

# Test Pit Investigation Report Site Screening Area (SSA) 4

Naval Air Station  
Joint Reserve Base  
Willow Grove, Pennsylvania



Naval Facilities Engineering Command  
Mid-Atlantic

Contract No. N62467-04-D-0055

Contract Task Order 412

January 2009



TETRA TECH

**TEST PIT INVESTIGATION REPORT  
SITE SCREENING AREA (SSA) 4  
NAS JRB WILLOW GROVE, PENNSYLVANIA**

**Project History and Overview**

In 1986, the Navy Energy and Environmental Support Activity (NEESA) performed an Initial Assessment Study (IAS) on nine potentially contaminated sites at NAS JRB Willow Grove, including SSA 4, also known as Site 4 - North End Landfill. During initial site reconnaissance, a "pool of black tarry waste" measuring approximately 50 square feet was observed on the ground surface near the base of the runway embankment adjacent to the marsh. Analysis of soil samples taken from the "tarry waste" in 1989 indicated total petroleum hydrocarbons (TPH) levels up to 211,000 mg/kg.

The goal of the test pit investigation conducted on September 24, 2008 was to locate and excavate the "tarry waste" reported earlier. Field activities consisted of excavation of one test pit and collection of four subsurface soil samples plus a field duplicate sample for QA/QC purposes. Figure 1 shows the location of Site 4 at the north end of the runway at NAS JRB Willow Grove. Figure 2 shows the approximate soil sample locations. Table 1 summarizes the soil samples collected. Field procedures followed Tetra Tech NUS (Tetra Tech) standard operating procedures (SOPs) as presented in the Work Plan for Test Pit Investigation, Site 4 – North End Landfill (July 2008). Tetra Tech NUS personnel performed all sample collection, sample handling, and sample management throughout the investigation. Berner Construction, Incorporated, of Gap, Pennsylvania, a subcontractor to Tetra Tech NUS, provided the excavating equipment (a Caterpillar 320CL track excavator) and the equipment operation.

**Methods of the Investigation**

Prior to the start of excavating, the Tetra Tech field geologist marked out the proposed excavation dimensions, an area approximately 30 feet by 40 feet centered on the 1989 Site Inspection (SI) soil boring location NELB-1. The proposed dimensions were intended to encompass the extent of the tar encountered during the soil boring investigation conducted by Tetra Tech in May 2008.

Soil was excavated to an approximate average depth of 2 feet. The excavation was extended until all visible tar had been removed. Small, discrete pockets of tar were encountered scattered throughout the excavation area. The tar generally occurred at a depth of approximately 0.5 foot to 1.5 feet. The most concentrated area of tar (approximately 5 feet by 10 feet by 1.5 feet deep) was found at boring location NELB-1.

The finished excavation was irregularly shaped and approximately 50 feet long by 30 feet wide and approximately 3 feet deep at the deepest point, which corresponded with boring location NELB-1. The

excavated soil was loaded directly into dump trucks and transported off-site for proper disposal. A total of approximately 97 tons of soil (four dump truck loads) were excavated and disposed off site. The soil disposal certification documentation is included as Appendix A.

When the excavation was complete, four confirmation soil samples were collected to document the condition of the remaining soil. The soil samples were collected directly from the excavation using disposable trowels and were analyzed for Target Compound List (TCL) semi-volatile compounds (SVOCs) and total petroleum hydrocarbons (TPH) diesel range organics (DRO). The soil was described by the site geologist and was screened for evidence of contamination with a photoionization detector (PID). All sampling data were recorded on sample log sheets (included as Appendix B) and in the site logbook by the site geologist. The confirmation soil samples were collected from areas within the excavation where tar had been encountered and excavated. Sample S4-TP01-01 was collected from the floor of the excavation at the location of SI soil boring NELB-1 from a depth of 2.5 to 3 feet; sample S4-TP01-02 was collected from the floor of the western side of the excavation from a depth of 1.5 to 2 feet; and samples S4-TP01-03 and S4-TP01-04 were collected from the southern and northern sidewalls, respectively, from a depth of 1 foot. Photographs taken of the excavation activities are included as Appendix C.

In accordance with the instructions of the Base environmental department, the excavation was not backfilled. After all excavation and confirmation sampling was complete, the sides were tapered to a gentle slope and left as an enhancement to ecological habitat.

### **Analytical Results**

Table 2 summarizes the positive detections from the analytical results and compares them to Pennsylvania Department of Environmental Protection (PADEP) Medium Specific Concentrations (MSCs) for residential soil. Trace levels of polyaromatic hydrocarbons (PAHs), well below the corresponding MSCs, were detected in the two sidewall samples, S4-TP01-03 and S4-TP01-04. There were no SVOCs detected in the two bottom samples, S4-TP01-01 and S4-TP01-02. TPH DRO was detected in all four samples at concentrations ranging from 14.1 mg/kg to 1220 mg/kg. The highest TPH DRO concentrations were detected in the two sidewall samples. There is no published upper limit for TPH DRO from PADEP; however, a maximum concentration of 1,220 mg/kg is generally below any level of concern.

### **Conclusions**

Only low levels of petroleum compounds, below levels of regulatory concern, were encountered in confirmation soil samples taken after soil excavation.

No further action is needed or indicated.

## **TABLES**

**TABLE 1**  
**SOIL SAMPLE SUMMARY**  
**TEST PIT INVESTIGATION**  
**SITE 4 – NORTH END LANDFILL**  
**NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA**

<b>Sample Designation</b>	<b>Soil Sample Depth (ft bgs)</b>	<b>Sample Description</b>	<b>PID Reading (ppm)</b>	<b>Analysis</b>
S4-TP01-01	2.5 - 3	Sandy silt	0	TCL SVOC, TPH DRO
S4-TP01-02	1.5 - 2	Clayey silt, some sand and siltstone fragments	0	TCL SVOC, TPH DRO
S4-TP01-03	1	Clayey silt, some sand	0	TCL SVOC, TPH DRO
S4-TP01-04	1	Sandy silt	0	TCL SVOC, TPH DRO

**TABLE 2**  
**DATA SUMMARY OF POSITIVE ANALYTICAL RESULTS**  
**SITE 4 TEST PIT SOIL SAMPLES**  
**NAS JRB WILLOW GROVE, WILLOW GROVE, PENNSYLVANIA**

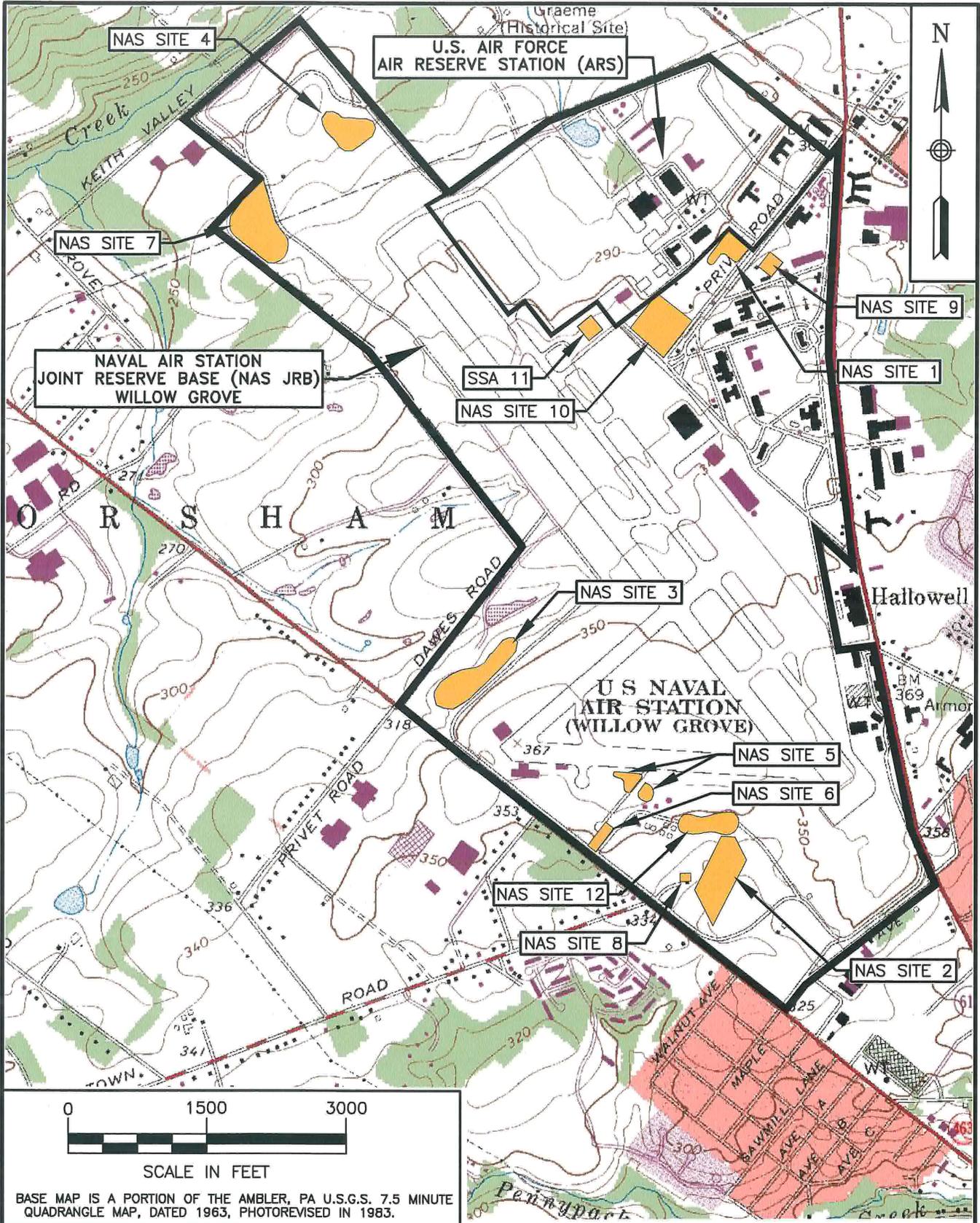
Sample ID:	PADEP MSCs - RESIDENTIAL	S4-TP01-01	S4-FD-01	S4-TP01-02	S4-TP01-03	S4-TP01-04
Sample Date:		09/24/08	09/24/08	09/24/08	09/24/08	09/24/08
Duplicate:			S4-TP01-01			
MISCELLANEOUS PARAMETERS		%	%	%	%	%
Total Solids	NA	85.2	86.3	85.6	82.2	84.1
PETROLEUM HYDROCARBONS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TPH-DRO C10-C44	NA	14.1	23.7	48.8	516	1220
SEMIVOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
2-Methylnaphthalene	4.40E+06	79 U	81 U	79 U	26 J	81 U
Acenaphthylene	1.30E+07	79 U	81 U	79 U	85 U	30 J
Benz(a)anthracene	2.50E+04	79 U	81 U	79 U	53 J	62 J
Benzo(a)pyrene	2.50E+03	79 U	81 U	79 U	78 J	93
Benzo(b)fluoranthene	2.50E+04	79 U	81 U	79 U	96	128
Benzo(g,h,i)perylene	1.30E+07	79 U	81 U	79 U	38 J	43 J
Benzo(k)fluoranthene	2.50E+05	79 U	81 U	79 U	95	91
Chrysene	2.50E+06	79 U	81 U	79 U	71 J	126
Fluoranthene	8.80E+06	79 U	81 U	79 U	123	164
Indeno(1,2,3-cd)pyrene	2.50E+04	79 U	81 U	79 U	32 J	28 J
Phenanthrene	6.60E+07	79 U	81 U	79 U	41 J	54 J
Pyrene	6.60E+06	79 U	81 U	79 U	75 J	116

Data Qualifiers:

J -- Value indicates that the analyte is present but is considered estimated because result is less than the laboratory quantitation limit.

U -- Value indicates that the analyte is not detected. The associated number indicates the approximate sample concentration necessary to be reliably measured.

## FIGURES



BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.



TETRA TECH NUS, INC.

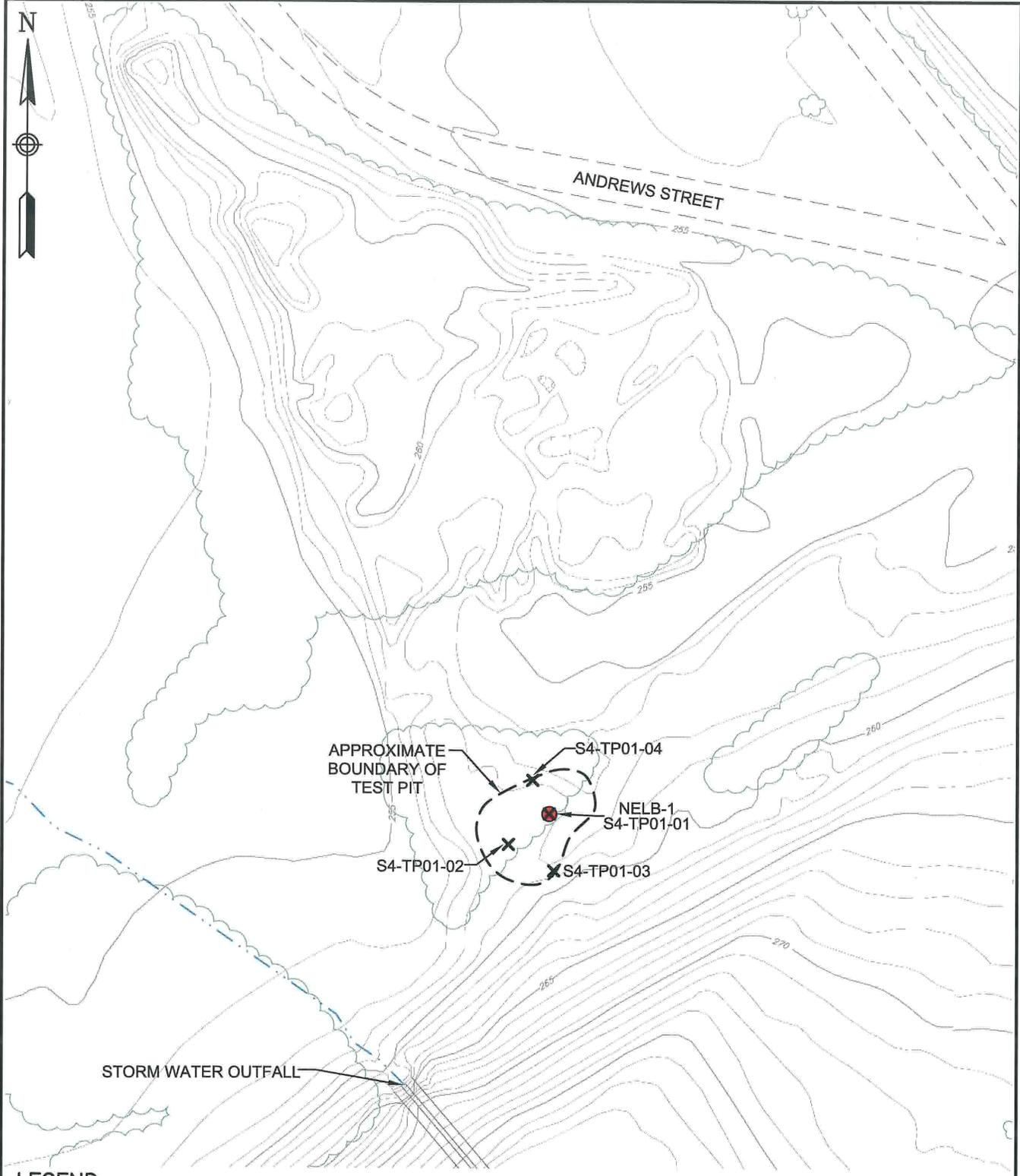
### SITE LOCATION MAP NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA

SCALE  
AS NOTED

FILE  
112G00845CM01

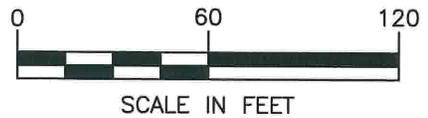
REV DATE  
0 12/31/08

FIGURE NUMBER  
FIGURE 1



**LEGEND**

- SI SOIL BORING LOCATION
- ✕ TEST PIT SAMPLE LOCATION (APPROXIMATE)




**TETRA TECH NUS, INC.**

**SITE 4 – NORTH END LANDFILL  
 TEST PIT INVESTIGATION  
 SEPTEMBER 2008  
 NAS JRB WILLOW GROVE  
 WILLOW GROVE, PENNSYLVANIA**

SCALE AS NOTED	
FILE 112G00845GM02	
REV 0	DATE 01/05/09
FIGURE NUMBER FIGURE 2	

**APPENDIX A**

**SOIL DISPOSAL CERTIFICATION DOCUMENTATION**



CLEAN EARTH of PHILADELPHIA, INC.

3201 South 61st Street · Philadelphia, PA 19153

Phone: 215-724-5520 · FAX: 215-724-2939

A Pennsylvania Department of Environmental Protection Permitted Facility

**CERTIFICATE OF RECYCLING**

Certificate Issued To: NAS JRB Willow Grove, Environmental Division

Clean Earth of Philadelphia, Inc. certifies that 97.24 tons of non-hazardous contaminated soil delivered from NAS JRB Willow Grove Site 4, BLDG 78, identified as Clean Earth Project # 083100292 has been processed and rendered safe for beneficial reuse in accordance with the permit to operate issued to Clean Earth of Philadelphia by the Pennsylvania Department of Environmental Protection.

Authorized Signature:   
Dane M. Tanner, Laboratory Director

Date: 10/15/2008

**Clean Earth of Philadelphia**  
**Profile Report Gross/Tare/Net**  
 Transactions from 09/01/2008 through 09/30/2008  
 Inbound Tickets Only  
 Third Party and Intercompany Customers  
 Sent and Unsent Tickets  
 Full Details

Ticket	Date	Truck	In / Out	Manifest	Customer	Gross	Tare	Net
<b>083100292 - NAS JRB Willow Grove-Site 4</b>					Global Job Number: 106469			
310000012033	09/24/08	CDS11	I	112944	BER520-BERNER CONSTRUCTION	34.78	13.30	21.48
310000012034	09/24/08	RM33	I	112943	BER520-BERNER CONSTRUCTION	32.56	12.81	19.75
310000012040	09/24/08	CDS11	I	112942	BER520-BERNER CONSTRUCTION	42.42	13.30	29.12
310000012041	09/24/08	RM33	I	112945	BER520-BERNER CONSTRUCTION	39.70	12.81	26.89
<b>083100292 - NAS JRB Willow Grove-Site 4</b>								<u>97.24</u>

4 tickets

**Report Grand Totals**

4 tickets

97.24

**APPENDIX B**  
**SOIL SAMPLE COLLECTION LOGS**



Project Site Name: Site 4 Test Pit Investigation  
Project No.: 00845

Sample ID No.: S4-TP01-01  
Sample Location: S4-TP01-01  
Sampled By: \_\_\_\_\_  
C.O.C. No.: \_\_\_\_\_

- Surface Soil
- Subsurface Soil
- Sediment
- Other: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

Type of Sample:  
 Low Concentration  
 High Concentration

GRAB SAMPLE DATA:

Date: 9/24/08	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1235	2.5' - 3'	BROWN	SANDY SILT, moist, no odor
Method: Disposable trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

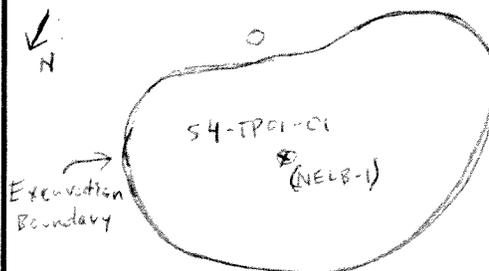
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, DRO (C10-C44)	8 oz. jar	2	

OBSERVATIONS / NOTES:

Sample collected from former sample location NELB-1.

MAP:



Circle if Applicable:

MS/MSD

Duplicate ID No.:

S4-FD-01

Signature(s):

Donald Whalen





Project Site Name: Site 4 Test Pit Investigation  
Project No.: 00845

Sample ID No.: S4-TP01-03  
Sample Location: S4-TP01-03  
Sampled By: DW  
C.O.C. No.:

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

Type of Sample:  
 Low Concentration  
 High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
9/24/08	1'	BROWN	CLAYEY SILT, some SAND MOIST, NO ODOR
Time: 1255			
Method: Disposable trowel			
Monitor Reading (ppm): 0			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			N/A	

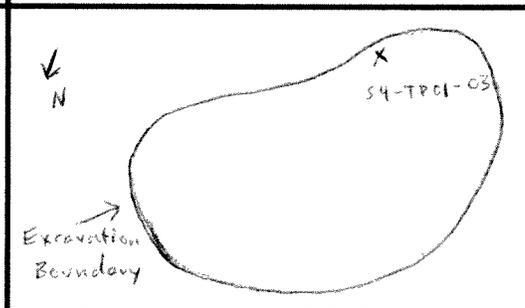
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, DRO (C10-C44)	8 oz. jar	1	

OBSERVATIONS / NOTES:

MAP:

Observations / Notes area (empty)



Circle if Applicable:

Signature(s):

MS/MSD Duplicate ID No.:

Signature: Donald Whalen



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name:	<u>Site 4 Test Pit Investigation</u>	Sample ID No.:	<u>S4-TP01-04</u>
Project No.:	<u>00845</u>	Sample Location:	<u>S4-TP01-04</u>
<input type="checkbox"/> Surface Soil		Sampled By:	<u>D. Whalen</u>
<input checked="" type="checkbox"/> Subsurface Soil		C.O.C. No.:	<u>                    </u>
<input type="checkbox"/> Sediment		Type of Sample:	
<input type="checkbox"/> Other:	<u>                    </u>	<input checked="" type="checkbox"/> Low Concentration	
<input type="checkbox"/> QA Sample Type:	<u>                    </u>	<input type="checkbox"/> High Concentration	

GRAB SAMPLE DATA:			
Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/24/08</u>	<u>1'</u>	<u>BROWN</u>	<u>SANDY SILT; MOIST, no odor</u>
Time: <u>1305</u>			
Method: <u>Disposable trowel</u>			
Monitor Reading (ppm): <u>0</u>			

COMPOSITE SAMPLE DATA:				
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):			<u>N/A</u>	

SAMPLE COLLECTION INFORMATION:			
Analysis	Container Requirements	Collected	Other
<u>SVOC, DRO (C10-C44)</u>	<u>8 oz. jar</u>	<u>1</u>	

OBSERVATIONS / NOTES:	MAP:

Circle if Applicable:		Signature(s):  <u>Donald Whalen</u>
<input type="checkbox"/> MS/MSD	Duplicate ID No.: <u>                    </u>	

**APPENDIX C**  
**PHOTOGRAPHS**



**Photo 1.** View of test pit location prior to start of excavating, looking SE.



**Photo 2.** Start of excavation, showing tar pieces at NELB-1 location.



**Photo 3.** Close-up of excavated tar at NELB-1 location.



**Photo 4.** View of excavation in progress, looking SE.



**Photo 5.** Thin layer of tar exposed in NW wall of excavation.



**Photo 6.** View of excavation in progress, looking SW. NELB-1 in foreground.



**Photo 7.** Tar exposed in southern wall of excavation.



**Photo 8.** Excavating tar exposed in southern wall of excavation, looking SW.



**Photo 9.** Close-up of excavated tar.



**Photo 10.** Tar exposed in western part of excavation.



**Photo 11.** Excavating tar exposed in western part of excavation, looking west.