noted that the presence of construction debris prevented any sampling from being completed at the CW-3A Landfill site.

Consequently, to determine if historic subsurface disposal had occurred at the CW-3A Landfill site, geophysical investigations utilizing MAG, EM measurements and GPR were conducted by Weston (Weston, 1995). According to the Weston report, the geophysical investigation revealed various “anomalies” indicative of buried ferrous materials at a depth of 2-3 feet below ground surface (bgs). As a result, Weston recommended that exploratory trenching be conducted at the CW-3A site to verify the presence of subsurface metallic debris (Weston, 1995). Fort Monmouth DPW conducted exploratory trenching on September 25, 1997. Several test pits were excavated that revealed debris consisting of concrete, asphalt, brick, wood, glass, coal ash and assorted scrap metals. In addition to the trenching, four monitoring wells were installed on December 17, 1997 to further evaluate the potential impact of the CW-3A Landfill site on surrounding soils and groundwater. The results of these investigations have been reported by others.

The present investigation was undertaken to further expand the Weston SI report and assess the potential PCB-related impacts to stream sediments in the unnamed tributary of Wampum Brook near the CW-3A Landfill site based on past site use and findings at other Main Post landfill sites.

2.3 Current Conditions

VERSAR conducted a site walk on December 11, 2000 to assess current conditions at the CW-3A Landfill site. The site consisted of a partially wooded lot with tall grass in the center and trees to the north, east and west. A parking area for the Pulse Power Facility is located to the south. Site photographs are provided in **Appendix A**.

2.4 Environmental Setting

The following is a description of the geological/hydrogeological setting of the area surrounding the CW-3A Landfill site. Included is a description of the regional geology and hydrogeology of the area surrounding Fort Monmouth, as well as descriptions of the local geology and hydrogeology of the CW-3A area. The Charles Wood Area is one mile from the Main Post and regional geologic/hydrogeologic conditions are similar.

2.4.1 Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The CW-3A Landfill site is located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands. The geologic map of New Jersey is provided as **Figure 2-3**.

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

date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

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

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

The Tinton Sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse-grained feldspathic-quartz and glauconite-sand to a glauconitic-coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit. The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard, 1969). Groundwater occurs beneath the site at a depth of approximately 2 to 12 feet bgs.

The Kirkwood Formation (part of the Kirkwood-Cohansey system) crops out southeast of the Main Post and dips to the southeast at a slope of 20 feet per mile (Jablonski, 1968). The Kirkwood Formation consists of alternating layers of sand and clay. The upper unit is a light gray to yellowish-brown, fine-grained quartz sand with quartz nodules and small pebbles. The lower unit is a brown silt in Monmouth County (Jablonski, 1968).

As presented in the *Site Investigation Report - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey*, prepared by Weston, Inc, December 1995 (Weston SI), several natural and anthropogenic factors contribute to the wide range in concentrations of metals in soils, which further impact the concentration of metals in groundwater. Soils derived from the glauconitic sands contain abundant aluminum, calcium, potassium, iron, magnesium and manganese (among others), which are likely to be present at elevated concentrations in the groundwater, particularly when sediments are entrained in the collected groundwater samples.

2.4.2 Hydrogeology

Fort Monmouth lies in the Atlantic and Eastern Gulf Coastal Plain groundwater region (Meisler et al., 1988). This groundwater region is underlain by undeformed, unconsolidated to semi-consolidated sedimentary deposits. The chemistry of the water near the surface is variable with low dissolved solids and high iron concentrations. The water chemistry in areas underlain by glauconitic sediments (such as Red Bank, Tinton and Hornerstown Sands) is dominated by calcium, magnesium, manganese, aluminum and iron. The sediments in the area of Fort Monmouth were deposited in fluvial-deltaic to near shore environments.

The water table aquifer in the Main Post Area is identified as part of the “Navesink-Hornerstown Confining Units,” or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation and the basal clay of the Kirkwood Formation. These geologic formations comprise a “Composite Confining Bed” for the Wenonah Mount Laurel Aquifer (Zapeczka, 1984).

Wells installed in the Red Bank and Tinton Sands produce 2 to 25 gallons per minute (gpm) (Jablonski, 1968). Groundwater is typically encountered at the Main Post and in the surrounding areas at shallow depths below ground surface (2 to 9 feet bgs). Water in the surficial aquifer generally flows east toward the Atlantic Ocean.

Based on a review of the NJDEP GWQS (NJAC 7:9-6), January 7, 1993, Versar has determined that the site is underlain by a Class III-A aquifer. A formal presentation of this finding was made to the NJDEP on April 17, 2001. The primary designated use for Class III-A groundwater is the release or transmittal of groundwater to adjacent classification areas and surface water, as relevant. Secondary designated uses in Class III-A include any reasonable use.

Shallow groundwater may be locally influenced within the Main Post Area by the following factors:

- Tidal influence (based on proximity to the Atlantic Ocean, rivers, and tributaries)
- Topography
- Nature of the fill material within the Main Post Area
- Presence of clay and silt lenses in the natural overburden deposits
- Local groundwater recharge areas (e.g., streams, lakes)
- Roadways, utility conduits and stormwater culverts

Due to the fluvial nature of the overburden deposits (e.g., sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. The groundwater flow in the vicinity of the CW-3A Landfill site is assumed to be north towards Wampum Brook.

2.4.3 Soils

According to the U.S. Department of Agriculture (USDA), Soil Conservation Service, Monmouth County Soil Survey, the majority of the Main Post and Charles Wood areas are covered by urban land (**Figure 2-4**). The soil survey describes urban land as areas where concrete, asphalt, buildings, shopping centers, airports or other impervious surfaces cover 80 percent or more of the surface. In addition, the survey indicated that the natural subsurface soils have largely been replaced with artificial or foreign fill materials (developed land with disturbed soils). The following soil series and classification units are mapped in the Main Post and Charles Wood areas:

- DoB Downer sandy loam (with 2 to 5 percent slopes);
- FrB Freehold sandy loam (with 2 to 5 percent slopes);
- FUB Freehold sandy loam/urban land complex (with 0 to 10 percent slopes);
- HV Humaquepts, frequently flooded;
- KvA Kresson loam (with 0 to 5 percent slopes);
- PT Pits, Sand and Gravel;
- UA Udorthents, smoothed; and
- UD Udorthents – urban land complex (with 0 to 3 percent slopes).

The Downer series soils are well-drained soils that are found on uplands and terraces. The soils are formed in acid, silty coastal plain sediments. The Freehold soils are also well drained and are formed in acid, loamy, coastal plain sediments that, by volume, are 1 to 10 percent glauconite and are found on uplands. The Humaquepts soils are somewhat poorly- to very poorly- drained soils that are formed in stratified, sandy, or loamy sediments of fluvial origins. The Humaquepts soils are located on the floodplain and are subject to flooding several times each year. The Kresson loam is a nearly level to gently sloping soil and is somewhat poorly drained. The soil is found on low divides and in depressions. The Udorthents soils have been altered by excavation or filling activities. In filled areas, these soils consist of loamy material that is more than 20 inches thick. The filled areas include floodplain, tidal marshes and areas with moderately, well drained to very poorly drained soils. Some Udorthent soils contain concrete, asphalt, metal, and glass. The soils in the vicinity of the CW-3A Landfill site are classified as FrB – Freehold sandy loam (with 2 to 5 percent slopes) and (possibly the westernmost area) PT – Pits, Sand and Gravel.

2.4.4 Topography and Surface Drainage

Over the last 80 years, the natural topography of Fort Monmouth has been altered by excavation and filling activities by the military. The CW-3A Landfill Site is located on the floodplain of Wampum Brook. The USGS topographic map (**Figure 2-1**) shows that the land surface of the site is relatively flat at an elevation of approximately 60 ft above mean sea level (amsl).

Surface water bodies in the vicinity of the Charles Wood Area include two unnamed tributaries of Wampum Brook. Wampum Brook is joined by several unnamed tributaries east of Charles Wood, prior to becoming Wampum Lake. Wampum Lake discharges into Mill Creek, which flows toward the Main Post Area.

The U.S Fish and Wildlife Service (FWS) National Wetland Inventory Long Branch quadrangle maps indicate the presence of several wetlands at the Main Post and Charles Wood areas. However, in the vicinity of the CW-3A Landfill site, the golf course lake is classified as palustrine open water/unknown bottom, and several areas along the unnamed tributaries of Wampum Brook are classified as palustrine forested wetland, broad-leaved deciduous.

3.0 SEDIMENT SAMPLING ACTIVITIES

Fort Monmouth DPW conducted sediment sampling in the unnamed tributary of Wampum Brook to evaluate potential PCB-related impacts to stream sediments from the adjacent CW-3A Landfill site. On April 10, 2000, six borings were installed at a maximum spacing of approximately every 160 feet, ranging from approximately 130-180 feet, along the bottom of the tributary, as shown in **Figure 3-1**. The locations extended from downstream at Boring B-1 along Harbor Avenue to upstream at Boring B-6, northeast of the site, and were sampled accordingly in that order (see **Appendix D**). The sediment sampling was conducted in accordance with the *Installation Landfill Program Sediment Sampling Plan for Nine Former Landfill Sites* (March 2000) found in **Appendix B**, with one exception: borings were installed at a rate greater than one boring per 100 feet in order to target depositional areas along the unnamed tributary of Wampum Brook. The Sediment Sampling Plan (SSP) was approved by the NJDEP on April 3, 2000.

Twelve sediment samples were collected from six borings using a Wildco Sediment Sampler. The samples were obtained along the 600-foot portion of the unnamed tributary of Wampum Brook that flows along the northern perimeter of the CW-3A Landfill site. Sample depths ranged from surface (0-6 inches) to near-surface (6-12 inches bgs) at each boring location. The samples consisted of medium to dark brown sandy silt to fine sandy silt with some organic material, small angulars and rounds. Glass fragments were noted in Boring B-2. Boring logs are provided in **Appendix C**.

Sampling equipment was thoroughly decontaminated before and after each use, in accordance with the SSP. The sediment samples were collected using a Wildco Sampler and immediately placed in laboratory-supplied bottleware. The sample containers were labeled, sealed, packed in ice and transported to the Fort Monmouth Environmental Testing Laboratory (FMETL), New Jersey Certification Number NJDEP 13461, under proper chain-of-custody procedures. The samples were analyzed by the FMETL on April 10, 2000 for PCBs utilizing USEPA Method 8082. Copies of the chain-of-custody for the laboratory analysis can be found in **Appendix D**. A summary of the borings, including sample IDs, sample collection date/time, sample depths, northing/easting coordinates, analysis and general soil descriptions is provided in **Table 3-1**.

4.0 SITE CHEMICAL CHARACTERIZATION

On April 10, 2000, the DPW collected 12 sediment samples along the bottom of an unnamed tributary of Wampus Brook to evaluate potential PCB-related impacts to stream sediments from the adjacent CW-3A Landfill site. Six borings were installed at a maximum spacing of approximately every 160 feet, ranging from approximately 130-180 feet, along the bottom of the tributary of Wampus Brook. Twelve sediment samples were collected from six borings at depths ranging from surface (0-6 inches) to near-surface (6-12 inches bgs) at each boring location. Samples were identified in the field with the following nomenclature: CW3A/1 0-6", CW3A/1 6"-12" to CW3A/6 0-6", CW3A/6 6"-12". The samples were analyzed for PCBs utilizing USEPA Method 8082.

4.1 Chemical Characterization

The sediment laboratory analytical data were compared to the established screening level criteria presented in the *NJDEP Guidance for Sediment Quality Evaluations* (November 1998). This evaluation included at least two samples from each boring to assess the sampling data and to identify potential contaminants of concern. For marine/estuarine sediment screenings, the guidelines define two guidance concentrations for Total PCBs, an Effects Range-Low (ER-L) and an Effects Range-Medium (ER-M). The ER-L (0.023 mg/kg Total PCBs) represents the concentration at which adverse benthic effects are found in approximately 10% of studies. The ER-M (0.180 mg/kg Total PCBs) represents the concentration at which a greater than 50% incidence of adverse effects to sensitive species and/or life stages is likely to occur. The ER-L and ER-M are not regulatory cleanup standards. An exceedence indicates a potential risk to the benthic community and helps determine the need for further investigations (e.g., toxicity testing, tissue bioassays, etc.). However, an exceedence of the ER-L/ER-M criteria does not necessarily mandate further investigations if the sediments proximal to the site have similar contaminant concentration ranges to upgradient sediments. As stated previously, the samples were collected beginning with the downstream location (B-1) and proceeding to the upstream location (B-6). Therefore, the upgradient sediments are most closely represented by the laboratory data results for location B-6 (**Table 4-1**). No PCBs were detected in sediment samples collected at this location or any other location at the site.

Based on the *NJDEP Guidance for Sediment Quality Evaluations* (November 1998), the Lowest Effects Levels (LEL) and the Severe Effects Levels (SEL) are to be used as guidelines for individual Arochlors. Arochlor 1254 is the only Arochlor found at the Main Post landfill sites, which is the location of all of the remaining landfill sites with uses similar to CW-3A. The LEL indicates concentrations at which adverse benthic impacts may begin to occur (level tolerated by most benthic organisms). The SEL is a contamination level that indicates severe impacts to the benthic community in most cases studied. Both the LEL and the SEL are derived from freshwater sediment screening criteria; however, they are used in conjunction with the marine/estuarine ER-L and ER-M values for screening purposes. The ER-L and ER-M apply to Total PCBs, whereas the LEL and SEL can be used for screening purposes for individual Arochlors.

In the case of non-polar organic compounds, such as PCBs, it may be necessary to modify the SEL to create a Site-specific SEL (SSEL) based on the Total Organic Carbon (TOC) fraction present in the sample. The TOC fraction is used to determine if the samples were collected in depositional zones, evidenced by a higher percentage of fine-grained particles. Depositional zones are generally the areas of highest potential contamination and are targeted during Site sampling events. To calculate a SSEL, the SEL is multiplied by the TOC fraction. If the TOC of the samples is not measured during sampling, as is the case at the CW-3A Landfill site, a default value of 1% is used. In this instance, each SEL is multiplied by 0.01 to derive the SSEL for comparison purposes. At the CW-3A, no Arochlors were detected. However, at other Fort Monmouth landfill sites, the only Arochlor detected in the sediments was Arochlor 1254. The LEL, SEL and SSEL for Arochlor 1254 are shown below.

Polychlorinated Biphenyl	LEL (mg/kg, dry weight)	SEL (mg/kg organic carbon, dry weight)	SSEL (mg/kg)
Arochlor 1254	0.060	34	0.34

mg/kg=milligrams per kilogram

The USEPA, Region II, and the NJDEP Bureau of Environmental Evaluation and Risk Assessment/Environmental Toxicology and Risk Assessment (BEERA/ETRA) have discontinued the SSEL approach for general screening purposes except in cases of borderline screening exceedances and/or a weight of professional evidence suggesting that the SSEL is appropriate. The SSEL approach is discussed here for completeness, but was not otherwise used to formulate site-related environmental risk decisions or conclusions.

The results of the laboratory analysis indicate no detections of PCBs above the laboratory MDL in any of the 12 samples. Therefore, there were no exceedences of the NJDEP guidance criteria for sediment quality and no potential exists for long-term adverse benthic effects in the unnamed tributary of Wampum Brook associated with the CW-3A Landfill site. The sample results are summarized in **Table 4-1**. The laboratory data sheets are available in **Appendix D**.

4.2 Quality Assurance/Quality Control (QA/QC)

In order to verify the reliability of the analytical results, VERSAR reviewed the holding times for each sample and the results of the analysis of each sample. All samples were analyzed by the FMETL within the prescribed holding time requirements for each analytical method.

No field duplicate samples were taken.

5.0 CONCLUSIONS

Based on the results of this sediment quality evaluation, no PCBs were detected above the MDL in any sample. Therefore, No Further Action is recommended for the CW-3A Landfill site related to potential PCB impacts to the sediments of the unnamed tributary of Wampum Brook.

6.0 REFERENCES

- Fort Monmouth Directorate of Public Works Letter to New Jersey Department of Environmental Protection, Re: *Site Investigation of Suspected Landfill – Site CW-3A*, January 9, 1998.
- Fort Monmouth Environmental Testing Laboratory (FMETL), *Analytical Data Package – Stream Sediments – M3 Landfill*, April 19, 2000
- Jablonski, L.A., 1968. *Groundwater Resources of Monmouth County, New Jersey. USGS Special Report 23*. USGS, Washington, DC.
- Meisler, H., J.A. Miller, L.L. Knobel, and R.L. Wait. 1988. “Region 22, Atlantic and Eastern Gulf Coastal Plan.” *In: Hydrogeology: The Geology of North America*, W. Back, J.S. Rosenhein, and P.R. Seaber, editors. Vol. 0-2. pp. 209-218.
- Minard, J.P., 1969. *Geology of Sandy Hook Quadrangle in Monmouth County, New Jersey*. U.S. Government Printing Office, Washington, DC.
- New Jersey Administrative Code (NJAC) 7:26E - *Technical Requirements for Site Remediation*.
- New Jersey Department of Environmental Protection - *NJDEP Guidance for Sediment Quality Evaluations (November 1998)*.
- New Jersey Geological Survey Map, 1994.
- TVS (TECOM-Vinnell Services), 2000. *SITE INVESTIGATION PLAN – Installation Landfill Program Sediment Sampling Plan for Nine Former Landfill Sites*.
- USGS (U.S. Geological Survey), 1981. Long Branch Quadrangle Map.
- VERSAR, Inc. (VERSAR), September 8, 1999. Subject: *Indefinite Quantity Delivery Contract No. DACA51-98-D0006, Fort Monmouth, Contract Support Services Relating to the Development of Four Remedial Action Reports*.
- WESTON (Roy F. Weston, Inc.), 1993. *Investigation of Suspected Waste Sites at Fort Monmouth, New Jersey*.
- WESTON (Roy F. Weston, Inc.), 1995. *Site Investigation Report - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey*, December 1995.
- Zapeczka, O. 1989. *Hydrogeologic Framework of the New Jersey Coastal Plain*. USGS Professional Paper 1404-B. U.S. Government Printing Office, Washington, DC.

TABLES

Table 3-1
Sediment Sampling Summary
CW-3A Landfill Site
Fort Monmouth, New Jersey

Boring ID	Field Sample Location ID	Laboratory Sample ID	Date Collected	Time Collected	Sample Depth (in bgs) ⁽¹⁾	Coordinates Northing	Coordinates Easting	Analysis	General Soil Description
B-1	CW3A/ 1 0-6"	5325.01	4/10/2000	0840	0-6"	531949.077	607352.088	PCBs ⁽²⁾ (SW-846 Method 8082)	Medium Dark Brown Sandy Silt
	CW3A/ 1 6-12"	5325.02	4/10/2000	0844	6"-12"				
B-2	CW3A/ 2 0-6"	5325.03	4/10/2000	0855	0-6"	531799.361	607233.53	PCBs (SW-846 Method 8082)	Medium to Dark Brown Sandy Silt w/Small Angulars & Brown Glass Fragments
	CW3A/ 2 6-12"	5325.04	4/10/2000	0856	6"-12"				
B-3	CW3A/ 3 0-6"	5325.05	4/10/2000	0900	0-6"	531688.886	607149.675	PCBs (SW-846 Method 8082)	Dark Brown Fine Sand to Sandy Silt w/Small Rounds & Organic Material
	CW3A/ 3 6-12"	5325.06	4/10/2000	0902	6"-12"				
B-4	CW3A/ 4 0-6"	5325.07	4/10/2000	0905	0-6"	531644.015	606998.489	PCBs (SW-846 Method 8082)	Dark Brown Fine Sandy Silt w/Organic Material
	CW3A/ 4 6-12"	5325.08	4/10/2000	0907	6"-12"				
B-5	CW3A/ 5 0-6"	5325.09	4/10/2000	0917	0-6"	531538.55	606865.719	PCBs (SW-846 Method 8082)	Dark Brown Fine Sandy Silt w/Organic Material
	CW3A/ 5 6-12"	5325.10	4/10/2000	0924	6"-12"				
B-6	CW3A/ 6 0-6"	5325.11	4/10/2000	0938	0-6"	531366.814	606847.325	PCBs (SW-846 Method 8082)	Light to Dark Brown Fine Sandy Silt
	CW3A/ 6 6-12"	5325.12	4/10/2000	0943	6"-12"				

⁽¹⁾ bgs = below ground surface

⁽²⁾ PCBs = Polychlorinated Biphenyls

Table 4-1
PCB Sampling Results
CW-3A Landfill Site
Fort Monmouth, New Jersey

Boring ID	Sample Depth (bgs)	Field Sample Location ID	Laboratory Sample ID	Date Collected	Analytical Results ⁽⁵⁾	MDL ⁽⁶⁾
Total PCBs ER-L⁽¹⁾					0.023	
Total PCBs ER-M⁽²⁾					0.180	
Arochlor 1254 LEL⁽³⁾					0.060	
Arochlor 1254 SEL⁽⁴⁾					34	
B-1	0-6"	CW3A/ 1 0-6"	5325.01	4/10/2000	ND	0.0220
	6"-12"	CW3A/ 1 6-12"	5325.02	4/10/2000	ND	0.0200
B-2	0-6"	CW3A/ 2 0-6"	5325.03	4/10/2000	ND	0.0190
	6"-12"	CW3A/ 2 6-12"	5325.04	4/10/2000	ND	0.0180
B-3	0-6"	CW3A/ 3 0-6"	5325.05	4/10/2000	ND	0.0130
	6"-12"	CW3A/ 3 6-12"	5325.06	4/10/2000	ND	0.0130
B-4	0-6"	CW3A/ 4 0-6"	5325.07	4/10/2000	ND	0.0170
	6"-12"	CW3A/ 4 6-12"	5325.08	4/10/2000	ND	0.0120
B-5	0-6"	CW3A/ 5 0-6"	5325.09	4/10/2000	ND	0.0230
	6"-12"	CW3A/ 5 6-12"	5325.10	4/10/2000	ND	0.0140
B-6	0-6"	CW3A/ 6 0-6"	5325.11	4/10/2000	ND	0.0220
	6"-12"	CW3A/ 6 6-12"	5325.12	4/10/2000	ND	0.0200

Notes:

⁽¹⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (ER-L) - Effects Range-Low

⁽²⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (ER-M) - Effects Range-Medium

⁽³⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (LEL) - Lowest Effects Level

⁽⁴⁾NJDEP Guidance For Sediment Quality Evaluations, November 1998 (SEL) - Severe Effects Level

⁽⁵⁾All Results in milligrams per kilogram (mg/kg)

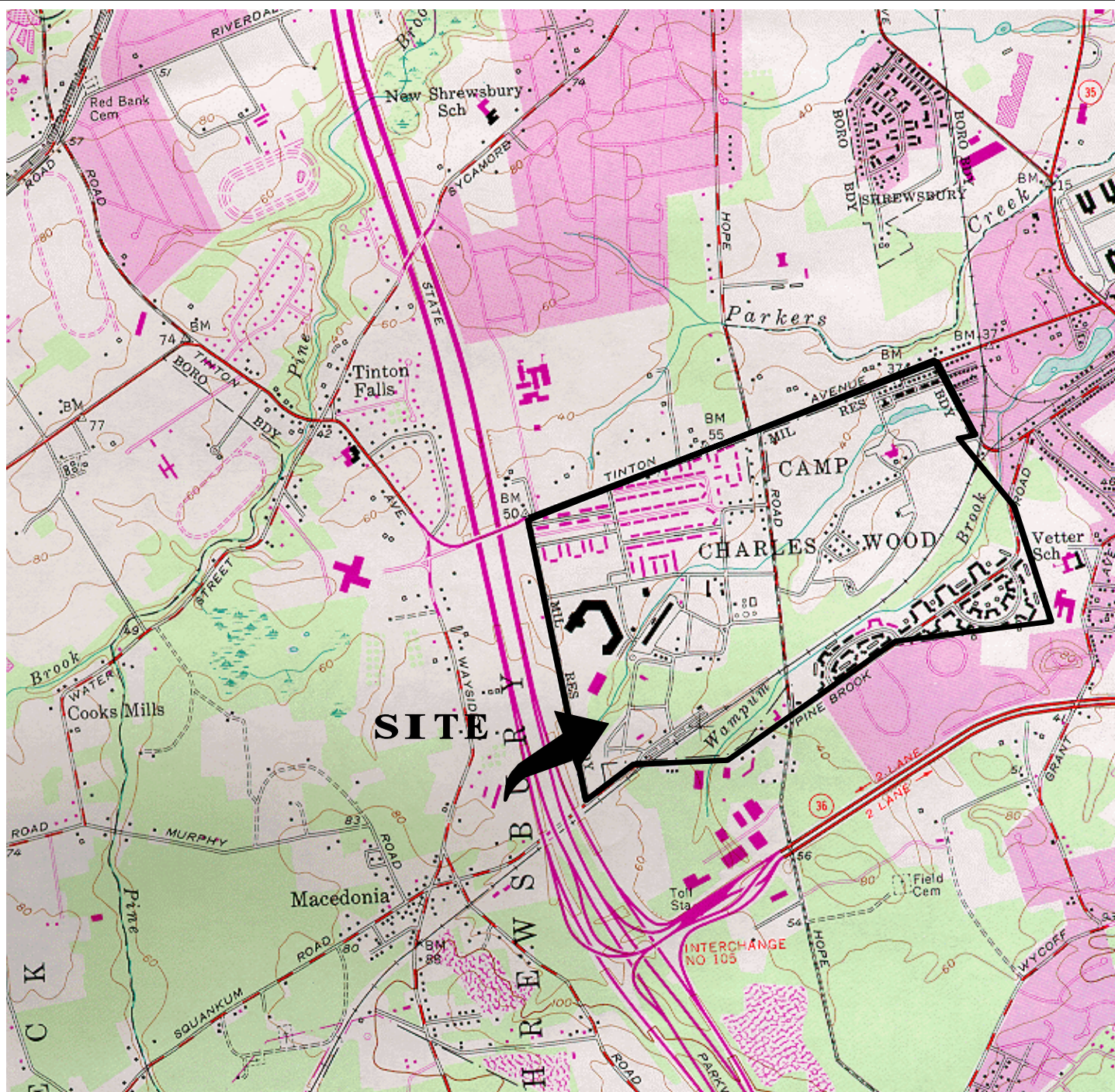
⁽⁶⁾Method Detection Limit (mg/kg) representing Total PCBs

ND = Analyte Not Detected in Sample

Exceedances of the NJDEP Guidances are shaded and printed in **bold-faced** type

PCBs = Polychlorinated Biphenyls

FIGURES



LONG BRANCH, N. J.

40073-C8-TF-024

1954

PHOTOREVISED 1981

DMA 6164 I SE-SERIES V822

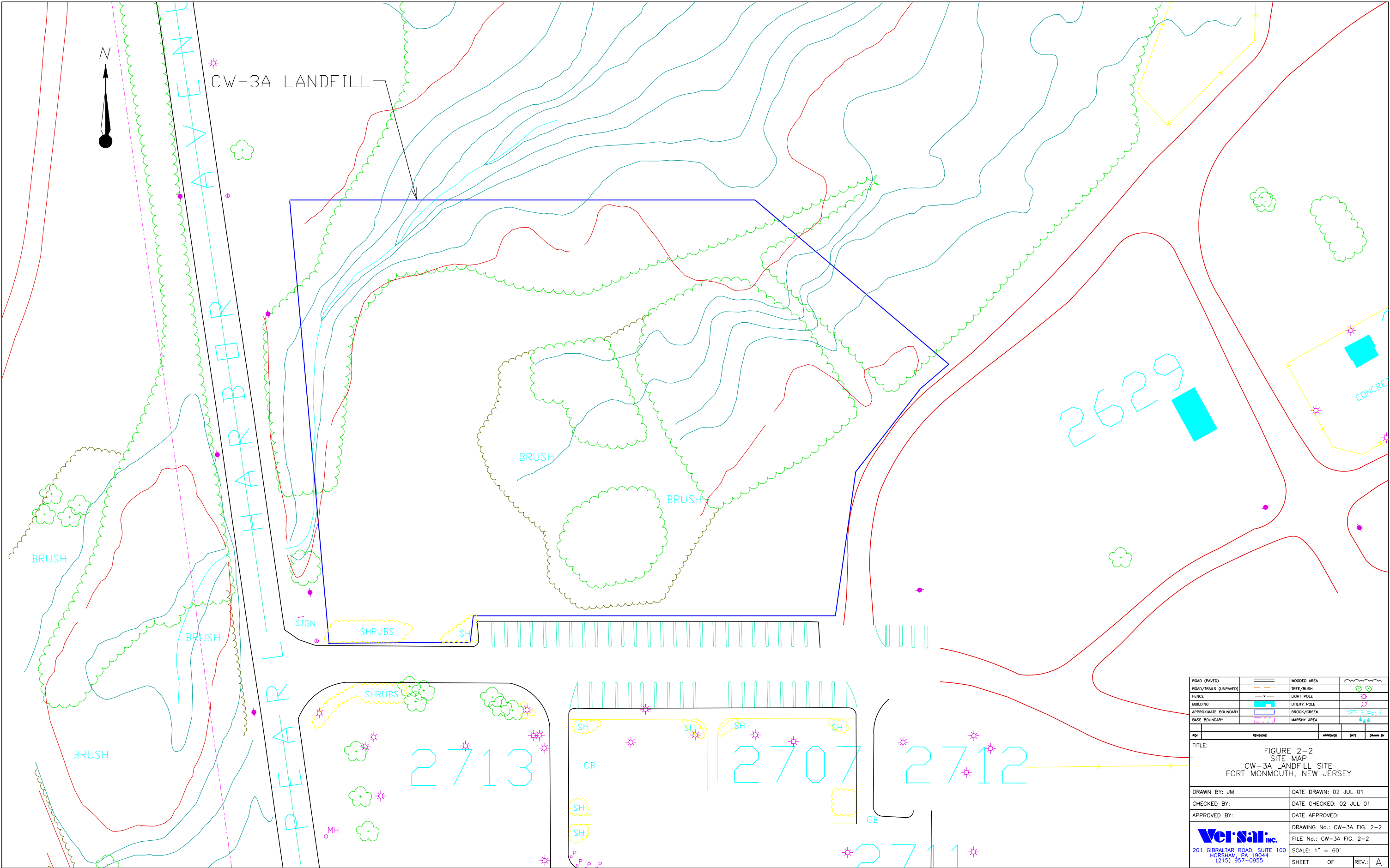


QUADRANGLE LOCATION

Figure 2-1
Site Location Map
CW-3A Landfill Site
Fort Monmouth, New Jersey

Versar INC. 201 Gibraltar Road, Suite 100
Horsham, PA 19044
(215) 957-0955

Mapped, edited and published by the Geological Survey



ROAD (PAVED)		WOODED AREA	
ROAD/TRAILS (UNPAVED)		TREE/BUSH	
FENCE		LIGHT POLE	
BUILDING		UTILITY POLE	
APPROXIMATE BOUNDARY		BROOK/CREEK	
BASE BOUNDARY		MARSHY AREA	

REV.	REVISIONS	APPROVED	DATE	DRAWN BY
TITLE: FIGURE 2-2 SITE MAP CW-3A LANDFILL SITE FORT MONMOUTH, NEW JERSEY				
DRAWN BY: JM		DATE DRAWN: 02 JUL 01		
CHECKED BY:		DATE CHECKED: 02 JUL 01		
APPROVED BY:		DATE APPROVED:		
 201 GIBRALTAR ROAD, SUITE 100 HORSHAM, PA 19044 (215) 957-0955		DRAWING No.: CW-3A FIG. 2-2 FILE No.: CW-3A FIG. 2-2 SCALE: 1" = 60'		
SHEET		OF		REV.: A

Geologic Map of New Jersey

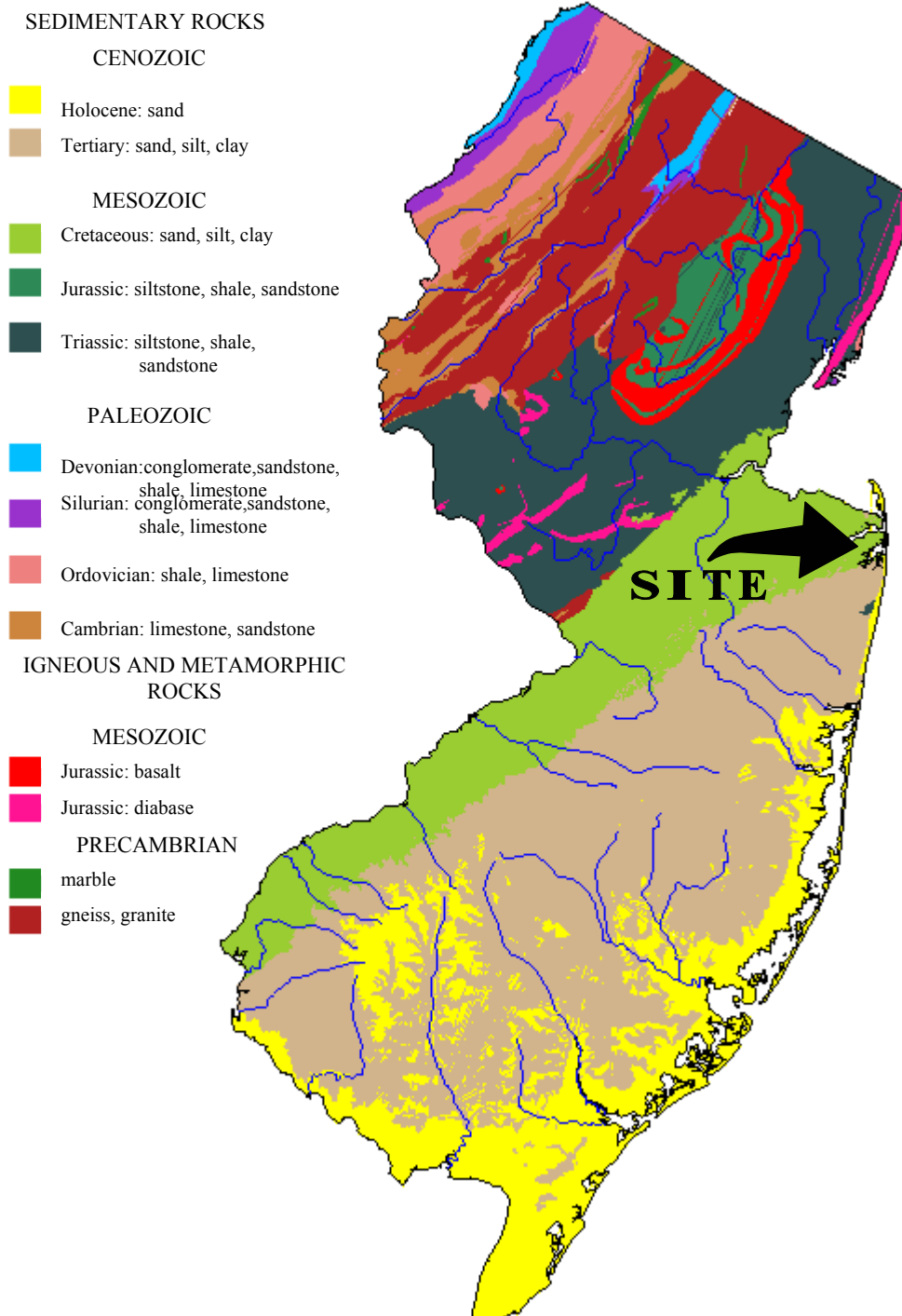
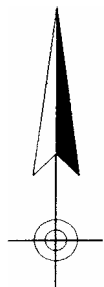
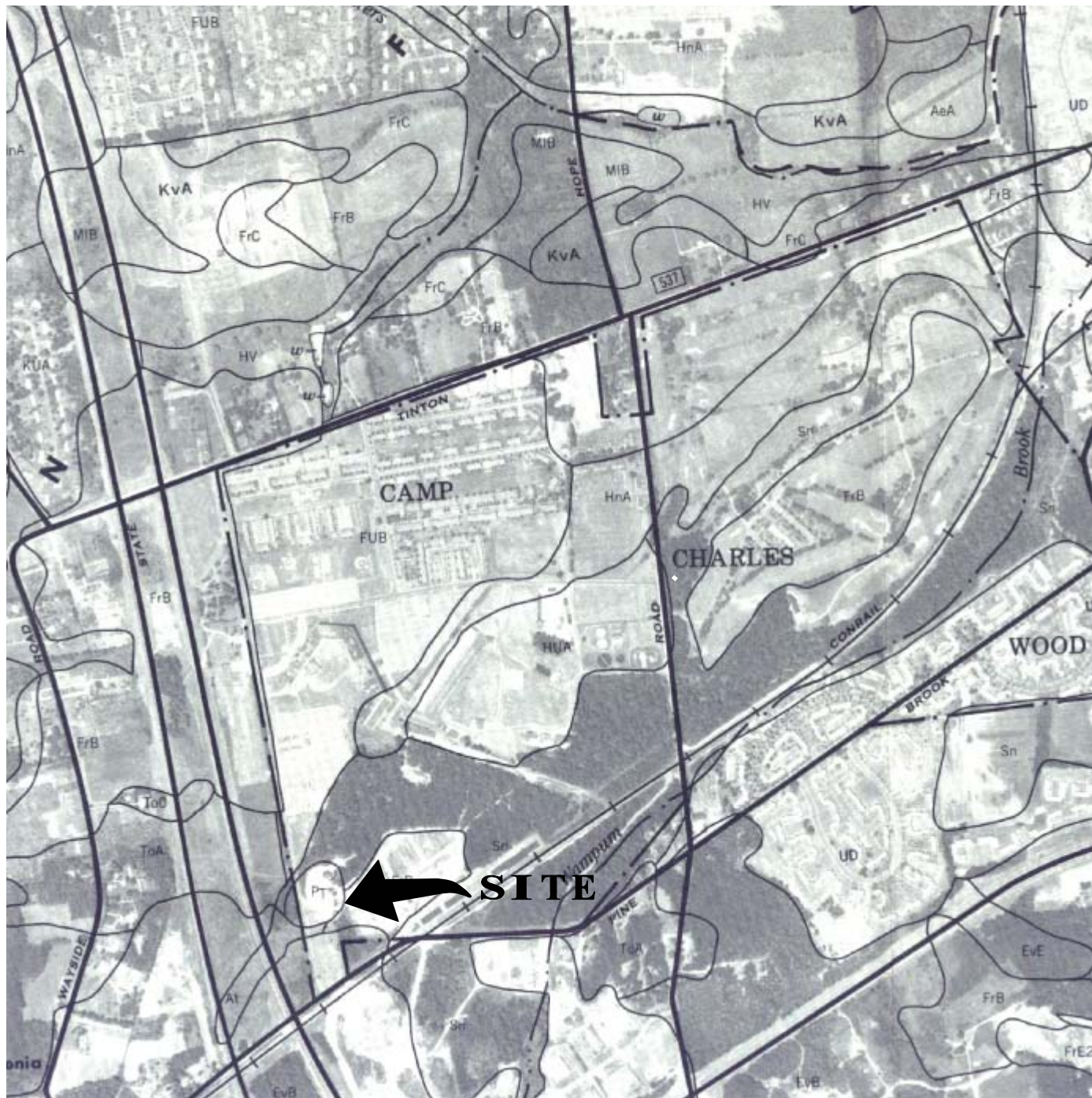


Figure 2-3
Geologic Map of New Jersey
CW-3A Landfill Site
Fort Monmouth, New Jersey

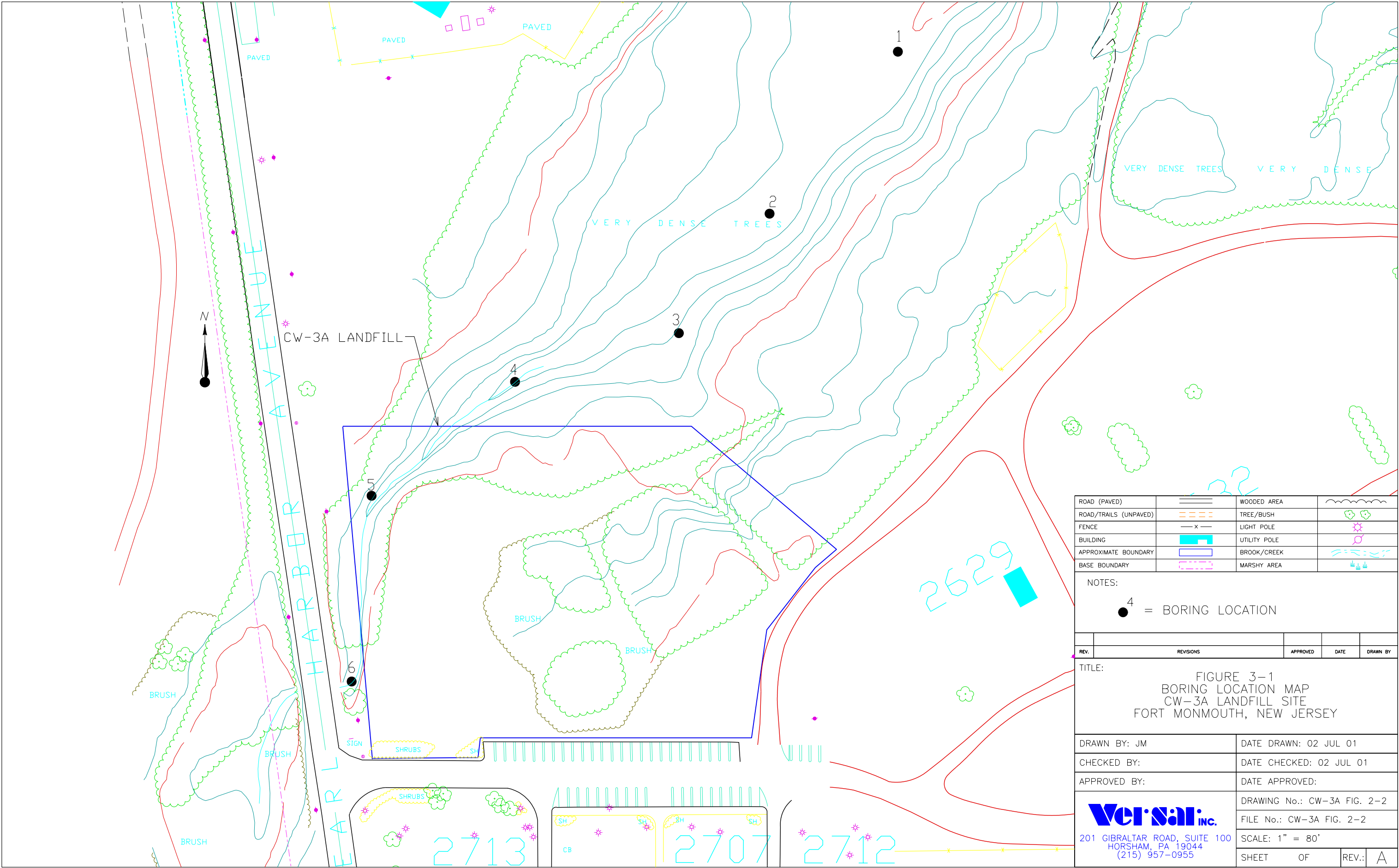
Versar INC. 201 Gibraltar Road, Suite 100
 Horsham, PA 19044
 (215) 957-0955



US Department of Agriculture
Soil Conservation Service
Soil Survey of Monmouth County, NJ
April 1989

Figure 2-4
Soil Map of Monmouth County
CW-3A Landfill Site
Fort Monmouth, New Jersey

Versar INC. 201 Gibraltar Road, Suite 100
Horsham, PA 19044
(215) 957-0955



ROAD (PAVED)		WOODED AREA	
ROAD/TRAILS (UNPAVED)		TREE/BUSH	
FENCE		LIGHT POLE	
BUILDING		UTILITY POLE	
APPROXIMATE BOUNDARY		BROOK/CREEK	
BASE BOUNDARY		MARSHY AREA	

NOTES:

= BORING LOCATION

REV.	REVISIONS	APPROVED	DATE	DRAWN BY
------	-----------	----------	------	----------

TITLE:

FIGURE 3-1
BORING LOCATION MAP
CW-3A LANDFILL SITE
FORT MONMOUTH, NEW JERSEY

DRAWN BY: JM	DATE DRAWN: 02 JUL 01
CHECKED BY:	DATE CHECKED: 02 JUL 01
APPROVED BY:	DATE APPROVED:
 201 GIBRALTAR ROAD, SUITE 100 HORSHAM, PA 19044 (215) 957-0955	DRAWING No.: CW-3A FIG. 2-2
	FILE No.: CW-3A FIG. 2-2
	SCALE: 1" = 80'
SHEET	OF
REV.:	A

APPENDICES

Appendix A

Current Conditions Site Photographs

Appendix A
Current Conditions Site Photographs
CW-3A Landfill Site
Fort Monmouth, New Jersey





Appendix B

Sediment Sampling Plan for Nine Former Landfill Sites (TVS, March 2000)



State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

Mr. Joseph Fallon
Directorate of Public Works
Headquarters, U.S. Army Garrison Fort Monmouth
Fort Monmouth, NJ 07703 - 5101

APR 03 2000

Re: Sediment Sampling Plan
Sites M-2, M-3, M-4, M-5, M-8, M-12, M-14, M-18 and CW-3A
Fort Monmouth Main Post/Charles Wood
Tinton Falls, Monmouth County

Dear Mr. Fallon:

The NJDEP has reviewed the March 29, 2000 Sediment sampling plan for the nine former landfill sites referenced above and we accept the plan as submitted.

The referenced document, developed with NJDEP using appropriate technical guidance documents and requirements, is specifically designed to determine if PCBs have impacted adjacent surface waters.

There are a few brief comments which we have previously discussed, but I wanted to note here as a reminder for you in this investigation.

- The NJDEP requires PCB method 8082 to be utilized.
- Approved sample preservation methods must be used if volatile compounds are to be investigated or reported on.
- Some discussion regarding the sediment criteria utilized along with a discussion on the application to the sample location and water body must be provided in the final report.
- Sampling must be performed on downgradient samples first.

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

Sincerely,

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

FTMMTH65IRC.DOC



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY GARRISON FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY 07703-5101



REPLY TO
ATTENTION OF

Directorate of Public Works

March 29, 2000

State of New Jersey
Department of Environmental Protection
Division of Responsible Party Site Remediation
Bureau of Case Management
401 East State Street
ATTN: Ian Curtis
P. O. Box 028
Trenton, NJ 08625-0028

Re: Sediment Sampling Plan for Nine Former Landfill Sites
(i.e. M-2, M-3, M-4, M-5, M-8, M-12, M-14, M-18 & CW-3A)
Main Post and Charles Wood Area, Fort Monmouth, New Jersey

Dear Mr. Curtis:

Submitted for your review and approval, please find a copy of the above referenced sampling plan. Said plan should enable the Directorate of Public Works to ascertain whether polychlorinated biphenyls are present within stream sediments bordering the nine referenced landfills. Future site work will be based upon the findings of this sampling initiative.

Should you have any questions or require any additional information regarding this plan, please contact the undersigned at the following telephone number: (732) 532-6223.

Sincerely,

Joseph M. Fallon, CHMM
Environmental Protection Specialist
Directorate of Public Works

Encl.

**United States Army
Directorate of Public Works
Fort Monmouth, New Jersey**

**Installation Restoration Program
Sediment Sampling Plan for
Nine Former Landfill Sites**

March 2000

SITE INVESTIGATION PLAN

Installation Restoration Program Sediment Sampling Plan for Nine Former Landfill Sites

PREPARED FOR:

**JOSEPH FALLON
PROJECT MANAGER
Directorate of Public Works
BUILDING 173
FORT MONMOUTH, NJ 07703
(732)-532-6223**

PREPARED BY:

**TECOM-VINNELL SERVICES (TVS)
ENVIRONMENTAL OFFICE
BUILDING 173
FORT MONMOUTH, NJ 07703**

TABLE OF CONTENTS

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1.1 Overview	4
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1.3 Health and Safety	5
2.0 SITE INVESTIGATION ACTIVITIES	
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1.0 SAMPLING ACTIVITIES

1.1 OVERVIEW

This report provides details for a proposed sediment sampling plan as prepared by TECOM-Vinnell Services (TVS) on the behalf of the U.S. Army Fort Monmouth, Directorate of Public Works (DPW), Fort Monmouth, New Jersey. The purpose of this sampling initiative is to ascertain whether Polychlorinated Biphenyls (PCBs) are present within stream sediments which border nine former landfill sites (i.e. M-2, M-3, M-4, M-5, M-8, M-12, M-14, M-18 and CW-3A). The streams associated with this investigation include Mill Creek, Lafetra Creek, Parkers Creek, Husky Brook, and an unnamed tributary of Wampum Brook (see attachments 1 & 2). The data generated from this study will be used in conjunction with other previously collected data involving surface soils, subsurface soils, ground water and surface water. As part of the larger, ongoing remedial investigation at these nine landfill sites, PCBs were identified within subsurface soils at landfill sites M-2 and M-8. The Final Site Investigation (SI) Report, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas (December 1995) identifies electronic components as one of the waste types being disposed of within the subject landfills. Said components (i.e. electrical ballasts) typically contained small quantities of insulating oil which may or may not have contained PCBs. Based upon the potential presence of electronic components at the other seven landfill sites, PCBs may also exist within subsurface soils at these locations. As part of previously conducted sampling initiatives, the DPW has been able to document that the PCBs identified at sites M-2 and M-8 have not impacted site ground water or surface water. Furthermore, PCBs have not been identified within site ground water or surface water at the other landfill sites. The overall goal of the proposed sampling plan is to document that the presence of PCBs at sites M-2 and M-8 have not impacted the nearby stream sediments.

This investigation will be conducted by TVS personnel in accordance with the specifications required for collecting sediment samples as determined by the New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual (May 1992) and the NJDEP Guidance For Sediment Quality Evaluations (November 1998).

1.2 SITE DESCRIPTION

Mill Creek is located along the northern side of the M-2 landfill (approximate distance 1,400 feet) and along the western side of the M-4 landfill (approximate distance 360 feet) and the M-5 landfill (approximate distance 570 feet). Lafetra Creek runs along the northern side of the M-3 landfill (approximate distance 1,200 feet), joining with Mill Creek to form Parkers Creek. Parkers Creek surrounds the M-8 landfill (approximate distance 1,500 feet) on the western, northern, and eastern sides. It then runs along the western side of the M-18 landfill (approximate distance 700 feet). Husky Brook runs along the northern side of the M-12 landfill, eventually running between the M-12 and M-14 landfills (combined approximate distance 1,700 feet) before flowing into Oceanport Creek. An unnamed tributary of Wampum Brook is located along the northern side of the CW-3A landfill (approximate distance 600 feet). Stream banks along the landfills vary from heavily vegetated with trees and bramble to simply grass. A stream bank restoration project is currently underway at the landfill sites located on the Main Post. The project entails stabilizing the stream banks through a combination of hard (rip-rap) and soft (vegetative plantings) engineering practices. All sites vary in steepness and have various access points. The streams flow constantly even in drought conditions and all but the unnamed tributary of Wampum Brook are tidally influenced. Currents and depth vary with tide.

1.3 HEALTH AND SAFETY

Before sampling activities commence, potential site hazards (physical, chemical and biological) will be evaluated by the TVS Health and Safety Office. A site specific Health and Safety Plan shall be prepared accordingly.

2.0 SITE INVESTIGATION ACTIVITIES

2.1 CONTACTS AND PERSONNEL

The following is a listing of all contacts and personnel involved in the investigation. All analyses are to be performed and reported by U.S. Army Fort Monmouth Environmental Laboratory, NJDEP- Certification # 13461. All sampling will be performed under the direct supervision of a NJDEP trained sample technician according to the methods described in the NJDEP Field Sampling Procedures Manual (1992) and as defined in this sampling plan.

The following parties are participants in this investigation:

- Environmental Protection Specialist: Joseph Fallon, CHMM
Employer: U.S. Army, Fort Monmouth Phone Number: (732) 532-6223
- Field Technician: Corey McCormack
Employer: TECOM-Vinnell Services (TVS) Phone Number: (732) 532-0989
- Analytical Laboratory: U.S. Army Fort Monmouth Environmental Laboratory
Contact Person: Daniel Wright - Phone Number: (732) 532-4359
Employer: TECOM-Vinnell Services
NJDEP Certification No.: 13461
- Field Technician Supervisor: Mark Laura
Employer: TECOM-Vinnell Services (TVS) Phone Number: (732) 532-0989
- Health and Safety Personnel: Bruce Wadlington, Chandra Jennings, and John Wierbowski. Employer: TVS - Phone Number: (732) 532-1706

2.2 SAMPLING PROCEDURES AND PROTOCOL

During the investigation, all samples will be collected with proper attention to quality assurance protocols and in accordance with the guidelines set forth by the New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual (May, 1992), the Technical Requirements for Site Remediation (NJAC 7:26E, June, 1993) and the NJDEP Guidance for Sediment Quality Evaluations (November 1998).

2.2.1 SITE ACTIVITIES

Site activities shall include recording field conditions and other relevant observations, sampling sediments, plotting sample locations by use of our Global Positioning System (GPS), decontamination of equipment, and preservation and storage of samples.

2.2.2 SEDIMENT SAMPLING

Sample locations will be determined, sampled, and recorded in the following way:

1. Samples will be taken from clearly discernable depositional areas in and along the streams. In the event that no clear depositional areas can be located, a sample will be taken from the best possible stream bed point at the rate of 1 sample for every 100 feet.
2. Samples will be taken at a depth of 0-6 inches for surface deposits and 6-12 inches for subsurface deposits in each sampling event. Based upon the individual thickness of each depositional area, an 18-24 inch deep sample will also be taken if the desired depth is obtainable.
3. Sampling will commence from downstream, working upstream. Care will be taken to minimize disturbance of sediments and washing of samples as collected.
4. Tide, weather, recent activity, and notable observations will be recorded.
5. A boring log shall be created to note any layers, particle sizes, and defining aspects to each boring.
6. Sampling will be conducted using a hand core sediment sampler.
7. Samples for PCBs analysis will be collected into new, pre-cleaned, 4oz. clear glass jars with Teflon lined caps. All samples will be stored in a cooler at 4 degrees Celsius.
8. After each sampling event, equipment will be decontaminated as stated in section 2.3.
9. Each sample location will be plotted using our GPS.

2.2.3 QA/QC

Quality control samples are required to verify that the sample collection and handling process has not affected the quality of the sediment samples. All field quality control samples will be prepared exactly as regular investigation samples with regard to volume and containers. The following quality control samples will be collected for each batch of samples:

- Field duplicate daily or one every 20 samples; homogenized before splitting.

2.3 EQUIPMENT DECONTAMINATION

Decontamination will be done after every sampling event by the following procedure:

1. Alconox and water wash
2. Water rinse
3. Deionized water rinse
4. Air dry

Appendix C

Soil Boring Logs



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-1

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : CW3A

CW3A Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0							
5325.01	1		SANDY SILT, Med. Dk. Brown.	0840			
4							
8	5325.02	2	SANDY SILT, Med. Dk. Brown.	0844			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-2

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : CW3A

CW3A Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SANDY SILT, Med. w/ Sm. Angulars. Dk. Brown.				
5325.03	1			0855			
4			Brown Glass Fragments				
			SANDY SILT, Med. w/ Sm. Angulars. Dk. Brown.				
8			SANDY SILT, Med. w/ Sm. Angulars. Dk. Brown.				
5325.04	2			0856			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-3

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : CW3A

CW3A Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SAND, Fine. Sm. Rounds w/ organics. Dk. Brown.				
5325.05		1	SANDY SILT, Fine. Some Organic Material. Dk. Brown.	0900			
4							
8							
5325.06		2		0902			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-4

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : CW3A

CW3A Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SANDY SILT, Fine. Dk. Brown.				
5325.07	1		SANDY SILT, Fine. Some Organic Material. Dk. Brown.	0905			
4							
8							
5325.08	2			0907			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-5

(Page 1 of 1)

US ARMY FT. MONMOUTH N.J. SELF-M-PW-EV JOSEPH FALLON			DATE COMPLETED : 04/10/00 SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER SAMPLER : COREY MCCORMACK CONTRACTOR : TVS-PWS-07 ENV. LOCATON : CW3A				
CW3A Landfill Sediments							
Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0			SANDY SILT, Fine. Some Organic Material. Dk. Brown.				
5325.09	1			0917			
4							
8			SANDY SILT, Fine. Some Organic Material. Dk. Brown.				
5325.10	2			0924			
12							
16							
20							
24							



U.S. ARMY
FORT MONMOUTH
SELF-M-PW-EV

LOG OF BORING B-6

(Page 1 of 1)

US ARMY
FT. MONMOUTH N.J.
SELF-M-PW-EV
JOSEPH FALLON

DATE COMPLETED : 04/10/00
SAMPLE DEVICE : WILDCO SEDIMENT SAMPLER
SAMPLER : COREY MCCORMACK
CONTRACTOR : TVS-PWS-07 ENV.
LOCATON : CW3A

CW3A Landfill Sediments

Depth in INCHES	Lab No.	Samples	DESCRIPTION	TIME			
0							
5325.11		1	SANDY SILT, Fine. Lt./ Dk. Brown.	0938			
4							
8							
5325.12		2	SANDY SILT, Fine. Lt./ Dk. Brown.	0943			
12							
16							
20							
24							

Appendix D

Soil Laboratory Data Sheets

(8)

FORT MONMOUTH ENVIRONMENTAL TESTING LABORATORY

DIRECTORATE OF PUBLIC WORKS

PHONE: (732) 532-6224 FAX: (732) 532-6263

WET-CHEM - METALS - ORGANICS - FIELD SAMPLING

CERTIFICATIONS: NJDEP #13461, NYSDOH #11699



ANALYTICAL DATA REPORT
Fort Monmouth Environmental Laboratory
ENVIRONMENTAL DIVISION
Fort Monmouth, New Jersey
PROJECT: Stream Sediments

CW3A Landfill

Field Sample Location	Laboratory Sample ID#	Matrix	Date and Time of Collection	Date Received
CW3A/1 0-6"	5325.01	Sediment	10-Apr-00 08:40	04/10/00
CW3A/1 6-12"	5325.02	Sediment	10-Apr-00 08:44	04/10/00
CW3A/2 0-6"	5325.03	Sediment	10-Apr-00 08:55	04/10/00
CW3A/2 6-12"	5325.04	Sediment	10-Apr-00 08:56	04/10/00
CW3A/3 0-6"	5325.05	Sediment	10-Apr-00 09:00	04/10/00
CW3A/3 6-12"	5325.06	Sediment	10-Apr-00 09:02	04/10/00
CW3A/4 0-6"	5325.07	Sediment	10-Apr-00 09:05	04/10/00
CW3A/4 6-12"	5325.08	Sediment	10-Apr-00 09:07	04/10/00
CW3A/5 0-6"	5325.09	Sediment	10-Apr-00 09:17	04/10/00
CW3A/5 6-12"	5325.10	Sediment	10-Apr-00 09:24	04/10/00
CW3A/6 0-6"	5325.11	Sediment	10-Apr-00 09:38	04/10/00
CW3A/6 6-12"	5325.12	Sediment	10-Apr-00 09:43	04/10/00

ANALYSIS:
FORT MONMOUTH ENVIRONMENTAL LAB
PCB's, %SOLIDS

ENCLOSURE:
CHAIN OF CUSTODY
RESULTS

5-15-00


Daniel Wright/Date
Laboratory Director

CHAIN OF CUSTODY



Fort Monmouth Environmental Testing Laboratory

Bldg. 173, SELFM-PW-EV, Fort Monmouth, NJ 07703

Tel (732)532-4355 Fax (732)532-6263 EMail:wrightd@mail1.monmouth.army.mil

NJDEP Certification #13461

Chain of Custody Record

Customer: <u>J. Fallon</u>				Project No:		Analysis Parameters								Comments: 24°C			
Phone #: <u>X2 6223</u>				Location: <u>CW3A Landfill</u>		PCB's											
() DERA () OMA () Other: _____				Stream Sediments													
Samplers Name / Company: <u>Cory McCormack, TVS</u>				Sample	#									Remarks / Preservation Method			
Lab Sample I.D.	Sample Location		Date	Time	Type	bottles											
5325 .01	CW3A 1 0-6"		4/10/00	0840	Sed	1	✓										
.02	" 1 6-12"			0844	"	1	✓										
.03	CW3A 2 0-6"			0855		1	✓										
.04	" 2 6-12"			0856		1	✓										
.05	CW3A 3 0-6"			0900		1	✓										
.06	" 3 6-12"			0902		1	✓										
.07	CW3A 4 0-6"			0905		1	✓										
.08	" 4 6-12"			0907		1	✓										
.09	CW3A 5 0-6"			0917		1	✓										
.10	" 5 6-12"			0924		1	✓										
.11	CW3A 6 0-6"			0938		1	✓										
.12	" 6 6-12"			0943		1	✓										
Relinquished by (signature): <u>Cory McCormack</u>				Date/Time: <u>4/10/00 1345</u>		Received by (signature): <u>[Signature]</u>				Relinquished by (signature):				Date/Time:		Received by (signature):	
Relinquished by (signature):				Date/Time:		Received by (signature):				Relinquished by (signature):				Date/Time:		Received by (signature):	
Report Type: () Full, () Reduced, () Standard, () Screen / non-certified, () EDD						Remarks: <u>Tide & P/A, Too far inland.</u>											
Turnaround time: () Standard 3 wks, () Rush <u>1 wk</u> Days, () ASAP Verbal _____ Hrs.																	

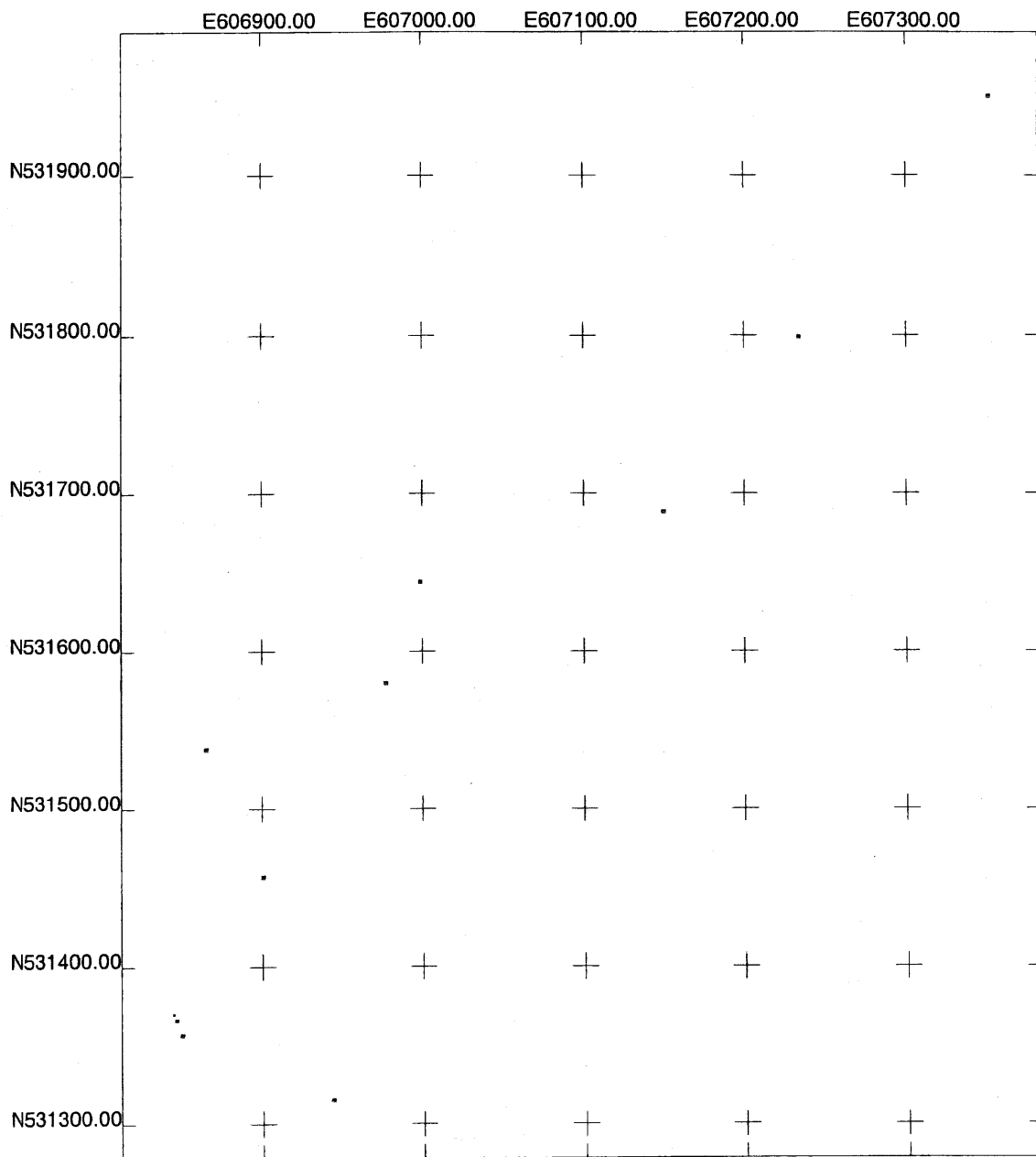
Landfill Stream Sediment PCB's Sample Event Site Field Summary for CW3A

An unnamed tributary of Wampum Brook runs along the northern side of CW3A landfill for approximately 600 feet. The stream is choked by fallen trees, thick vegetation both in it and overhanging the banks. There are some man made materials and garbage scattered the length of the stream. There has been little recent activity.

Flow is constant, with pools never deeper than 2 feet. Tide does not affect this stream at all since it is far enough inland. The weather at the time of sampling was sunny and cold. There was a rain/snow event a day prior to sampling.

Depositional areas are scattered. Sampling targeted these areas. When depositional areas were not present, a sample was taken at the rate of 1 per 100 feet.

GPS



CW3A Landfill Stream Sediments PCB Samples GPS Map

US State Plane 1983
New Jersey (NY East) 2900
NAD 1983 (Conus)



Scale 1:1250
0 150.0

US Survey Feet

cw3a r042717a.cor
04/27/2000
Pathfinder Office
 **Trimble**

CW3A LANDFILL STREAM SEDIMENT PCB'S SAMPLE GPS POSITIONS & COORDINATES

US STATE PLANE 1983 NJ (NY EAST) 2900 NAD 1983 (CONUS)

(IN US SURVEY FEET)

SAMPLE POINTS

<u>POSITION / DESC.</u>	<u>Y COORD. (NORTHING)</u>	<u>X COORD. (EASTING)</u>
1	531949.077	607352.088
2	531799.361	607233.53
3	531688.886	607149.675
4	531644.015	606998.489
5	531538.55	606865.719
6	531366.814	606847.325

REFERENCE POINTS

<u>POSITION / DESC.</u>	<u>Y COORD. (NORTHING)</u>	<u>X COORD. (EASTING)</u>
CW3A MW 01	531316.558	606943.129
STORM DRAIN	531357.198	606850.742
CW3A MW02	531457.293	606900.337
CW3A MW03	531580.459	606976.799

PCB's

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : PBLK507
Date Rec'd:
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location :

Field ID:

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	100.00	0.0022	ND	0.007	53.000	10.00
Arochlor 1221	1	100.00	0.0041	ND	NA	NA	10.00
Arochlor 1232	1	100.00	0.0028	ND	NA	NA	10.00
Arochlor 1242	1	100.00	0.0032	ND	NA	NA	10.00
Arochlor 1248	1	100.00	0.0013	ND	0.030	150.000	10.00
Arochlor 1254	1	100.00	0.0008	ND	0.060	34.000	10.00
Arochlor 1260	1	100.00	0.0007	ND	0.005	24.000	10.00
Total PCB	1	100.00	0.015	ND	0.070	530.000	10.00

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.01
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 1 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	66.10	0.0033	ND	0.007	53.000	10.22
Arochlor 1221	1	66.10	0.0061	ND	NA	NA	10.22
Arochlor 1232	1	66.10	0.0041	ND	NA	NA	10.22
Arochlor 1242	1	66.10	0.0047	ND	NA	NA	10.22
Arochlor 1248	1	66.10	0.0019	ND	0.030	150.000	10.22
Arochlor 1254	1	66.10	0.0012	ND	0.060	34.000	10.22
Arochlor 1260	1	66.10	0.0011	ND	0.005	24.000	10.22
Total PCB	1	66.10	0.022	ND	0.070	530.000	10.22

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Rtx-5 30m/.32mmID/.25um

Column-Confirmation:

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.02
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 1 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	70.77	0.0030	ND	0.007	53.000	10.47
Arochlor 1221	1	70.77	0.0056	ND	NA	NA	10.47
Arochlor 1232	1	70.77	0.0038	ND	NA	NA	10.47
Arochlor 1242	1	70.77	0.0043	ND	NA	NA	10.47
Arochlor 1248	1	70.77	0.0017	ND	0.030	150.000	10.47
Arochlor 1254	1	70.77	0.0011	ND	0.060	34.000	10.47
Arochlor 1260	1	70.77	0.0010	ND	0.005	24.000	10.47
Total PCB	1	70.77	0.020	ND	0.070	530.000	10.47

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.03
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/17/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 2 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	79.69	0.0028	ND	0.007	53.000	10.05
Arochlor 1221	1	79.69	0.0051	ND	NA	NA	10.05
Arochlor 1232	1	79.69	0.0035	ND	NA	NA	10.05
Arochlor 1242	1	79.69	0.0040	ND	NA	NA	10.05
Arochlor 1248	1	79.69	0.0016	ND	0.030	150.000	10.05
Arochlor 1254	1	79.69	0.0010	ND	0.060	34.000	10.05
Arochlor 1260	1	79.69	0.0009	ND	0.005	24.000	10.05
Total PCB	1	79.69	0.019	ND	0.070	530.000	10.05

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.04
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 2 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	21.04	0.0027	ND	0.007	53.000	10.00
Arochlor 1221	1	21.04	0.0049	ND	NA	NA	10.00
Arochlor 1232	1	21.04	0.0033	ND	NA	NA	10.00
Arochlor 1242	1	21.04	0.0038	ND	NA	NA	10.00
Arochlor 1248	1	21.04	0.0015	ND	0.030	150.000	10.00
Arochlor 1254	1	21.04	0.0010	ND	0.060	34.000	10.00
Arochlor 1260	1	21.04	0.0009	ND	0.005	24.000	10.00
Total PCB	1	21.04	0.018	ND	0.070	530.000	10.00

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.05
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 3 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	57.19	0.0019	ND	0.007	53.000	10.19
Arochlor 1221	1	57.19	0.0035	ND	NA	NA	10.19
Arochlor 1232	1	57.19	0.0024	ND	NA	NA	10.19
Arochlor 1242	1	57.19	0.0027	ND	NA	NA	10.19
Arochlor 1248	1	57.19	0.0011	ND	0.030	150.000	10.19
Arochlor 1254	1	57.19	0.0007	ND	0.060	34.000	10.19
Arochlor 1260	1	57.19	0.0006	ND	0.005	24.000	10.19
Total PCB	1	57.19	0.013	ND	0.070	530.000	10.19

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.06
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 3 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	57.40	0.0019	ND	0.007	53.000	10.04
Arochlor 1221	1	57.40	0.0036	ND	NA	NA	10.04
Arochlor 1232	1	57.40	0.0024	ND	NA	NA	10.04
Arochlor 1242	1	57.40	0.0028	ND	NA	NA	10.04
Arochlor 1248	1	57.40	0.0011	ND	0.030	150.000	10.04
Arochlor 1254	1	57.40	0.0007	ND	0.060	34.000	10.04
Arochlor 1260	1	57.40	0.0006	ND	0.005	24.000	10.04
Total PCB	1	57.40	0.013	ND	0.070	530.000	10.04

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.07
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 4 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	43.67	0.0025	ND	0.007	53.000	10.27
Arochlor 1221	1	43.67	0.0046	ND	NA	NA	10.27
Arochlor 1232	1	43.67	0.0031	ND	NA	NA	10.27
Arochlor 1242	1	43.67	0.0036	ND	NA	NA	10.27
Arochlor 1248	1	43.67	0.0014	ND	0.030	150.000	10.27
Arochlor 1254	1	43.67	0.0009	ND	0.060	34.000	10.27
Arochlor 1260	1	43.67	0.0008	ND	0.005	24.000	10.27
Total PCB	1	43.67	0.017	ND	0.070	530.000	10.27

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.08
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 4 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	59.52	0.0018	ND	0.007	53.000	10.30
Arochlor 1221	1	59.52	0.0034	ND	NA	NA	10.30
Arochlor 1232	1	59.52	0.0023	ND	NA	NA	10.30
Arochlor 1242	1	59.52	0.0026	ND	NA	NA	10.30
Arochlor 1248	1	59.52	0.0010	ND	0.030	150.000	10.30
Arochlor 1254	1	59.52	0.0007	ND	0.060	34.000	10.30
Arochlor 1260	1	59.52	0.0006	ND	0.005	24.000	10.30
Total PCB	1	59.52	0.012	ND	0.070	530.000	10.30

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.09
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 5 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	64.91	0.0034	ND	0.007	53.000	10.04
Arochlor 1221	1	64.91	0.0063	ND	NA	NA	10.04
Arochlor 1232	1	64.91	0.0043	ND	NA	NA	10.04
Arochlor 1242	1	64.91	0.0049	ND	NA	NA	10.04
Arochlor 1248	1	64.91	0.0020	ND	0.030	150.000	10.04
Arochlor 1254	1	64.91	0.0012	ND	0.060	34.000	10.04
Arochlor 1260	1	64.91	0.0011	ND	0.005	24.000	10.04
Total PCB	1	64.91	0.023	ND	0.070	530.000	10.04

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.10
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 5 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	55.13	0.0020	ND	0.007	53.000	10.10
Arochlor 1221	1	55.13	0.0037	ND	NA	NA	10.10
Arochlor 1232	1	55.13	0.0025	ND	NA	NA	10.10
Arochlor 1242	1	55.13	0.0029	ND	NA	NA	10.10
Arochlor 1248	1	55.13	0.0011	ND	0.030	150.000	10.10
Arochlor 1254	1	55.13	0.0007	ND	0.060	34.000	10.10
Arochlor 1260	1	55.13	0.0006	ND	0.005	24.000	10.10
Total PCB	1	55.13	0.014	ND	0.070	530.000	10.10

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.11
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 6 0-6"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	67.55	0.0033	ND	0.007	53.000	10.04
Arochlor 1221	1	67.55	0.0061	ND	NA	NA	10.04
Arochlor 1232	1	67.55	0.0041	ND	NA	NA	10.04
Arochlor 1242	1	67.55	0.0047	ND	NA	NA	10.04
Arochlor 1248	1	67.55	0.0019	ND	0.030	150.000	10.04
Arochlor 1254	1	67.55	0.0012	ND	0.060	34.000	10.04
Arochlor 1260	1	67.55	0.0011	ND	0.005	24.000	10.04
Total PCB	1	67.55	0.022	ND	0.070	530.000	10.04

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

Column-Confirmation:

Rtx-5 30m/.32mmID/.25um

Rtx-1701 30m/.32mmID/.25um

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

Client : U.S. Army
DPW. SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Lab. ID # : 5325.12
Date Rec'd: 4/10/00
Extraction Date: 4/12/00
Analysis Date: 4/18/00

Analysis: SW-846 Method 8082
Matrix: Sediment
Analyst: T. Frankovich

Location : CW3A Landfill
Stream Sediments
Field ID: CW3A 6 6-12"

Pesticide/PCB	Dilution Factor	% Solid	MDL (mg/kg)	Result (mg/kg)	Lowest Effects Level (LEL)*	Severe Effects Level (SEL)*	Weight (g)
Arochlor 1016	1	73.57	0.0030	ND	0.007	53.000	10.20
Arochlor 1221	1	73.57	0.0055	ND	NA	NA	10.20
Arochlor 1232	1	73.57	0.0037	ND	NA	NA	10.20
Arochlor 1242	1	73.57	0.0043	ND	NA	NA	10.20
Arochlor 1248	1	73.57	0.0017	ND	0.030	150.000	10.20
Arochlor 1254	1	73.57	0.0011	ND	0.060	34.000	10.20
Arochlor 1260	1	73.57	0.0010	ND	0.005	24.000	10.20
Total PCB	1	73.57	0.020	ND	0.070	530.000	10.20

* NJDEP Guidance For Sediment Quality Evaluations, November 1998

ND = Not Detected

MDL = Method Detection Limit

NA = Not Applicable

Column-Primary:

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