DEPARTMENT OF THE ARMY
INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON, PICATINNY
PICATINNY ARSENAL, NEW JERSEY 07806-5000
May 28, 2014

SUBJECT: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Interagency Agreement (IAG) Administrative Docket No. II-CERCLA-FFA-001-04: Submittal of page drops related to signed Record of Decision called **No Further Action with Monitoring of Land Use Record of Decision for Sites within PICA 001, 022, 143,163, 171, 192, and 199**

Mr. William Roach
U.S. Environmental Protection Agency
Region 2
290 Broadway, 18th Floor
New York, NY 10007-1866

Mr. Roach:

As discussed, attached are three page drops that were needed to show that Site 113 Army's data base corresponding designation of PICA 146 was part of this ROD. The RI Concept Site 113 is mentioned without a reference to PICA 146 in the existing ROD. RI Concept Site 113 (PICA 146) is also designated as a 'truer' NFA site than the others.

Changes include:

1. Section 1.1: The number "146" added to the list of PICA sites between PICA 143 and 163;
2. Section 1.3: Next to the two mentions of "Site 113" in the first and 4th line of this section: "(PICA 146)" is added to the text;
3. Section 2.4: "146" is also added to the list of sites after "143";
4. Cover page: Title changed to "***No Further Action with Monitoring of Land Use Record of Decision for Sites within PICA 001, 022, 143,163, 171, 192, and 199 and No Further Action for PICA 146***"

Any questions please call or email me.

Sincerely,

Ted Gabel, Project Manager for
Environmental Restoration

Enclosures

CC
Mr. Anne Pavelka, NJDEP

NO FURTHER ACTION WITH MONITORING OF LAND USE RECORD OF DECISION FOR SITES WITHIN PICA 001, 006, 022, 085,143, 163, 171, 192, AND 199 AND NO FURTHER ACTION FOR PICA 146

PICATINNY ARSENAL NEW JERSEY

FINAL, REVISION 1 **MARCH 2014**

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
µg/L	micrograms per liter
ANL	Argonne National Laboratory
ARAR	Applicable or Relevant and Appropriate Requirements
Army	U.S. Department of the Army
AST	Aboveground Storage Tank
BaP	Benzo(a)pyrene
bgs	below ground surface
BSB	Bear Swamp Brook
CEA	Classification Exception Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Identification System
CFR	Code of Federal Regulations
COC	Constituent of Concern
COPEC	Constituent of Potential Ecological Concern
CY	Cubic Yard
DDE	Dichlorodiphenyldichloro-ethylene
DDT	Dichlorodiphenyltrichloroethane
DERP	Defense Environmental Restoration Program
DNT	Dinitrotoluene
ELCR	Excess Lifetime Cancer Risk
EEQ	Environmental Effects Quotient
ER-L	Effect Range-Low Criteria
ERA	Ecological Risk Assessment
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	feet
GCL	Guncotton Line
GIS	Geographic Information System
GPB	Green Pond Brook
GWQS	Ground Water Quality Standards
GWRS	Ground Water Remediation Standards
HHRA	Human Health Risk Assessment
HI	Hazard Index
HMX	Cyclortetramethylenetetra-nitramine
HQ	Hazard Quotient
IGW	Impact to Groundwater
INGAS	a mixture of carbon dioxide and nitrogen
ISQG	Interim Sediment Quality Guidelines
LOC	Level of Concern
LOVA	Low Vulnerability Ammunition
mg/kg	milligrams per kilogram
msl	mean sea level
N.J.A.C.	New Jersey Administrative Code
N.J.S.A.	New Jersey Statutes Annotated
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJSRS	New Jersey Soil Remediation Standards
NPL	National Priorities List
NYSC	New York Sediment Criteria
OSWER	Office of Solid Waste and Emergency Response
PAERAB	Picatinny Arsenal Environmental Restoration Advisory Board
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated biphenyl
PHST	Packaging, Handling, Storage, and Transportation Center
PICA	Picatinny
Picatinny	Picatinny Arsenal
pCi/g	picocuries per gram
PP	Proposed Plan
ppm	part per million
RA	Response Action
RCRA	Resource Conservation and Recovery Act
RDX	Cyclotrimethylenetrinitramene
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SLERA	Screening Level Ecological Risk Assessment
SQB	Sediment Quality Benchmark
SRS	Soil Remediation Standards
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethene
TNT	Trinitrotoluene
TPH	Total Petroleum Hydrocarbon
TR	Transformer
TRV	Toxicity Reference Value
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WWI	World War I
WWII	World War II

1.0 PART 1: DECLARATION

1.1 SITE NAME AND LOCATION

Picatinny Arsenal (Picatinny) formally designated as U.S. Department of the Army (Army), Installation Management Command, Northeast Region, Garrison Office, is located in north central New Jersey in Morris County near the city of Dover. The facility was included on the National Priorities List (NPL) in March of 1990 and assigned a Comprehensive Environmental Response, Compensation, and Liability Identification System (CERCLIS) number of NJ3210020704. The Army signed a Federal Facility Agreement (FFA) with the U.S. Environmental Protection Agency (USEPA) in 1991. The Army is authorized to achieve compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) through the Defense Environmental Restoration Program (DERP) and Executive Order 12580.

This Record of Decision (ROD) addresses surface and subsurface soil, sediment, surface water, and groundwater, unless noted otherwise, at 26 Picatinny sites within the following Picatinny (PICA) sites: PICA 001, 006, 022, 085, 143, 146, 163, 171, 192, and 199, located at Picatinny Arsenal, Rockaway Township, New Jersey (the Site). To ensure that the areas with the greatest potential for environmental contamination were addressed first, the Army categorized the 16 parts of the base into Areas labeled A (greatest potential) through P (least potential). The Army further categorized these Areas into three phases. Phase I included Areas B though G, Phase II included Areas H through K, and Phase III included Areas L through P. The nine PICA sites addressed in this ROD are located within Areas D, I, K, and L, as designated in the Argonne National Laboratory (ANL) Remedial Investigation (Rl) Concept Plan (ANL, 1991).

The RI study sites addressed herein are as follows: one site in Area D (189); 14 sites in Area I, (16, 32, 33, 46, 50, 63/65, 97, 105, 108, 113, 147, 148, 150, and 184); one site in Area K (199); and 10 sites in Area L (17, 18, 35, 91, 161, 162, 166, 168, 169, and 171). These sites and potential response actions were evaluated in the Feasibility Study (FS) (ARCADIS, 2009). The recommended response action was presented in the Proposed Plan (PP) (ARCADIS, 2013) and presented at the public meeting on March 7, 2013.

Area D covers approximately 89 acres and is located in the west-central portion of Picatinny. Area I is located at the approximate center of Picatinny and consists of Picatinny Lake and production and storage facilities located around the shore of the lake. Area K is located in a heavily wooded, central portion of Picatinny, and east of Picatinny Lake. Area L is located near the southeast border of the facility. **Figure 1** presents the site locations.

1.2 STATEMENT OF BASIS AND PURPOSE

This ROD for 26 Picatinny sites presents the Response Action (RA) selected for the sites. The RA is selected in accordance with the CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), and the NCP. The information supporting the decisions on the Selected RA is contained in the administrative record file for the site. These decisions have been made by the Army and USEPA. Comments received from the New Jersey Department of Environmental Protection (NJDEP) were evaluated and considered in selecting the final RA, as well. NJDEP does not concur with the selected response action.

1.3 DESCRIPTION OF THE SELECTED RESPONSE ACTION – NO FURTHER ACTION DECISION

No action is necessary at Site 113 (PICA 146), which can be released for unrestricted use. No further remedial action is necessary for the remaining 25 sites included in this ROD; however, annual monitoring of land use is required at these 25 sites, as they cannot be released for unrestricted use. At Site 113 (PICA 146), there are no unacceptable risks for current or reasonably anticipated future land uses, and there are no unacceptable risks for residential use based on concentrations of constituents in soil, sediment, surface water, or groundwater. For remaining sites, there are no unacceptable cumulative risks (including groundwater) for the current or reasonably anticipated future land uses (military/industrial), and, therefore, remedial action under CERCLA is not warranted although monitoring of the land use is needed

to verify that the assumptions remain valid. Actions are not warranted for groundwater at these sites. Sites 16, 46, 97, 105, 113, 148, 166, 168, and 189, either have no groundwater data associated with them (there were no suspected sources) or have no exceedances of groundwater drinking water standards (Ground Water Quality Standards or GWQS). The regional groundwater actions for Mid-Valley address groundwater exceedances at Sites 17, 18, 35, 161, 162, and 171. As noted in the ROD, Sites 32, 33, 50, 63/65, 91, 108, 147, 150, 184, and 199 have minor, isolated concentrations of various constituents that exceed the GWQS. However, the groundwater at these sites is addressed through the existing site-wide New Jersey Classification Exception Area (CEA) which is an existing land use control at Picatinny. The CEA provides notice that the constituent standards for groundwater at Picatinny do not meet the given aquifer classification criteria due to natural water quality and/or anthropogenic influences, and that designated aquifer uses are suspended in the affected area for the duration of the CEA. The duration for the CEA is anticipated to be at least 35 years, as noted in the timeframe for remediation in the Mid-Valley groundwater ROD (September 2012).

Picatinny has controls in place as components of regular facility operations, which prevent unrestricted use, including: Picatinny access regulations; Picatinny safety program; Army military construction program development and execution; site clearance/soil management procedures; munitions and explosives of concern clearance procedures; Picatinny Installation Master Plan environmental notations, which includes the Picatinny Geographic Information System (GIS or EPRISM) Database that shows the boundaries of each site and any land use restrictions; and procedures followed by the Environmental Directorate of Public Works of the Picatinny Garrison to ensure environmental compliance for construction and other projects. An example of these procedures includes the use of the Picatinny Environmental Management System and its corresponding database. In addition, as noted above, Picatinny Arsenal also has an existing CEA to address the minor, isolated concentrations of constituents that are greater than screening levels in groundwater. Under the CERCLA/NCP process, the “No Further Action” response is considered to be protective of human health and the environment.

To ensure the existing land use remains intact, the Army will conduct annual monitoring. Sites will be visited each year to monitor existing land use, and the Picatinny Master Plan will be reviewed to identify planned future land uses for the sites. The physical site inspection, photographs, and review of land use will be summarized and certified to the USEPA annually. The certification will state that all sites remain military/industrial, that existing controls which prevent unrestricted use remain in place and the selected No Further Action remedy remains protective of human health and the environment. CERCLA Five-Year Reviews will be performed and summarize the results of the monitoring certifying that land use at these sites remained protective of human health. The Army will also notify the USEPA 45 days in advance of any proposed land use changes that are inconsistent with the risk assessment assumptions (military industrial land use). If future land use changes and additional response actions are required to address a risk associated with that land use change, any dispute regarding the extent or scope of that response action will be settled between the USEPA and the Army under the dispute resolution clause of the FFA.

1.4 STATUTORY DETERMINATIONS

For these sites, the risks did not exceed the generally acceptable risk range (1E-06 to 1E-04) or hazard index of 1 for the existing and reasonably anticipated future land use (military/industrial). Therefore, there was no basis for action at these sites.

1.5 AUTHORIZING SIGNATURE

Jason C. MacKay
LTC, LG
Commanding

20MAR14
Date

Walter E. Mugdan, Director
Emergency and Remedial Response Division
United States Environmental Protection Agency, Region 2

MAY 15, 2014
Date

2.0 PART 2: DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

This ROD describes the Selected RA for the 26 Picatinny Sites within PICA 001, 006, 022, 085, 143, 163, 171, 192, and 199 located at Picatinny Arsenal in Rockaway Township, Morris County, New Jersey. Picatinny is an NPL site and is registered under the CERCLIS number NJ3210020704. The Army is the lead agency for CERCLA actions at these sites and USEPA Region 2 is the lead regulatory agency with oversight responsibilities. An FFA was signed, and the sites are being remediated as part of Installation Restoration Program/DERP. In addition, plans and activities are also being coordinated with appropriate state agencies, including NJDEP.

Picatinny Arsenal is a 5,900-acre government-operated munitions research and development facility located in Morris County, New Jersey, approximately 40 miles west of New York City and 4 miles northeast of Dover, New Jersey. The Arsenal sits in the Highlands of the state of New Jersey (**Figure 2**).

This ROD addresses the RA for the sites as follows: one site in Area D (189); 14 sites in Area I, (16, 32, 33, 46, 50, 63/65, 97, 105, 108, 113, 147, 148, 150, and 184); one site in Area K (199); and 10 sites in Area L (17, 18, 35, 91, 161, 162, 166, 168, 169, and 171). Area D covers approximately 89 acres and is located in the west-central portion of Picatinny. Area I is located at the approximate center of Picatinny and consists of Picatinny Lake and production and storage facilities located around the shore of the lake. Area K is located in a heavily wooded, central portion of Picatinny, and east of Picatinny Lake. Area L is located near the southeast border of the facility. **Figure 1** presents the site locations.

The remedial action presented in this ROD was selected by the Army, in partnership with USEPA Region 2, in accordance with CERCLA, as amended by the SARA, and the NCP.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 Picatinny Arsenal Background

Picatinny Arsenal was established in 1880 by the U.S. War Department as a storage and powder depot. Later it was expanded to assemble powder charges for cannons and to fill projectiles with maximite (a propellant). During World War I (WWI), Picatinny Arsenal produced all sizes of projectiles. In the years following WWI, Picatinny Arsenal began projectile melt-loading operations and began to manufacture pyrotechnic signals and flares on a production basis. During World War II (WWII), Picatinny Arsenal produced artillery ammunition, bombs, high explosives, pyrotechnics, and other ordnance. After WWII, Picatinny Arsenal's primary role became the research and engineering of new ordnance. However, during the Korean and Vietnam conflicts, Picatinny Arsenal resumed the production and development of explosives, ammunition, and mine systems.

In recent years, Picatinny Arsenal's mission has shifted to conducting and managing research and development, life-cycle engineering, and support of other military weapons and weapon systems. The facility has responsibility for the research and development of armament items. The Base Realignment and Closure process in 2005 resulted in Picatinny being designated to remain open and to expand in mission.

Picatinny is not closed to the public but access to the Arsenal is strictly controlled. Trespassing and unauthorized activities on Picatinny are illegal. Picatinny has seven elements of site controls including Site Clearance and Soil Management Procedures; Munitions and Explosives of Concern Clearance Procedures; Master Plan Regulations; Picatinny GIS Database; Picatinny Base Access Restrictions; Picatinny Safety Program; and Army Military Construction Program Development and Execution. These controls have been developed with consideration of all reasonably anticipated land uses at the Arsenal including administrative and industrial military operations and outdoor recreation/golf course. The Picatinny Office of the Chief of Security Division and the Public Safety and Environmental Affairs Division are in charge of enforcing these regulations.

2.2.2 Site Investigations

Previous environmental investigations conducted for the Site are listed in **Table 1**.

The media at the following sites were not included because they are addressed within other operable units as listed below:

- Site 108 sediment and surface water are addressed with the Lakes FS;
- Site 161 surface water and groundwater are addressed through the Mid-Valley ROD; and
- Groundwater at Sites 17, 18, 35, 162, and 171 are addressed through the Mid-Valley ROD.

2.2.3 Enforcement Activities

No formal enforcement activities have been conducted for the 26 Picatinny sites. Picatinny is working in cooperation with the USEPA and the NJDEP to apply appropriate remedies that will preclude the necessity of formalized enforcement actions, such as Notices of Violation.

2.3 COMMUNITY PARTICIPATION

The 26 Sites addressed in this ROD have been the topic of presentations at the Picatinny Arsenal Environmental Restoration Advisory Board (PAERAB). PAERAB members have provided comments regarding the Selected RA. A copy of the Final PP (ARCADIS, 2013) was given to the PAERAB's co-chair, and a copy was offered to all PAERAB members. The Final PP for these sites was completed and released to the public on February 22, 2013 at the information repositories listed below:

Installation Restoration Program Office
Building 319
Picatinny Arsenal, New Jersey 07806

Rockaway Township Library
61 Mount Hope Road
Rockaway Township, New Jersey 07866

Morris County Library
30 East Hanover Avenue
Whippany, New Jersey 07981

Multiple newspaper notifications were made to inform the public of the start of the PP comment period, to solicit comments from the public, and to announce the public meeting. The notification was run in the Daily Record and the Star Ledger on February 22, 2013. Copies of the certificates of publication are provided in **Appendix A**. A public meeting was held on March 7 2013 to inform the public about all of the remedial alternatives considered and the Selected RA for the 26 Sites and to seek public comments. At this meeting, representatives from the U.S. Army, NJDEP, USEPA, and the Army's contractor, ARCADIS, were present to answer questions about the site and RAs under consideration. Following the public meeting, a public comment period was held from March 7, 2013 to April 6, 2013 during which written comments were received from NJDEP, and four written comments were received from the public. Public comments and prepared responses from the public meeting are presented in Section 3.0 of this ROD.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses the selection of a RA for the 26 Sites within PICA 001, 006, 022, 085, 143, 146, 163, 171, 192, and 199, including sites: 16, 17, 18, 32, 33, 35, 46, 50, 63/65, 91, 97, 105, 108, 113, 147, 148, 150, 161, 162, 166, 168, 169, 171, 184, 189, and 199. The Selected RA for Site 113 is No Further Action. The Selected RA for the remaining 25 sites is No Further Action with Monitoring of Land Use, which will ensure that the land use remains military/industrial. The Selected RA for these sites is designed to provide protection to human health and the environment.

2.5 SITE CHARACTERISTICS

2.5.1 Physical Characteristics

Size, Topography, and Geology/Hydrogeology

Picatinny consists of 5,900 acres of improved and unimproved property. Picatinny is located in an elongated, U-shaped valley between Green Pond Mountain and Copperas Mountain to the northwest and an unnamed hill to the southeast. Most of the buildings and other facilities at Picatinny are located on the valley floor or on the slopes along the southeast side of the property. Several firing and testing ranges are located on Green Pond Mountain.

Picatinny lies within Green Pond Valley, a glaciated river valley bounded by Green Pond Mountain to the northwest and Copperas Mountain to the southeast. Elevations at Picatinny range from approximately 1,000 feet (ft) above mean sea level (msl) to 700 ft above msl at Green Pond Brook (GPB) at the southern installation boundary. Green Pond Valley is filled with glacially-derived sediments surrounded and underlain by bedrock. The basement rocks are faulted by a series of northeast/southwest trending faults.

The principal source of groundwater in the Green Pond Valley is found in the glacial deposits filling the valley floor. The low-permeability and the steep slopes of Green Pond Mountain and Copperas Mountain restrict infiltration of precipitation in these mountains. As a result, most precipitation flows overland and into the permeable valley fill deposits in the valley center. The small amount of precipitation that enters Green Pond and Copperas Mountains flows down through shallow fractures to the glacial sediments in the valley. Groundwater beneath Picatinny is classified as Class IIA (potable water or water potable after conventional treatment).

Climate

Northern New Jersey has a continental temperate climate controlled by weather patterns from the continental interior. Prevailing winds blow from the northwest from October to April and from the southwest from May to September. The average monthly temperature ranges from a high of about 72 degrees Fahrenheit (°F) in July to a low of about 27°F in January and February. The average date of the last freeze is May 2, and the first freeze is October 8. Average annual precipitation at the Boonton monitoring station located approximately five miles east of Picatinny is 48 inches and is evenly distributed throughout the year.

2.5.2 Site Backgrounds

Area D Sites

Area D is flat with elevations ranging from approximately 695 to 715 ft above msl. Surface water runoff is minimal, as precipitation on the golf course and other undeveloped grassy portions of Area D infiltrates into the ground. Storm drains leading to Bear Swamp Brook (BSB) before it reaches GPB control surface water runoff.

Area D geology consists of the Leithsville Dolomite, which is overlain by glacial sediments. Glacial sediments range in thickness from approximately 100 to 250 ft. Recent swamp deposits occur in the northwest portion of Area D and are represented by organic clays and muck up to 5-ft thick.

Site 189

The site layout is shown on **Figure 3**. Site 189 is a recreational area lined with approximately 20 apple trees scattered throughout the site. The exact age of this site is unknown. However, a 1938 Picatinny map indicates that this site once contained numerous apple trees. In the spring of 2004, Site 189 was re-classified by the Army from an apple orchard to a recreational area.

Three pesticides, 4,4'-Dichlorodiphenyldichloroethylene (DDE) and 4,4'-Dichlorodiphenyltrichloroethylene (DDT), and toxaphene, were detected in excess of levels of concern (LOCs) in one or more surface soil samples. 4,4'-DDE exceeded the LOC in three locations with the maximum concentration of 12 milligrams per kilogram (mg/kg) detected at both 192SS-D6 and 192SS-D8, at 0 – 1 ft. 4,4'-DDT was detected in excess of the LOC in four locations with a maximum concentration of 16 mg/kg reported at 192SS-D8 (0

–1 ft). Toxaphene was found to exceed the LOC in one location (192SS-K3 [0 – 1 ft]) with a concentration of 3.3 mg/kg.

One metal, arsenic, which is commonly applied with pesticides, was detected at concentrations exceeding the LOC in multiple surface soil samples. The maximum concentration detected was 251 mg/kg at 192SS-131-2-6 (0 – 1 ft). In subsurface soils, no pesticides were detected at levels exceeding the respective LOCs. Arsenic slightly exceeded the LOC in one subsurface soil sample (192SS-S3-6 [2 – 3 ft]) with a concentration of 22.3 mg/kg. No other metals were found to exceed the LOC in any of the subsurface soil samples.

Although pesticides and arsenic LOC exceedances are present, 42 United States Code § 9607(i) provides an exception to the general rule of CERCLA liability for contamination resulting from the application of pesticides registered under the Federal Insecticide, Fungicide and Rodenticide Act. In addition, the nearest monitoring well (112-2) is approximately 400 ft downgradient of this site and is located within the golf course area. DDT, DDE, or arsenic was not detected in groundwater from this well. Therefore, there is no indication that groundwater has been impacted from the pesticide applications at Site 189.

Area I Sites

Historical operations in this area included explosives manufacturing, loading and storage, shell washout, and research and development. Area I also contained the main power generating plant for the Arsenal which has been demolished.

Area I encircles Picatinny Lake and the associated flood plain which is present in the main valley floor. The area is bounded to the northwest by Green Pond Mountain and to the southeast by the unnamed ridge. To both the northeast and southwest of the area, the main valley floor continues. Following regional topographic trends, the elevated ridges slope into the valley floor, and the valley floor then slopes gently to the southwest. Surface water bodies in Area I, which include Picatinny Lake and GPB, act as groundwater discharge areas and drain the Installation.

Site 16

The site layout is shown on **Figure 4**. Site 16, the Guncotton Line (GCL), is located near the southern end of Picatinny Lake and is believed to have been either an abandoned sanitary sewer line or a storm drain that inadvertently received nitrocellulose, referred to as guncotton. Reportedly, the GCL was about 2,500 ft long and ran from a pit near Building 554 (Site 32), past Building 506 (Sites 63/65), under the location of the former coal pile, and ended southwest of Picatinny Lake. The GCL is situated in the main valley floor, which slopes gently to the southwest. It includes portions of open trench which collect surface runoff. A drainage divide along the course of the trench channels runs east of Whittemore Road toward Picatinny Lake. The remaining portion of the trench is relatively flat. Water in the remainder of the trench flows south-southwest, but stagnates and generally percolates downward.

In April 2000, a GCL investigation and removal action was conducted to remove nitrocellulose in the GCL and surrounding soil (Shaw, 2001). Approximately 270 ft of 12-inch diameter vitrified clay pipe, 200 ft of the original 8-inch GCL, and surrounding impacted soils to a maximum depth of 8 ft below ground surface (bgs) were removed. In 2010/2011, a new Packaging, Handling, Storage, and Transportation Center (PHST) was constructed over a portion of Site 16 along Whitmore Avenue. Impacted soils from the ditch (approximately 250 cubic yards [CY]) were placed under the asphalt parking area adjacent to the PHST building.

There were no LOC exceedances in surface soils. In the subsurface soils, arsenic was detected at a concentration greater than the LOC (19.0 mg/kg) in 12 samples. The maximum arsenic concentration of 76.9 mg/kg was observed at I-16-EB2, collected at a depth of 5 – 5.5 ft.

In surface sediment samples, two volatile organic compounds (VOCs) were detected at concentrations exceeding their respective LOCs. Acetone exceedances occurred in four locations, with a maximum concentration of 0.05 mg/kg detected at 16SD-5. Trichloroethene (TCE) was detected at a level in excess of the LOC at two locations. The maximum concentration of 0.55 mg/kg was detected at 16SD-8 at a depth of 0 – 1 ft. Two explosives (2,4-dinitrotoluene [DNT] and 2,6-DNT) were detected in several surface sediment samples at concentrations greater than the LOC. The maximum concentrations

occurred at 16SD-1 (0 – 1 ft) with 400 mg/kg 2,4-DNT and 23.9 mg/kg 2,6-DNT. The explosive nitrocellulose was also detected in surface sediment samples. As noted above, there is no LOC for nitrocellulose. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals.

Metals detected at concentrations greater than their respective LOCs in surface sediment included arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, strontium, vanadium and zinc. At 16SD-5 (0 – 1 ft), the maximum concentrations of arsenic (100 mg/kg) and beryllium (3.35 mg/kg) were observed. At 16SD-8 (0 – 1 ft), the maximum concentrations of lead (4,150 mg/kg) and vanadium (1,500 mg/kg) were observed. At 16SD-1 (0 – 1 ft), the maximum concentrations of cadmium (2.20 mg/kg) and zinc (1,280 mg/kg) were detected. At 16SD-2 (0 – 1 ft), the maximum concentrations of copper (173.0 mg/kg) and silver (10.30 mg/kg) were detected. At 16SD-3 (0 – 1 ft), the maximum concentrations of mercury (1.45 mg/kg) and nickel (344.0 mg/kg) were detected. Strontium exceeded the LOC (16 mg/kg) in eight sample locations with a maximum concentration in sample 16-SD-05 with a concentration of 190 mg/kg.

Explosives were detected in subsurface sediment samples. The 2,4-DNT concentration exceeded the LOC in three samples with a maximum of 110.0 mg/kg occurring at 16SD-10A (2 – 3 ft). The concentration of 2,6-DNT exceeded the LOC in the same sample, with a concentration of 8.1 mg/kg. Nitrocellulose, which does not have an established LOC, was also detected in subsurface sediment samples.

Eight metals, including arsenic, chromium, copper, lead, mercury, nickel, vanadium, and zinc, were detected in excess of their respective LOCs in several subsurface sediment samples. The maximum arsenic concentration of 18.0 mg/kg was detected at 16SD-2 (2 – 3 ft). The following maximum concentrations were detected at 1SD-1 (2 – 3 ft): 140.0 mg/kg copper, 1.10 mg/kg mercury, 301.0 mg/kg nickel, and 406.0 mg/kg zinc. At 16SD-8 (2 – 3 ft), maximum concentrations of several other metals were detected: 1,390 mg/kg lead, 1.10 mg/kg mercury, and 699.0 mg/kg vanadium. No other compounds in subsurface sediment were detected at levels greater than their respective LOCs. Strontium was not analyzed for in the subsurface samples.

Site 32

The site layout is shown on **Figure 5**. Site 32 covers 1.5 acres, located on a hill approximately 600 ft southeast of Picatinny Lake in the southeastern portion of Area I, and contains Building 553 - constructed in 1942 as an open concrete structure to house 11 aboveground storage tanks (ASTs). The primary function of the tanks in Building 553 was to support the manufacturing of nitrocellulose, which took place in the surrounding buildings. The tanks were removed in 1991 as part of a Resource Conservation and Recovery Act (RCRA) closure; however, use of the tanks ceased sometime before 1980. Building 553 has since been demolished. The 11 tanks at former Building 553 are believed to have ranged in capacity from 3,000 to 10,000 gallons. These tanks were used to store ether, alcohol, diesel fuel, unknown process wastes, mixed solvents, and spent solvents containing explosives and propellant wastes. According to Picatinny personnel, an unknown quantity of liquid was released when a valve assembly on one of the tanks failed. Otherwise, there are no known reports of major spills from the tanks. In 2009, this site was included in the construction area for the New Pyrotechnic Building.

No VOCs, semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), or total petroleum hydrocarbons (TPHs) were detected at concentrations greater than their respective LOCs in the surface and subsurface soil samples. No explosives were detected in the samples. No inorganic compounds were detected in excess of LOCs. The maximum concentration of arsenic detected in soil (10.5 mg/kg) is lower than the LOC of 20 mg/kg while slightly higher than the surface soil background concentration of 9.34 mg/kg. All radiological concentrations detected in surface soil samples were lower than background levels.

In the groundwater samples, no constituents were detected in excess of their LOCs with the exception of a marginal exceedance for lead in one location (6.28 micrograms per liter [µg/L] at 32MW-2). Some of the surrounding sites, which include Site 50, 150, and 147 also appear to have some wells with marginal exceedances of the lead LOC in groundwater. The most recent sampling conducted at these sites,

including Site 32, was collected in 1996. The surrounding sites are not very close to Site 32, and groundwater contamination was not identified as a concern at Site 32 during the RI process.

Site 33

The site layout is shown on **Figure 6**. Site 33 is a small site measuring approximately 0.2 acres in area, located on the southeastern shore of Picatinny Lake and contains Building 527A. Building 527A was a small rectangular building that formerly operated as a pump house for Building 527. Two steel ASTs (with a combined capacity of 6,325 gallons) were housed just east of the pump house. It is known that the ASTs stored spent ethyl alcohol contaminated with nitrocellulose from Building 527. The spent ethyl alcohol was conveyed to the ASTs via an aboveground conveyance. The ASTs were removed and the building was demolished in 1991 as part of a RCRA closure.

No VOCs, TPH, PCBs, or pesticides were detected at concentrations greater than the LOC in surface or subsurface soil samples. Benzo(a)pyrene (LOC = 0.2 mg/kg) was detected in one surface sample (33-MW-001) with an estimated concentration of 0.5 mg/kg. The only explosive to be detected above the LOC is 2,4-DNT in samples 33SS-001 and 33SS-002. At these sample locations, DNT exceeded the LOC (4.2 mg/kg) with concentrations of 15.9 mg/kg and 57 mg/kg, respectively.

One metal, arsenic, was detected in excess of the LOC in both surface and subsurface soil samples. The maximum arsenic concentration occurred at 33MW-1: 84 mg/kg in surface soil (0 – 2 ft) and 43 mg/kg in subsurface soil (5 – 7 ft).

In groundwater, the VOC methylene chloride was the only constituent that exceeded its respective LOC (3 µg/L). The methylene chloride exceedance was reported at 33MW-1 with a maximum concentration of 6.9 µg/L, with the duplicate concentration of 3.9 µg/L. Methylene chloride was only detected above the LOC at Site 184 in one well with a marginal exceedances of 4.2 µg/L. Methylene chloride is a common laboratory contaminant, and, based on the marginal exceedances and lack of prevalence at surrounding sites, methylene chloride is not a concern at this site.

Sediment and surface water sampling in Picatinny Lake are discussed in a separate FS for PICA 057 that addresses the lakes at Picatinny Arsenal.

Site 46

The site layout is shown on **Figure 7**. Site 46 is located approximately 300 ft southeast of Picatinny Lake and contains Building 507. Building 507 was constructed in 1929 for use as a train engine maintenance facility. From 1987 to the present, Building 507 has been used as a garage facility for utility line maintenance vehicles. Waste oil and spent cleaning solvents were generated at Building 507 as a result of maintenance-related operations. Waste materials were reportedly stored in 55-gallon drums in a shed adjacent to the east side of the building. In April 1991, the shed was closed in accordance with New Jersey hazardous waste regulations and currently remains vacant. A PCB-contaminated transformer (TR) was removed from Building 507 in 1989. According to the Phase II RI Report, Rounds 1 and 2, Volume 3 – Area I 500 Area Sites (Shaw, 2005a), soil samples were proposed to be collected around the former transformer pad, but the location of the former transformer could not be identified. No information exists to indicate whether any environmental studies related to the transformer were conducted.

Three SVOCs were detected in excess of the LOCs in two surface soil samples. The following maximum concentrations were detected in 46SS-2A (0 – 1 ft): 9 mg/kg benzo(a)anthracene, 10 mg/kg benzo(a)pyrene, 10 mg/kg benzo(b)fluoranthene. One metal, arsenic, was detected in surface soils at concentrations greater than the LOC. The maximum arsenic concentration of 250 mg/kg was observed at 46SS-2A (0 – 1 ft), the same location as the maximum SVOC exceedances. No TPH, pesticides, explosives, or PCBs were detected in surface soils in excess of LOCs. No VOCs or SVOCs were identified at concentrations in excess of LOCs in the subsurface soil samples. No fuel-related compounds, pesticides, explosives, or PCBs were detected in subsurface soil. One metal, arsenic, was found in excess of its LOC in one subsurface soil sample: 43 mg/kg in 46SB-1 (10 – 12 ft).

The well I-MW-506-103 is within the outline of Site 46, but is associated with adjacent Site 63/65. Therefore, the analytical results from this well are discussed with Site 63/65. There are no groundwater LOC exceedances for wells associated with Site 46.

Site 50

The site layout is shown on **Figure 8**. Site 50 consists of Building 519, a former still house for storage of ether and alcohol, and Building 519-A, which formerly housed an inactive 3,800-gallon AST that was used to store spent alcohol. Building 519 and associated buildings (e.g., 523, 521, and 527) were used as a single-base propellant manufacturing area; these constituents include nitrocellulose, diphenylamine, DNT, and potassium sulfate. Operations at Building 519 also included the manufacture of ether prior to 1940. Materials utilized for this process were sulfuric acid, ethanol, and lead monoxide. The manufacturing process utilized two 400-gallon acid neutralization underground storage tanks (USTs) that have since been removed. Both tanks were located on the south wall of Building 519, directly east of Picatinny Lake. One of the tanks connected to a storm sewer at the edge of Building 519. The building was deactivated in February 1975 when the explosive allowance was rescinded and demolished in 1995. In 2009, this site was included in the construction area for the New Pyro Building.

VOCs, SVOCs, pesticides/PCBs, and explosives were not detected in excess of the LOCs in surface and subsurface soil. The explosive nitrocellulose was detected in two surface soil samples. As discussed previously, no LOC has been established for this compound. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals. Lead was the only metal to exceed the LOC in surface soil (800 mg/kg) with a concentration of 1,860 mg/kg lead at 50SS-3A (0 – 1 ft). The maximum observed arsenic concentration (13.4 mg/kg) is lower than the LOC of 20 mg/kg and slightly higher than the surface soil background concentration of 9.34 mg/kg.

In groundwater samples, individual detections of two VOCs were greater than the LOC. These detections were 6.00 µg/L methylene chloride at 50MW-1 and 9.00 µg/L TCE at 50MW-3. Methylene chloride is a common laboratory contaminant. The other wells on site did not contain concentrations of these parameters at concentrations greater than the LOCs. Surrounding up- and down-gradient sites do not have exceedances of TCE in groundwater, thus indicating that this exceedance is an isolated hit of TCE rather than a contiguous plume. Several naturally occurring metals, including, aluminum, iron, lead, manganese, sodium, and strontium were also detected at concentrations in excess of the LOCs in one or more locations. Radium-226 was detected in excess of its LOC in one location (50MW-3). Surrounding wells do not have exceedances of Radium-226.

Seventeen SVOCs were detected above LOCs in the sediment sample. Inorganic compounds detected in excess of sediment LOCs included copper, lead, zinc and ammonia.

Site 63/65

The site layout is shown on **Figure 9**. Site 63/65 is located southeast of Picatinny Lake. Building 506, originally constructed in 1907 and enlarged in 1956, served as Picatinny's main power plant and housed three seven-story boilers that provided Picatinny with electricity and steam for heating. This building has since been demolished. Coal was used to generate power until 1964. From 1964 to the 1970s, a combination of coal and No. 6 fuel oil was used. Currently, only oil is used to generate power. The oil is stored in two 420,000-gallon ASTs and one 850,000-gallon AST, which are located approximately 1,000 feet southeast of Building 506. Two reportable fuel oil spills have occurred at this site. In 1981, 20,000 gallons of No. 6 fuel oil spilled onto the soil and migrated to Picatinny Lake and the nearby sewage drains. In addition, 3,000 gallons of oil spilled in 1987 and was remediated. In June 1990, two 25,000-gallon USTs used for storing No. 6 fuel oil were removed. Petroleum-contaminated soil and free product floating on the water table were observed during removal of the USTs. As a result, contaminated backfill was removed, free product was recovered, and passive oil skimmers were installed. A large coal pile left near Building 506 was removed in 1984 and disposed of off-site. Materials used at Building 506 included: fuel oil, coal, hydraulic oil, lubricating oils, compressed gases, and degreasers, as well as sodium hydroxide, batteries, caustics, sodium sulfides, various solvents, paints, enamel thinners, and possibly pesticides.

In surface soil samples, one VOC and five SVOCs were detected at concentrations greater than the respective LOCs. The following maximum concentrations of SVOCs were all detected at 65MW-2 (0 – 2 ft): 20 mg/kg benz(a)anthracene, 30 mg/kg benzo(a)pyrene, 50 mg/kg benzo(b)fluoranthene, 2.6 mg/kg dibenz(a,h)anthracene, and 10 mg/kg indeno(1,2,3-c,d)pyrene. Arsenic was the only metal detected in

excess of the LOC in surface soils. The maximum concentration of 940 mg/kg was reported from 65SS-004A (0 -1 ft). No other contaminants exceeded the LOCs in surface soils.

In subsurface soils, arsenic was the only reported constituent that exceeded its LOC. The maximum concentration of 179.0 mg/kg was detected at 65SB-004 (3 – 3.5 ft).

SVOCs, copper, lead, mercury, antimony, arsenic, nickel, and zinc were detected at levels above their respective LOCs in the sediment samples and are addressed as part of Picatinny Lake in the PICA 057 Lakes FS.

Benzene was detected in one groundwater sample at a concentration slightly greater than the LOC: 1.80 µg/L at MW506-103. The most recent sample, collected for this well, however, indicates that benzene concentration (2003) is non-detect. One explosive was detected in groundwater; nitroglycerin was detected in well MW506-103 at a concentration of 14 µg/L, which is greater than the LOC (3.7 µg/L). This is the only well at this and surrounding sites that exceeds the LOC for nitroglycerin or benzene, which would indicate that this is an isolated occurrence. Several naturally occurring metals, including aluminum, iron, manganese, and sodium, were detected with concentrations exceeding LOCs. Lead was detected in groundwater at a maximum concentration of 36.4 µg/L at well MW506-104; however, the only surrounding well that contained lead in groundwater at a concentration greater than the LOC was well MW506-103 (5.18 µg/L, LOC = 5 µg/L), which, based on the proximity of these two wells and surrounding wells, would indicate that the concentration of lead at MW506-103 is an isolated exceedance.

Surface water samples collected as part of the Phase II RI are discussed in the PICA 057 Lakes FS.

Site 97

The site layout is shown on **Figure 10**. Site 97 (Building 501) is a small site measuring approximately 0.2 acres in area located immediately adjacent to the southern end of Picatinny Lake. Building 501 has served as a maintenance shop for repairing pumps. According to Picatinny personnel, pump oil and mercury were spilled onto the floor during pump repairs and was cleaned up. During excavation activities in January 1990, a 5-gallon pail of an unknown substance was unearthed. Approximately one pint of the substance had leaked onto the ground. The substance tested negative for energetics (i.e., explosives). The affected area was subsequently cleaned up. The unknown substance was disposed of off-site. Building 501 is currently used as a storage area for the powerhouse.

No VOCs were detected at levels greater than their respective LOCs in surface soil samples. Five SVOCs (polynuclear aromatic hydrocarbons [PAHs]) were identified slightly in excess of their LOCs. The maximum concentrations of four of the SVOCs were observed in 97SB-1 (0 – 2 ft): 30 mg/kg benzo(a)anthracene, 30 mg/kg benzo(a)pyrene, 30 mg/kg benzo(b)fluoranthene, and 20 mg/kg indeno(1,2,3-c,d)pyrene. The fifth SVOC, dibenzo(a,h)anthracene, exceeded its LOC at 97SS-2 (0 – 1 ft) with a concentration of 2.3 mg/kg. No pesticides/PCBs, TPHs, explosives, or metals were detected at concentrations in excess of their respective LOCs in surface soil samples. Arsenic was not detected in any of the soil samples at concentrations greater than the LOC. The maximum arsenic concentration of 10.7 mg/kg was detected in sample location 97SB-1.

In subsurface soil, the only constituents detected in excess of LOCs were the SVOCs benzo(a)pyrene and dibenz(a,h)anthracene. The respective maximum detections were 1.4 mg/kg at 97SB-3 (10 – 12 ft) and 0.22 mg/kg (10 - 12 ft). No VOCs, pesticides/PCBs, TPHs, explosives, or metals were detected at concentrations greater than LOCs in the subsurface soil sample analyzed for these compounds.

Site 105

The site layout is shown on **Figure 11**. Site 105 (Building 511) is located approximately 500 ft southeast of the southeastern shore of Picatinny Lake. Building 511 was constructed in 1942 as a nitrating house and propellant production plant. The nitrating process involved mixing nitric acid and sulfuric acid with cotton fibers to make nitrocellulose (also known as guncotton). Building wastewater was conveyed to a sump located outside the building. Building 511 has been inactive since 1959 and was demolished in 1985. Picatinny personnel reported that transformers were removed at Building 511 prior to demolition activities and that at one time oils contaminated with PCBs were spilled. It is not known where the reported PCB leak originated from or whether the PCB-contaminated oil leaked inside or outside the building. There were no known USTs or ASTs in the vicinity of this building.

During the 2004 Sump and Drywell Investigation (Shaw, 2005b) a large sump measuring 5 ft square and 4 ft deep was discovered below a concrete catch basin. Trenches were excavated around the sump to a depth approximately 1 ft below the bottom of the sump. Five post-excavation samples were collected: two samples were collected from the closed sides of the vault (511-EX1-SWN-1 and SWS-1); two samples were collected from the soil directly beneath the influent and effluent pipes where they intersected the sump (511-EX1-B1-1 and B2-1); and one sample was collected from the bottom of the trench on the east side of the sump (511-EX1-SWE-1). The sediment contained within the sump, estimated to be approximately 1 CY, was sampled (511EX1-BOX-1), removed, and disposed off site. There were no LOC exceedances for soil or sediment. It is not explicitly stated that the excavated soils were used to close the trenches, but the only discussion of off-site disposal referred to the sediments within the sump. The catch basin was restored after this portion of the investigation was complete.

The second structure investigated was an abandoned communication box located south of the aforementioned sump. Due to its size (4 ft square and 6 ft deep), the box was not removed, but trenches were excavated (approximately 6 ft by 4 ft to a depth of 7 ft) on three sides of the box and one post-excavation sample was collected from the bottom of each trench. Because the sample results indicated there were no LOC exceedances, the excavated soil was used to close the trenches.

In surface soil, exceedances of three SVOCs (PAHs) were detected. The maximum concentrations of benz(a)anthracene (4 mg/kg) and benzo(a)pyrene (5 mg/kg) were observed at 105SS-2A (0 – 1 ft). The maximum concentration of benzo(b)fluoranthene (4.7 mg/kg) was detected at 105SS-11 (0 – 1 ft). The explosive nitrocellulose was identified in three of the four surface soil samples analyzed for the compound. As discussed previously, no LOC has been developed for nitrocellulose. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals.

One metal, lead, was detected in one surface soil sample at a level exceeding the LOC: 4,680 mg/kg in 105SS-1C (0 – 1 ft). The maximum arsenic concentration observed in Site 105 soils was 13.4 mg/kg in a surface soil sample. The observed concentration is lower than the LOC of 20 mg/kg and slightly higher than the surface soil background concentration of 9.34 mg/kg. Cesium-137 was detected at a concentration of 3.68 picoCuries per gram (pCi/g). No pesticides/ PCBs or anions were detected in the surface soil samples at levels greater than their respective LOCs.

In subsurface soil samples, no SVOCs, pesticides/PCBs, explosives, metals, or anions were detected at concentrations greater than the respective LOCs.

In sediment samples, no SVOCs, explosives, or pesticides/PCBs were detected at concentrations greater than the LOC. LOC exceedances in the surface sediment sample were reported for five metals, including copper, lead, mercury, silver and zinc. The following concentrations were detected in 105SD-1 (0 – 1 ft): 42.8 mg/kg copper, 268 mg/kg lead, 0.26 mg/kg mercury, 2.2 mg/kg silver, and 239 mg/kg zinc.

In surface water, no VOCs, SVOCs, explosives or metals were detected at concentrations that exceeded the LOC.

Site 108

The site layout is shown on **Figure 12**. Site 108 is located at the southwestern end of Picatinny Lake and consists of Building 717 – an ordnance facility, Building 722 – a physics and flare-testing laboratory, Building 732 – a physics laboratory and ordnance facility, and a peninsula located on the western shore of Picatinny Lake. Building 717, constructed in 1941, has had multiple uses as a major-caliber loading facility; a fuse loading, flare assembly, and pyrotechnic operations facility; and its current function as an Army Armament Research, Development and Engineering Center Electromagnetic and Electrothermal/Chemical Armament Research Facility for research of thrusts caused by the application of high electrical currents to chemical oxidizers. Substances used or possibly stored in Building 717 during flare production operations included black powder and other pyrotechnic materials. Materials associated with the current operations include hydrogen peroxide and JP4 (jet fuel). Three 75-kilovolt-ampere pad-mounted transformers (TR-717) are located on the north side of Building 717. According to the Picatinny transformer database, two of the transformers are PCB-contaminated. Building 722, constructed in 1930, has also had multiple uses: an office and testing laboratory; a flare testing facility; and a photographic processing area. The building contained a flare tunnel, which included an instrument containing a

radioactive source, and ash hearth. No radioactive material is known to have escaped; however, photographic processing chemicals were reportedly disposed of down sinks and drains that discharged to Picatinny Lake. Building 722 is currently vacant. Building 732 was constructed in 1938 as an operating building. From 1957 through the 1970s, the building was used as a pyrotechnic facility; activities reported to have occurred included unit inspection using a radiological source. During a 1992 inspection, Building 732 was vacant and inactive. Chemicals that were used in Building 732 included: dicyclohexylphosphide, barium chromate, sulfur, strontium, lithium, antimony, potassium chlorate, aluminum, magnesium, and heavy metals. Mercury spills were observed within the building; however, as mercury was not used in pyrotechnic production, Picatinny personnel indicated that the mercury spill may have been a product of a broken test instrument. Wastewater and stormwater from Building 732 was conveyed to GPB. A flare fire, possibly containing zirconium and Teflon, occurred on a loading platform adjacent to Building 732.

In August 2003, the three sumps and one catch basin that were part of the wastewater collection system at Building 732 were excavated. The concrete sumps were broken up and disposed of off-site as non-hazardous waste. Sediment from the sumps and soil around two of the sumps were drummed and staged at Picatinny.

In April 2004 two additional areas of concern were added to the scope of work at Site 108 adjacent to Building 722. Excavation 1 was a small 8 ft by 8 ft area located on the east side of Bldg 722 and adjacent to Fidlar Road was excavated around sample location 108SS-7 to a depth of 2 ft bgs. Excavation 2 was the flare tunnel clean-out sump, including the metal sump and concrete base that it rested upon. This excavation was 4-ft square by 2-ft deep. Approximately 4 CY of soil were excavated from Excavation 1 and 1 CY of soil was excavated from Excavation 2 at Building 722.

No VOCs were detected in surface soils at concentrations exceeding LOCs. Seven SVOCs were detected at concentrations exceeding the LOCs in several samples. The following maximum concentrations of constituents which exceeded their respective LOCs were detected in sample location 108SS-19 (0 – 1 ft): 14 mg/kg benz(a)anthracene, 17 mg/kg benzo(a)pyrene, 20 mg/kg benzo(b)fluoranthene, 2.7 mg/kg dibenz(a,h)anthracene, and 9.5 mg/kg indeno(1,2,3-c,d)pyrene. Hexachlorobenzene was detected at a maximum concentration of 100 mg/kg at 108SS-4 (0 – 1 ft). One PCB, Aroclor 1254, was detected in excess of the LOC at 108SS-12B (0 – 1 ft) at a concentration of 2.2 mg/kg. The pesticide mirex was detected in excess of the LOC at 108SS-9C (0 – 1 ft) at a concentration of 300 mg/kg. The maximum concentrations of metals were detected in samples from Flare Island, at levels higher than the LOC. At location 108SS-4, the following maximum metals concentrations were observed: 100,000 mg/kg barium, 4,480 mg/kg lead, and 610 mg/kg mercury. The maximum concentrations of arsenic (787 mg/kg) and lead (3,030 mg/kg) were observed at location 108SS-30.

Radiological parameters were analyzed in 14 soil samples in 1996, and all parameters were generally at or below background concentrations. The maximum concentration of radium-226 was 1.73 pCi/g, detected at 108-SS-008A (0 – 1 ft). The maximum concentration of cobalt-60 was 0.05 pCi/g, detected in three samples: 108MW-3 (0 – 2 ft), 108SS-5C (0 – 1 ft), and 108SS-19 (0 – 1 ft).

SVOCs and arsenic were the only constituents in subsurface soil detected at concentrations that exceeded the respective LOC. SVOC exceedances were detected at 108MW-1. The following maximum concentrations were collected at 5 – 7 ft: 10 mg/kg benz(a)anthracene, 20 mg/kg benzo(b)fluoranthene, and 7 mg/kg indeno(1,2,3-c,d)pyrene. The maximum concentration of benzo(a)pyrene (10 mg/kg) was detected at both 5 – 7 ft and 10 – 12 ft at this location. The maximum LOC exceedance for arsenic in subsurface soil was reported at 108MW-2 (15 – 17 ft) at a concentration of 27 mg/kg.

In sediment samples, SVOCs were the only constituents detected in excess of LOCs. At sample location SDBG-30, three SVOC exceedances were noted: 0.36 mg/kg fluoranthene, 0.28 mg/kg phenanthrene, and 0.62 mg/kg pyrene. Sediment for this site, however, will be addressed through the PICA 057 Lakes FS.

Naturally occurring metals were the only constituent detected in excess of the LOCs in groundwater samples. Maximum concentrations of arsenic (7.32 µg/L), iron (7,450 µg/L), and manganese (2,360 µg/L) were detected at 108MW-1.

Metals aluminum (1,830 µg/L), arsenic (2.59 µg/L), copper (20.7 µg/L), cyanide (5.82 µg/L), iron (3,570 µg/L), lead (43.6 µg/L), manganese (1,480 µg/L), and zinc (241 µg/L) were detected in surface water samples collected at I-108-SW-002. Mirex (8.2 µg/L) was also detected in surface water at the same sample location. Surface water for this site, however, will be addressed through the PICA 057 Lakes FS.

Site 113

Site 113, which measures approximately 0.9 acres, is located on a small delta situated along the eastern shore of Picatinny Lake (**Figure 1**). Building 561 was a five-story structure, which was constructed in 1931. It is not known how long Building 561 was in operation, but records indicate that the building was in operation during 1960 as a blending facility for propellants. Water spray nozzles were used during the charging and blending cycles to control static electricity accumulation. Although documents do not indicate that wastewater was generated or discharged from this process, the nature of the operations and the documented use of spray nozzles in this building suggest that wastewater was likely to have been generated. Building 561 was demolished under the Toxic and Energetic Cleanup Program sometime prior to 1988.

There are no exceedances of LOCs at Site 113, and although arsenic concentrations in surface and subsurface soil exceed the USEPA Regional Screening Levels, the concentrations are below background arsenic levels established for Picatinny Arsenal.

Site 147

The site layout is shown on **Figure 13**. Site 147 is located in the eastern portion of Area I in the main valley floor and less than 300 ft from the southeast shore of Picatinny Lake. This site includes 1.5 acres of open grass field and Building 520, which was constructed in 1943 for use as a poaching house for nitrocellulose water slurry processing. Poaching is a purification process used in the manufacturing of propellant to destroy unstable sulfur esters and completely remove free acids. Building 520 was deactivated in September 1972 when the explosive allowance was cancelled and was subsequently demolished. Wastewater generated during the poaching process at Building 520 was reportedly disposed of in pits in the basement of the building and liquid waste containing trinitrotoluene (TNT) may have been discharged into an underground pipeline (i.e., the GCL) that flowed toward Picatinny Lake and GPB. According to Picatinny personnel, a discharge of nitrocellulose also flowed into the GCL and may have traveled as far as Picatinny Lake. A transformer (TR-520) was located east of Building 520. The transformer was reportedly removed some time before the building was demolished. In 2009, this site was included in the construction area for the New Pyro Building.

No VOCs, SVOCs, pesticides/PCBs, TPHs. or anions were detected in the surface soil samples at concentrations exceeding their respective LOCs. Nitrocellulose was the only explosive compound detected in the surface soil samples. There is no LOC established for nitrocellulose. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals. Lead was the only metal detected in excess of its LOC. Lead was reported at a concentration of 604 mg/kg at 147SS-2C (0 – 1 ft). The maximum arsenic concentration observed in Site 147 soils was 12.2 mg/kg in a surface soil sample. The observed concentration is lower than the LOC of 20 mg/kg and slightly higher than the surface soil background concentration of 9.34 mg/kg.

In subsurface soils, no VOCs, SVOCs, explosives, pesticides, TPHs, or anions were detected in the subsurface soil samples at concentrations greater than their LOCs. One metal, beryllium, was detected in one subsurface soil sample at a level exceeding its LOC. This sample was collected at 147MW-1 from a depth of 10-12 ft bgs and had a concentration of 2.47 mg/kg.

In groundwater at 147MW-1, lead marginally exceeded its LOC (5 µg/L), with a concentration of 7.71 µg/L. The downgradient well on site did not contain any groundwater exceedances. The closest cross gradient well is approximately 200 feet to the northeast (cross gradient) and does have a marginal lead exceedance, as well (7.2 µg/L at 50MW-1). Lead was not identified as a concern at this site during the RI process. No other contaminants were detected in excess of their LOCs in groundwater.

Site 148

The site layout is shown on **Figure 14**. Site 148 (Building 527) covers approximately 1.3 acres on the southeast shore of Picatinny Lake. Building 527 was constructed in 1929 for use as part of the smokeless

powder production line. Operations at Building 527 reportedly ceased in the mid-1970s, and the building was demolished in 2000. According to Picatinny personnel, single- and double-base solid propellants were processed in Building 527. Wastes from propellant operations included: nitrocellulose, DNT, dibutyl thiolate, diphenylamine, ether, and alcohols. According to a historical drawing, a drainage line exited the building and discharged to a dry well located approximately 10 ft from the northwest corner of the building. During two separate site visits, no evidence of the dry well or sump was discovered.

No VOCs were detected in excess of the LOCs in surface soil. Five SVOCs (PAHs) were found to exceed the LOC in isolated surface soil locations. The following maximum concentrations were observed at 148SB-1 (0 – 2 ft): 30 mg/kg benz(a)anthracene, 40 mg/kg benzo(a)pyrene, 30 mg/kg benzo(b)fluoranthene, 20 mg/kg benzo(k)fluoranthene, and 20 mg/kg indeno(1,2,3-c,d)pyrene. One explosive, 2,4-DNT was detected in excess of the LOC in two locations. The maximum concentration of 5.59 mg/kg was reported at 148SS-5C (0 – 1 ft).

Two metals were detected at concentrations greater than the LOCs in surface soils. Arsenic was detected at a concentration exceeding the LOC in six samples, with the maximum of 250 mg/kg reported at 148SS-11 (0 – 1 ft). Manganese exceeded the LOC in one surface soil sample with a concentration of 60,000 mg/kg, respectively.

VOCs did not exceed their LOCs in subsurface soil samples. Benzo(a)pyrene was the only SVOC detected slightly in excess of its LOC in subsurface soil. The maximum concentration of 1 mg/kg benzo(a)pyrene was observed at 148MW-1 (5 – 7 ft). Arsenic was the only metal detected in excess of its LOC in subsurface soil, with a maximum concentration of 64.2 mg/kg at 148SS-13 (2 – 3 ft). No other detected compounds in subsurface soils exceeded LOCs.

Three naturally occurring metals (aluminum, iron, and manganese) were the only groundwater constituents identified in excess of LOCs. The maximum aluminum concentration of 1450 µg/L was detected at 148MW-1. The maximum iron (4,020 mg/kg) and manganese concentrations (624 µg/L) were observed at 148MW-2.

Site 150

The site layout is shown on **Figure 15**. Site 150 (Former Building 555) is located on the slope of an elevated plateau, approximately 250 ft southeast of the eastern shore of Picatinny. The site consists of 0.5 acre of forested land. Building 555 was constructed in 1930 as a continuous drying house for explosive powder. Railroad tracks were used to transport the explosive powder to this facility. Wastewater from explosive operations at Building 555 was formerly discharged to a lead-lined trough, which discharged to a sawdust filter located on the west side of the building. Once the explosives were filtered from the waste stream, the water was discharged directly onto the ground. Nitrocellulose chunks and water from explosive operations at Building 555 were reported to be found in a drainpipe and an explosion occurred when the pipeline was cut. Building 555 was demolished in the 1990s.

In 2002, a wooden filter box, soil, and debris were removed from Site 150. Analytical samples collected from the base of the excavation indicated that all contamination had been removed to levels below the LOCs, and the excavation was backfilled. In 2009, this site was included in the construction area for the New Pyro Building.

No constituents other than SVOCs, explosives and metals were detected in excess of LOCs in surface soil at Site 150. Benzo(a)pyrene exceeded the LOC (0.2 mg/kg) in one sample location (150SS-002C) with a concentration of 0.37 mg/kg. One explosive, 2,4-DNT, was detected at a concentration slightly higher than the LOC in one location: 5.3 mg/kg at 150SS-1C. Nitrocellulose was also detected in several samples. As noted previously, nitrocellulose does not have an established LOC. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals. One metal, lead, was detected in excess of its LOC in six surface soil samples with a maximum concentration of 4,770 mg/kg reported at 150SS-7 (0 – 1 ft). The maximum arsenic concentration detected in surface soil at Site 150 was 10.5 mg/kg observed at 150SS-2 (0 – 1 ft). The observed concentration is lower than the LOC of 20 mg/kg and slightly higher than the surface soil background concentration of 9.34 mg/kg.

Lead was the only analyte to exceed the LOC (800 mg/kg) for subsurface soil samples in sample location 150-EX-B1 with a maximum concentration of 2010 mg/kg.

In groundwater, four metals exceeded their respective LOCs. The following maximum concentrations were detected at 150MW-1: 9,340 µg/L aluminum, 22,300 µg/L iron, 7.32 µg/L lead, and 307 µg/L manganese.

Site 184

The site layout is shown on **Figure 16**. Site 184 (Former Building 523) is located on Babbitt Road in the center of Picatinny. The site is situated in the main valley floor approximately 200 ft from the southeast shore of Picatinny Lake. Building 523 was constructed in 1938 for use as a refrigeration house. Freon was used in the refrigeration unit to cool brine (salt water) which was circulated to nearby buildings for use in maintaining ether at low temperatures during the explosives manufacturing process. An inert gas manufacturing process was also located at Building 523. The process produced INGAS (a mixture of carbon dioxide and nitrogen). INGAS was distributed to Buildings 519, 521, and 553. Gasoline was used to fuel a combustion engine for powering the coolant pumps and compressors used in the production of INGAS. The gasoline was fed to the engine by underground lines from two USTs (capacities of 2,000 and 1,000 gallons) located on the west side of Building 523. In 1976 Building 523 was deactivated and most of the process equipment was removed. In 1991, the USTs were removed as part of a RCRA closure. The building was demolished in 1998. In 2009, this site was included in the construction area for the New Pyro Building.

No VOCs, SVOCs, explosives, or inorganics were detected in surface soils at concentrations exceeding LOCs. There were also no exceedances of LOCs in subsurface soil. The maximum arsenic concentrations detected in surface and subsurface soil are lower than the LOC of 19 mg/kg. The maximum arsenic concentrations (6.03 mg/kg at 0 – 1 ft and 9.07 mg/kg at a depth of 2 – 4 ft) are comparable to the respective surface and subsurface background concentrations: 9.23 and 8.57 mg/kg.

The VOC methylene chloride, a common laboratory contaminant, was the single detected constituent exceeding LOCs in groundwater. The reported concentration was 4.2 µg/L at 184MW-2, which is just slightly greater than the LOC (3 µg/L). The surrounding wells at the site do not have methylene chloride detections at concentrations greater than the LOCs, which would indicate this is either an isolated hit of the parameter or a laboratory contaminant issue.

Area K Site

Area K is located in a heavily wooded area, east of Picatinny Lake. Area K is comprised of five sites: Site 3 (1500 series buildings); Site 48 (Buildings 3314 and 3315); Site 172 (the parking area across from Building 3328); Site 173 (Building 3404); and Site 174 (Building 3420). Area K was previously owned and operated by the Department of the Navy and is commonly referred to as Navy Hill. The area is currently active, although its uses have changed over the past 50 years.

An intermittent stream conveys surface water drainage from the far western portions of Area K both overland and through a series of underground pipes and culverts to GPB located to the northwest. The eastern portion of the area is predominantly swampland. As a result, drainage channels have been dug to convey surface water away from structures. Drainage pathways from the area include a stream behind Building 1507, a channel through the berm area of the Building 1505 Test Range, and a channel along the road to the west of the Building 1505 Test Range. These three drainage features converge in a swale between Buildings 1501 and 1504 and ultimately discharge to a 500,000-gallon capacity reservoir, which was created during the 1950s and is located to the north.

Site 199

The site layout is shown on **Figure 17**. Site 199 is located between Areas I and K and consists of an abandoned pistol range and a former dumping area. The site is located at the junction of Belt and Quarry Roads within a heavily wooded portion of Picatinny. The pistol range portion of Site 199 was active from approximately 1936 to 1980. The range has not been used since and is overgrown. Building 3054 and an unnumbered building are the only two structures located at the site. The area to the north of the pistol range was used as a dumping area. The former dumping area, approximately one acre in size, contains

construction and demolition debris, as well as domestic trash. The type of trash present at the area suggests that the site was active from the 1920s to the mid-1930s, with sporadic activity as late as 1970.

In surface soils, no VOCs were detected in excess of LOCs. Five SVOCs (PAHs) exceeded the LOCs in three surface soil samples. The maximum concentrations of four SVOCs were observed at 199GR-N10 (0 – 1 ft): benz(a)anthracene (54 mg/kg), benzo(a)pyrene (42 mg/kg), benzo(b)fluoranthene (52 mg/kg), and indeno(1,2,3-d,c)pyrene (24 mg/kg). The maximum concentration of dibenz(a,h)anthracene (2.5 mg/kg) was detected at 199GR-M9 (0 – 1 ft). No explosives were detected at concentrations exceeding the LOCs.

Two metals, arsenic and lead, were detected in surface soils at concentrations exceeding the LOC. Elevated lead concentrations were widespread, whereas arsenic exceeded the LOC in two samples. The maximum lead concentration of 16,000 mg/kg was observed at 199GR-L10 (0 – 1 ft). The maximum arsenic concentration of 50.4 mg/kg was also detected in sample 199GR-L10 (0 – 1 ft). No other constituents exceeded the LOCs in surface soil.

In subsurface soil, VOCs were not detected at concentrations exceeding the LOCs. Five SVOCs were found to exceed their LOCs in one sample, 199SB-M9: benz(a)anthracene (4 mg/kg), benzo(a)pyrene (3.7 mg/kg), benzo(b)fluoranthene (4.4 mg/kg), dibenz(a,h)anthracene (0.52 mg/kg), and indeno(1,2,3-c,d)pyrene (2.6 mg/kg). Explosives were not detected at concentrations exceeding the LOCs.

Arsenic and lead exceeded their LOCs in subsurface soil samples. The maximum lead concentration of 4,700 mg/kg was observed at 199SB-L10 at a depth of 2 – 3 ft. Arsenic was detected in sample K-199-SB-L10 (2-3) at a concentration of 19.9 mg/kg. No other constituents were detected at concentrations exceeding the LOC in subsurface soil samples.

In groundwater samples, seven naturally occurring metals were the only constituents detected at concentrations that exceeded the LOCs. The maximum metals concentrations all were reported at 199MW-3: 24,300 µg/L aluminum, 4.8 µg/L arsenic, 95 µg/L chromium, 37,800 µg/L iron, 470 µg/L manganese, 1.3 mg/L thallium, and 77 µg/L vanadium.

The analytical results from samples collected at Site 199 can be summarized as indicating the following:

- Lead contaminated soil at the abandoned pistol range; and
- Metals and PAH contaminated soil at the former dumping area.

Area L Sites

Area L is located near the southeast border of the facility on the gently rising hillside and the unnamed ridge near the Mt. Hope entrance. Area L is bordered by the facility boundary to the southeast, Area F in Phase I to the northwest, and Areas I and K in Phase II to the north.

Area L consists of several different former explosive production, storage and testing areas and contains buildings in the 1000, 1300, 1400, and 3100 number series. The 1000 series buildings were associated with the production of high explosives; 1300 series buildings were associated with nitroglycerin production; 1400 series buildings predominantly supported propellant production; and 3100 series building were used for storage and testing of ordnance items. The majority of the sites within Area L are located within the Mt. Hope enclosure.

Robinson Run, a tributary of GPB, flows westward through the central portion of Area L and serves as the primary surface water discharge point in the central portion of Area L. Robinson Run originates from a spring/seep in a marshy headwaters area proceeds in a westerly direction. An unnamed intermittent tributary originating at Fisher's Pond feeds Robinson Run from the south.

Site 17

The site layout is shown on **Figure 18**. Site 17 is located at the southeastern portion of Picatinny near the base of the unnamed ridge near the Mt. Hope entrance, just up-slope from Area F. All of the buildings in and near Site 17 are part of the 1000 series buildings that were associated with the production of high explosives.

Site 17 consists of four unlined, bermed pits located in the former tetryl production area in the 1300 and 1000 area enclosure and believed to have operated from at least 1932 until 1945. All piping and settling systems have been removed, with the exception of three wooden settling tanks downgradient of Building 1055 and small portions of piping leading from the settling tanks to the upper northern tetryl pits. Lines feeding the pits consisted of process water and floor wash (tetryl waste, water, and spent acid), which came from former Building 1055 (a nitrating building), former Building 1051 (a laundry), former Building 1054 (a dry house) and several tetryl dry houses and storage facilities. Pit #4 (the "lime pit") also received waste from an apparently unlined acid drain ditch, which ran from the spent acid storage tanks at former Building 1070 (currently wooded and inactive) and one of the lower pits (an acid neutralizing pit with limestone) received waste from an acid line coming from former Building 1067 (an acid storage building). Wastes generated at the site included tetryl waste, water, spent acid (possibly nitric acid), lead (as indicated in a 1987 memorandum from the NJDEP Division of Water Resources), and sellite (from floor washdown, as indicated in the ANL RI Concept Plan). This site is currently inactive.

A removal action was conducted in 2002 to remove the tetryl contaminated soil from and around the four northern tetryl pits, treat the soil to reduce tetryl concentrations, and reuse the soil to restore the site. Tetryl-contaminated soils were removed from three tetryl pits and in the vicinity of the former settling tanks near the fourth tetryl pit.

In surface soil, no VOCs were detected at levels greater than their respective LOCs. Two sample locations exceeded the LOCs for SVOCs. Benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene exceeded their LOCs (0.2 mg/kg, 2.0 mg/kg, and 0.2 mg/kg; respectively) from two surface soil samples at location 17SB-8. In addition, sample location 17SS-15 exceeded the LOC for benzo(a)pyrene (0.2 mg/kg) with an estimated concentration of 0.21 mg/kg. None of the soil samples analyzed exceeded the LOC for explosives.

Two metals, lead and arsenic, were detected in surface soil at concentrations exceeding the LOC. Lead exceedances occurred in 15 soil samples, with a maximum concentration of 6,750 mg/kg observed at 17SB-22, at 0 – 1 ft. Arsenic was found to exceed the LOC in one location (17SS-8) with a concentration of 24.4 mg/kg at 0 – 1 ft. Pesticides, PCBs, and anions were not detected in excess of their respective LOCs in surface soil samples from Site 17. No contaminants were detected at concentrations greater than the LOCs in any of the Site 17 subsurface soil samples.

In the one sediment sample (17SD-1, 0 – 1 ft) collected from Site 17 and analyzed for SVOCs, nine SVOCs were detected at concentrations exceeding the respective LOCs: anthracene at 0.05 mg/kg, benz(a)anthracene at 0.18 mg/kg, benzo(a)pyrene at 0.17 mg/kg, benzo(b)fluoranthene at 0.22 mg/kg, benzo(k)fluoranthene at 0.17 mg/kg, chrysene at 0.24 mg/kg, fluoranthene at 0.39 mg/kg, phenanthrene at 0.30 mg/kg, and pyrene at 0.34 mg/kg.

In groundwater samples, the VOC TCE was detected at five locations at a concentration greater than the LOC. The maximum concentration of 12.0 µg/L was observed at monitoring well DM17-3. One SVOC, bis(2-ethylhexyl)phthalate, was determined to exceed its LOC in two locations. The maximum concentration detected was 6.09 µg/L at monitoring well DM17-2. The explosive cyclotrimethylenetrinitramine (RDX) was detected at a concentration exceeding the LOC in five locations. The maximum concentration of RDX (190 µg/L) was observed at monitoring well 17MW-5.

Five metals were detected in groundwater samples at one or more locations at concentrations greater than their respective LOCs. Aluminum was detected at a maximum concentration of 3,300 µg/L at 17MW-5. Beryllium was detected at a maximum concentration of 1.39 µg/L at 17MW-3. Iron was detected at a maximum concentration of 3,800 µg/L at DM17-1. Lead was detected at a maximum concentration of 46 µg/L at DM17-1. Manganese was detected at a maximum concentration of 260 µg/L at DM17-1Groundwater contamination at Site 17 is being addressed under the Mid-Valley Groundwater Operable Unit.

Site 18

The site layout is shown on **Figure 19**. The southern tetryl pits located at Site 18 reportedly operated from 1938 to 1945. A sludge area, fed by two process lines that ran through Building 1068: one of tetryl, acid, and water, and the other one of floor wash-down water that was discharged from former Building 1052 (a nitrating building), was identified immediately south of former Building 1068 and northwest of Building

1031. There are also two ditch or trough lines from the southern tetryl area leading to the Buildings 1033/1071/1031 trough system, one of which appears to lead to the second catch basin/settling tank. Wastes generated at the site included tetryl waste, acid (possibly nitric acid), water, lead (as indicated in a 1987 memorandum from the NJDEP Division of Water Resources), and sellite (from floor wash down, as indicated in the ANL RI Concept Plan [ANL, 1991]). This site is currently inactive.

Site 18 was included in the investigation of sumps and dry wells in 2003 (Shaw, 2005c). The investigation addressed a wooden catch basin that was located in a marshy area northwest of Building 1031. The catch basin consisted of a wooden box which was 10-ft long by 5-ft wide by 5-ft deep. The box was rotted and filled with debris, organic matter, and soil. After the box was removed, post-excavation confirmation samples (locations L-162) were collected on 15 July 2003, including a composite sample from the waste soil pile. The post-excavation and soil pile samples were analyzed for explosives and nitrocellulose and showed that all of the baseline explosives concentrations were less than the corresponding LOCs at the time of the excavation. Approximately 25 CY of soil were excavated from the area during the investigation and was returned to the excavation as fill after confirmatory data was reviewed. The catch basin has been eliminated as a potential source for explosives contamination at Site 18.

PAHs were the most prevalent contaminant at the site and were detected in 22 surface soil samples at levels greater than their respective LOCs. A total of five PAHs exceeded the LOCs, and the maximum concentrations were detected at SS-11: 19 mg/kg benzo(a)anthracene, 16 mg/kg benzo(a)pyrene, 20 mg/kg benzo(b)fluoranthene, 2.5 mg/kg dibenzo(a,h)anthracene, and 9.5 mg/kg indeno(1,2,3-c,d)pyrene.

Explosives were detected in two surface soil samples at levels greater than their respective LOCs. 2,6-DNT at SB02 exceeded the LOC. The maximum concentration was 60.72 mg/kg.

No metals, cyanide, or anions were detected at concentrations greater than their respective LOCs in surface soils. No contaminants were detected at concentrations greater than the respective LOCs in any of the 15 subsurface soil samples.

TCE was detected at a concentration (2.29 µg/L) greater than its LOC (1 µg/L) in one groundwater sample (MW-2) collected as part of the Phase III-1A RI. It should be noted that no TCE has been detected in any soil samples at Site 18, which suggests that the source of TCE might be discharge of wastewater. MW-2 was resampled and TCE was not detected at a concentration greater than the LOC. In addition, aluminum and iron were detected at concentrations greater than the LOC. Similarly, these metals were not present at elevated concentrations in soil. Groundwater is addressed under the Mid-Valley Groundwater Operable Unit.

Site 35

The site layout is shown on **Figure 20**. Five buildings within the former nitroglycerin production area (1300 area buildings) were included as part of Site 35 for investigation: Building 1361 (Nitroglycerin Buggy Storage and Block Breaker Building), Building 1361A (Catch Tank House), Building 1363 (Neutralizing Building), Building 1363A (Slum House), and Building 1365 (Spent Acid Storage Building). Building 1361 is located in the 1300 area enclosure. The building was used in various capacities in support of propellant manufacturing operations from the time of its construction in 1948 until 1993, but was originally used as a propellant roll dewatering building. Currently, the building is inactive. Former Building 1361A, constructed in 1947, was located in the 1000 and 1300 area enclosure directly northwest of Building 1361. The building was used as a catch tank house from the time of its construction until the early 1990s. The building has been demolished, although the concrete foundation is still present. The building had contained an AST that accepted wastewater from Building 1361 through a lead-lined trough. Wastewater then discharged to the ground immediately north of Building 1361A. Wastewater from Building 1373 also may have discharged to the 1361A catch tank through a set of gutters. Building 1363, located in the 1000 and 1300 area enclosure, was constructed in 1945 as a neutralizing building in the nitroglycerin production area. The building was certified in 1988 as having no solid or hazardous waste. Nitroglycerin was fed into the building via an elevated pipeline from Building 1362, two similar pipelines exited Building 1363 to go to Buildings 1373 and 1377 for further processing. The building currently houses wash and catch tanks and scales that are part of the Biazzi nitroglycerin production rewash system, installed in 1971. Building 1363 is listed as having a 170-gallon concrete UST containing wash-water with trace explosives. It is believed that this listing refers to a concrete storm catch basin located outside the northern side of the building. A second

storm catch basin is located at the southeast corner of the building immediately outside the barricade. The building is currently standing, but inactive. Building 1363A was originally constructed in 1945 as a slum house, and received wastewater from Building 1363. According to historic manufacturing data sheets, a nitroglycerin filtering operation was conducted in Building 1363A during the 1950s. The building currently contains one 25-gallon water tank and one catch tank designed to receive and treat waste from Building 1363. Building 1365 was originally constructed in 1945 as a flammable materials storage facility but was used to store spent nitric and sulfuric acid generated by the nitrating buildings (Building 1367 and Building 1362). The building contained two ASTs, to store spent acid and to pipe spent acid to the ASTs at Building 1355. In 1987, 2,000 pounds of explosively contaminated acid were discovered in the Building 1365 storage tanks. The material was eventually disposed of as hazardous waste during closure activities. In the mid to late 1980s until its demolition in 1991, the building was inspected weekly as a "special" area, which met the 90-day hazardous waste area requirements.

In 1995, a non-time critical removal action was conducted at Building 1363A. Eight and one-half cubic feet of soil around the western trough and the trough itself were removed and disposed of off-site.

In surface soil, no VOCs, SVOCs, or explosives exceeded the LOCs. One explosive, nitrocellulose was detected in surface soil samples. As discussed previously, an LOC for nitrocellulose has not been developed. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals. One PCB congener, Aroclor 1254, was detected in excess of the LOC (2 mg/kg). The maximum concentration of 7.95 mg/kg was reported at 35SS-10A (0 – 1 ft). One metal, lead, was also detected in several surface soil samples at concentrations greater than the LOC (800 mg/kg). The maximum lead concentration was 6,440 mg/kg and was detected at 35SS-60 (0 – 1 ft).

No constituents other than one metal, lead, were detected at concentrations greater than the LOC (600 kg/mg) in subsurface soil. The maximum lead concentration in subsurface soil was 4,710 mg/kg, occurring at 35SB-5 (2 – 3 ft).

In surface sediment, no VOCs or SVOCs were detected in excess of LOCs. No explosives were detected at concentrations greater than LOCs in surface sediment. The explosive nitrocellulose was detected in several sediment samples. As discussed previously, no LOC has been developed for nitrocellulose. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals.

One PCB congener, Aroclor 1254, exceeded its LOC in surface sediment. The maximum concentration of 143 mg/kg was observed at 35SS-9 (0 – 1 ft).

Seven metals, including arsenic, cadmium, chromium, copper, lead, mercury and zinc, were detected in excess of their respective LOCs in surface sediment. The maximum concentrations of four metals occurred at 35SD-2 (0 – 1 ft): 31.7 mg/kg arsenic, 76.5 mg/kg chromium, 0.26 mg/kg mercury, and 391 mg/kg zinc. The maximum cadmium concentration of 2.76 mg/kg was detected at L-35-SD-002 (0 – 1 ft). The maximum concentrations of copper (312 mg/kg) and lead (19,500 mg/kg) were detected at 35SS-44 (0 – 1 ft). Of all the metals exceedances in surface sediment samples, lead was detected in excess of the LOCs most frequently.

No constituents were detected in excess of the LOCs in subsurface sediment.

In surface water samples collected from ditches on site, no constituents other than eleven metals and one anion, sulfide, were detected in excess of the LOCs. The maximum concentrations of eight metals were detected at 35SW-2, as follows: 42,800 µg/L aluminum, 41.66 µg/L arsenic, 33.1 µg/L chromium, 36.5 µg/L copper, 765,000 µg/L iron, 2,844 µg/L lead, 8,030 µg/L manganese, and 17 µg/L vanadium. The maximum concentrations of three metals were detected at 35SW-3, as follows: 2.94 µg/L cadmium, 1,080 µg/L phosphorus, and 418 µg/L zinc. Sulfide was detected in excess of the LOC at 35SW-2 with a concentration of 3,500 µg/L.

In groundwater, bis(2-ethylhexyl)phthalate was the only SVOC that exceeded the LOC. A concentration of 4.59 µg/L was detected at L-35-MW-002. Five metals were detected in excess of the LOCs in groundwater. The metals exceedances were noted at 35MW-2 in the following concentrations: 21,600 µg/L aluminum, 7.79 µg/L arsenic, 23,600 µg/L iron, 27 µg/L lead, and 180 µg/L manganese.

Groundwater at Site 35 falls within the Mid-Valley Groundwater Operable Unit and is addressed in the Mid-Valley Groundwater Operable Unit.

Site 91

The site layout is shown on **Figure 21**. Site 91 (Building 1301) was constructed in 1945 as a double-base propellant finishing plant and is located east of Double Base Road. Building 1301 encompasses a total area of 31,000 square ft. The building was modified multiple times for the production of rocket powder, for the production of anti-personnel mines, and for the assembly/disassembly of rocket motors for various projectiles. Washdown water from the building is reported to have discharged into lead-lined catch basins and tanks located on the east side of the building. The wastewater from the catch basins and tanks was discharged in the woods west of Building 1301. Materials used during rocket motor assembly/disassembly operations include nitrocellulose, nitroglycerin, RDX, lead azide, acetone, isopropyl alcohol, ethanol, methyl ethyl ketone, n-butyl acetate, ethyl acetate, trichloroethene, trichloroethane, xylene, various paints and paint thinners, kerosene and No. 10 lubricant oil. Wastes generated during operations include spent fixer and developer from film processing and PCB contaminated dielectric fluid. Building 1301 is currently inactive; however, may be renovated for industrial use.

In June 2002, 14 sumps and catch basins, four drainage troughs, and a soil hot spot at the northwest corner of Building 1301, which were part of the Building 1301 wastewater collection system, were excavated. Approximately 62 CY of soil and sediment were excavated from these areas.

In surface soils, no VOCs, explosives, or PCBs were detected at concentrations exceeding LOCs. One SVOC, 0.26 mg/kg benzo(a)pyrene at L-91-SS-011, was detected at a concentration greater than the LOC. Two metals, lead and arsenic, exceeded LOCs in surface soil samples. Lead was detected at a maximum of 2,500 mg/kg at 91SB-4 (0 – 1 ft), and arsenic was detected at a maximum of 55.4 mg/kg at 91SB-8 (0 – 1 ft). No other constituents were reported in excess of LOCs in surface soils.

In subsurface soils, one metal, lead, was the only constituent detected at a concentration higher than the LOC. The maximum lead concentration of 920 mg/kg occurred at 91SB-1 (2 – 3 ft).

No constituents were detected in excess of the LOCs in sediment samples.

In surface water, metals were the only constituents detected in excess of the LOCs. Seven metals exceeded the LOC at 91SW-2, with the following concentrations: 1,480 µg/L aluminum, 3.4 µg/L arsenic, 0.38 µg/L cadmium, 27.5 µg/L cobalt, 12,100 µg/L iron, 15.2 µg/L lead, and 2,210 µg/L manganese. One metal, phosphorus, exceeded the LOC at 91SW-1 with a concentration of 60 µg/L.

Naturally occurring metals were the only groundwater constituents that exceeded LOCs. Aluminum and iron concentrations exceeded the LOCs at 91MW-2A with concentrations of 2,100 µg/L and 2,600 µg/L, respectively.

Site 161

The site layout is shown on **Figure 22**. Site 161 (Building 1031) is located in the 1000 and 1300 area enclosure. Building 1031 was constructed in 1952 as a research and development facility, operating pilot-scale operations for explosives (RDX and Cyclortetramethylenetetranitramine [HMX]) manufacturing. The building may also have housed a fine grind operation with a jet mill as part of the Low Vulnerability Ammunition (LOVA) propellant program. The building has been inactive since the early 1980s. The waste products from the RDX/HMX processes consisted of spent acid that may have contained dissolved explosives and process wastes from earlier processes may have contained solvents as well.

In April 2004, two 4 ft by 8 ft stainless steel above-ground sumps, located adjacent to the southwest corner of Building 1031, were removed, along with approximately 4 CY of soil.

In addition, during the period from July to September 2004, approximately 786 CY of soil were excavated from three delineated lead impacted locations as part of the facility-wide lead removal action, located to the west of Building 1031 (Shaw, 2005d).

No VOCs, SVOCs, explosives, or pesticides/PCBs were detected in surface soils at concentrations greater than the LOCs. Five post excavation confirmation soil samples that were collected from the

western edge of the nitration building had concentrations of lead in excess of the LOC (800 mg/kg). Lead concentrations collected from the edge of the excavation ranged from a minimum of 817 mg/kg at sample location L-161-EX1-SW-6A to a maximum of 1,610 mg/kg at sample location L-161-EX1-SW-1A. The maximum detected arsenic concentration (9.69 mg/kg) in surface soil was lower than the LOCs and comparable to the background concentrations of 9.34 mg/kg.

No VOCs, SVOCs, explosives, or pesticides/PCBs were detected in sediment at concentrations greater than the LOCs. Four metals were detected in excess of their respective LOCs at 161SD-3 (0 – 1 ft). The following concentrations were reported: 33 mg/kg copper, 271 mg/kg lead, 1,852 mg/kg manganese, and 449 mg/kg zinc.

TCE was the only constituent that exceeded the LOC in groundwater. TCE was detected in samples from locations L-161-MW-001C and L-161-MW-002. The maximum concentration detected was 45 µg/L from location L-161-MW-001C. There were no exceedances of LOCs for SVOCs, PCBs, pesticides, or explosives in groundwater. Groundwater at this site is being addressed under the Mid-Valley Groundwater Operable Unit.

Surface water exceedances of the LOCs were for TCE and copper. TCE exceeded the LOC at five locations. The maximum concentration detected of TCE (5.6 µg/L) exceeded the LOC (LOC = 1 µg/L) at sample location L-161-SW-007. Copper exceeded the LOC (LOC = 9.4 µg/L) at 161SW-3 with a concentration of 12.8 µg/L. Surface water in Robinson Run is being addressed by the Mid-Valley Groundwater Operable Unit. There were not exceedances of the LOCs for SVOCs, PCBs, pesticides, or explosives in surface water.

Site 162

The site layout is shown on **Figure 23**. Site 162 consists of three buildings formerly used in the production of high explosives. Building 1070 consisted of four tanks that were used to store spent acid from tetryl production. There were no documented spills or releases from the Building 1070 tanks. Potential discharges may have occurred at the loading dock set between Buildings 1053 and 1095, or at the possible end of the pipeline identified in the 400 area. Building 1071 was constructed in 1942 as the crystallizing building for tetryl production. The building also housed (not concurrently) Haleite production; tetryl and TNT recrystallizing processes; a nitroguanidine precipitation process; and slurrying, wax coating, and drying of RDX. Six non-PCB pad-mounted transformers (TR-1071), a concrete catch basin (removed in 2004 prior to demolition), a steel settling tank, and a recrystallization tank (removed in 1993) were located at Building 1071. A 1987 PCB test report indicated that these transformers had leaks at the primary and secondary bushings. The building has been inactive since the 1980s and was demolished in 2004. Building 1071C, constructed in 1943, stored solvent for use in the production operations of Building 1071. There are no obvious floor drains or piping in or leading to or from the building. Typical materials stored in Building 1071C were acetone and alcohol. HMX was also reported to have been stored in the building at one time. In 1988, Building 1071C was inspected and listed as having no hazardous waste at that time and there are no records of spills. Building 1071C has since been demolished.

In March 2004, the concrete sump associated with Building 1071 was removed from the ground. The elbow pipe associated with Building 1071C was also removed in March 2004, along with surrounding soils. The wooden filter box associated with Building 1071 was destroyed during demolition of an adjacent wooden walkway in 2000. The soil in this area was excavated, as well, although the date of this excavation is not identified in the Report on the Investigation of Sumps and Dry Wells with Previously Identified Constituents of Concern (COCs) at Various Sites (Shaw, 2005b). A total of approximately 25 CY of soil was removed from the three excavation areas.

In surface soil, no VOCs exceeded LOCs. One SVOC, benzo(a)pyrene, was detected in concentrations greater than the LOC (0.2 mg/kg) in six surface soil samples. The maximum concentration of benzo(a)pyrene, 0.52 mg/kg, was detected in a sample collected from location L-1070-SS-B (0-1 ft). The explosive RDX was detected at concentrations exceeding its LOC in two surface soil locations (L-162-GR-F4 and L-162-GR-E1) with the maximum concentration of 4,800 mg/kg. Arsenic and chromium were detected at concentrations slightly greater than the LOCs: 22.7 mg/kg arsenic (LOC = 19 mg/kg) at L-162-SS-012 (0-1 ft) and 251 mg/kg chromium (LOC = 200 mg/kg) at L-162-SS-016 (0 - 1 ft). No other constituents were detected in excess of the LOCs in surface soil samples.

No VOCs or SVOCs exceeded the LOCs in subsurface soil. As in surface soil, the explosive RDX was detected in excess of the LOC in two subsurface soil samples. The maximum RDX concentration of 830 mg/kg was observed at 162SB-8 (2.3 – 2.8 ft). No metals were detected in excess of LOCs in subsurface soils.

Trichloroethene was detected at L-162-MW-001 at a concentration of 3.1 µg/L in a sample collected in 2003, but was not detected at this location in samples collected in 2004 and 2008. An explosive was detected in groundwater in excess of the LOCs at L-162-MW-001. The maximum concentration detected at this location was 24 µg/L 2,4,6-TNT. One naturally occurring metal, iron, was also detected in excess of the LOC at this location, with a concentration of 3,300 µg/L. Groundwater at this site is being addressed as part of the Mid-Valley Groundwater Operable Unit.

Site 166

The site layout is shown on **Figure 24**. Site 166 consists of Buildings 1354, 1357, and 1359. Similar in operational history, these three buildings have served as explosives and propellant storage magazines supporting operations conducted in the 1300 and 1400 areas since their construction in the late 1940s. The following materials have been located at Buildings 1354, 1357, and 1359: RDX, HMX, nitroguanidine, nitroglycerin, nitrocellulose, and liquid propellant. In addition to these materials, Building 1359 has stored other various explosive constituents. Buildings 1354, 1357, and 1359 each had a sand-filled catch box which was located along an intermittent stream west of the buildings in order to catch wastewater from washdown activities. Once filtered, the wastewater was discharged directly to the intermittent stream, located northwest of the buildings. In April 2004, the catch boxes and 0.33 CY of soil were excavated as part of a facility-wide sump and dry well investigation.

All samples at Site 166 which had constituents (arsenic and lead) that exceeded their respective LOCs were removed during the sump and dry well investigation, conducted in 2004. The maximum concentration of arsenic detected in post-excavation soils (14.2 mg/kg) was lower than the LOC of 19 mg/kg.

Site 168

The site layout is shown on **Figure 25**. Site 168 consists of three buildings: Building 1400 (Propellant Roll House), Building 1402 (Propellant Cutting Building), and Building 1403 (Propellant Extrusion Building). Building 1400, constructed in 1948 as a propellant roll house, is located south of Rocket Production Road. Building 1400 is presently being used to store equipment for the RDX fine-grind facility to be located in Buildings 1461 and 1462. Building 1402, constructed in 1948, is located northwest of Building 1400 and south of Rocket Production Road. Until around 1990, Building 1402 received solvent-less propellant sheets from Building 1400 and cut them into strips in preparation for loading projectiles. Building 1402 is presently being used to store decontaminated propellant processing equipment. Standard operating procedure for propellant processing buildings included periodic wash-downs of the equipment and flooring to remove residual explosive material. Building 1402 did not have a wastewater catch basin; therefore, the explosives contaminated wash-down water may have flowed out the building doors and discharged directly onto the ground or flowed into the storm sewer located on the north side of Building 1402. The storm sewer discharges in the woods north of the building. Various explosive and inorganic materials were used during propellant related operations at Buildings 1400 and 1402. Building 1403, constructed in 1948 as a propellant extrusion building, is located south of Rocket Production Road. Building 1403 was used for extrusion and cutting of solvent-less propellants until 1987. The building was then renovated for the installation of a twin-screw mixer/extruder in 1992 as part of a pilot process for the production of LOVA propellants (75% RDX and 25% wax). Inert processing utilizing calcium carbonate instead of RDX is currently being conducted with the twin-screw mixer/extruder. Four catch basins located within the extrusion pressroom of Building 1403, discharged to concrete troughs and catch basins. Presently, any wastewater generated during propellant processing operations is collected in lead-lined troughs that discharge to two interior catch basins. The two catch basins are pumped to a 5,000-gallon AST with secondary containment. The wastewater stored in the AST is transferred to Building 809 for treatment. Building 1403 currently remains active.

Excavation of sumps, catch tanks, and catch basins at the site occurred from November 2003 to May 2004 (Shaw, 2005b). At Building 1400, approximately 18 CY of soil were removed from the locations of

two catch basins and a pipe which connected the catch basins. Approximately 8 CY of soil were removed from a catch basin and sewer outfall near Building 1403.

In surface soil, no VOCs were detected at levels in excess of LOCs. Five SVOCs were detected at concentrations greater than the LOCs, and one or more of the SVOCs were detected in four surface soil locations. The maximum concentrations for all five SVOCs were reported at L-168-SS-015 (0 – 1 ft): 4.88 mg/kg benz(a)anthracene, 4.88 mg/kg benzo(a)pyrene, 7.08 mg/kg benzo(b)fluoranthene, 0.61 mg/kg dibenz(a,h)anthracene, and 2.69 mg/kg indeno(1,2,3-c,d)pyrene. One explosive, 21.5 mg/kg 2,4-dinitrotoluene, was detected at a concentration greater than the LOC at one location, L-168-SS-004. Nitrocellulose was detected in several samples. As discussed previously, no LOC has been established for this compound. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals.

Three metals were found to exceed LOCs in surface soils samples and included arsenic, lead, and manganese. The maximum metals concentrations and respective sample locations are as follows: 253 mg/kg arsenic at L168-SS-013 (0 – 1 ft), 3,900 mg/kg lead at L-168-SS-039 (0 – 1 ft), and 24,400 mg/kg manganese at L-168-SS-006 (0 – 1 ft).

No other contaminants were identified at concentrations exceeding LOCs in surface soil samples.

In subsurface soil samples, no VOCs, explosives, or metals were identified at concentrations in excess of the LOCs. The explosive nitrocellulose was detected in several subsurface soil samples. One SVOC, 0.29 mg/kg benzo(a)pyrene, was detected at sample location L-1403-EX2-SWN-1, 3-3 ft. No other constituents were detected at concentrations exceeding the LOCs in subsurface soil.

In sediment, 16 SVOCs were detected above the LOC in at least one of locations L-168-SD-001, 0-1 ft, and L-168-SD-002, 0-1 ft. Maximum concentrations of 1.18 mg/kg acenaphthene, 1.99 mg/kg anthracene, 6.84 mg/kg fluoranthene, 1.31 mg/kg fluorene, and 7.46 mg/kg phenanthrene were detected at L-168-SD-001. Maximum concentrations of 0.2 mg/kg acenaphthylene, 3.07 mg/kg benz(a)anthracene, 3.07 mg/kg benzo(a)pyrene, 2.83 mg/kg benzo(b)fluoranthene, 1.63 mg/kg benzo(g,h,i)perylene, 2.83 mg/kg benzo(k) fluoranthene, 3.07 mg/kg chrysene, 0.63 mg/kg dibenz(a,h)anthracene, 1.58 mg/kg indeno(1,2,3-c,d)pyrene, 0.09 mg/kg naphthalene, and 5.42 mg/kg pyrene were detected at L-168-SD-002. Two metals, 29.1 mg/kg copper and 141 mg/kg lead, were also detected at L-168-SD-002. No VOCs or explosives were detected at concentrations greater than the LOC in sediments.

Nine metals, 4,000 µg/L aluminum, 9.5 µg/L arsenic, 16 µg/L chromium, 170 µg/L copper, 7,100 µg/L iron, 65 µg/L lead, 590 µg/L manganese, 0.41 µg/L mercury, and 1,200 µg/L zinc were detected at surface water sample location L-168-SW-001. No other constituents were detected at concentrations greater than the LOC.

In groundwater, no constituents were detected in excess of LOCs. Groundwater in Area L is being addressed as part of the Mid-Valley Groundwater Operable Unit.

Site 169

The site layout is shown on **Figure 26**. Site 169 consists of Buildings 1408, 1408A, 1408B, 1408C, 1409, and 1411. Four of the six buildings performed propellant processing operations, while the remaining two served as storage buildings for propellant operations conducted in the 1400 Area. Building 1408, constructed in 1948, was used to mix explosives and propellants. Six pad-mounted transformers, three of which were reported to contain PCBs, were located west of Building 1408 between Buildings 1411 and 1408A. The transformers have since been removed. Building 1408 also contained two catch tanks with 720 gallon and 370 gallon capacities. Complete wash-down operations have since ceased at the building. Building 1408A has been used since its construction in 1948 as a shipping, receiving, and storage building for propellant operations conducted in the 1400 Area. The building is currently used to store and weigh inert chemicals used in the manufacture of propellants. Inert chemicals stored at Building 1408A included: cellulose ester, lead stearate, diphenylamine, potassium sulfate, and graphite. Building 1408B has been used since its construction in 1944 as a storage structure for propellant operations conducted in the 1400 Area, including the storage of flammable solvents used in propellant manufacturing. Flammable solvents stored at Building 1408B included: acetone, ether, isopropanol, ethanol, ethyl acetate, acetyl triethyl citrate, and bis(2,2-Dinitropropyl) acetal. Building 1408C, constructed in 1948, has been used for

the glazing of propellants since its construction. A wastewater trough and catch tank existed on the west side of Building 1408C for the collection of explosives contaminated wastewater generated from wash-down of flooring and equipment. The three waste streams generated during propellant glazing operations included: dried propellant containing explosives, propellant contaminated rags, and propellant contaminated solvents. Building 1409, constructed in 1956, was used as a propellant extrusion press building until around 1987. A fire gutted the entire building in April 1989 and all remnants of Building 1409 have since been removed. Six pad-mounted transformers, three of which contained Aroclor 1260, were located southeast of Building 1409. In addition, five catch basins were located at former Building 1409 for the collection of explosives-contaminated wastewater generated from wash-down activities. Building 1411, constructed in 1948, has been used for the extrusion and cutting of solvent-based propellants since its construction. A catch tank was installed for the collection of explosives-contaminated wastewater generated from washdown activities and is located on the west side of the building. The four waste streams generated in addition to explosives-contaminated wastewater included: dried propellant, solvents contaminated with explosives, solvent wet propellant, and rags contaminated with solvents and explosives.

In January 2004, the catch tank was investigated as part of a facility-wide Sump and Dry Well Investigation to determine its potential for subsurface contamination (Shaw, 2005b). Approximately 2.5 CY of soil were removed during the excavation.

In surface soil samples, no VOCs or explosives were detected at concentrations exceeding LOCs. The explosive nitrocellulose was detected in surface soil samples. As noted previously, an LOC for nitrocellulose has not been established. Nitrocellulose has been evaluated to have little toxicity for most aquatic species and is virtually non-toxic to humans and other mammals. Lead exceeded the LOC at two locations. The maximum lead concentration of 2,450 mg/kg was detected at 1408C-SS-A (0 – 1 ft). One SVOC, benzo(a) pyrene, was detected in concentration greater than the LOC (0.2 mg/kg) in two samples: L-169-SS-012 (0.27 mg/kg) and L-169-SS-013 (0.25 mg/kg). No other constituents were reported in excess of LOCs in soils. No constituents were detected in subsurface soils at levels exceeding LOCs. In sediment, no explosives were detected in concentrations exceeding LOCs. The explosive nitrocellulose was detected in surface sediment samples at a maximum concentration of 209 mg/kg. Ten metals were detected in excess of LOCs in at least one sediment location. The maximum concentrations of four metals occurred at 169SD-1 (0 – 1 ft): 27 mg/kg arsenic, 46.4 mg/kg chromium, 387 mg/kg copper, and 149 mg/kg nickel. The maximum concentrations of five metals occurred at 169SD-3 (0 – 1 ft): 2.8 mg/kg cadmium, 65.4 mg/kg lead, 5,110 mg/kg manganese, 0.69 mg/kg mercury, 3.7 mg/kg thallium, and 269 mg/kg zinc. No other constituents were detected in excess of LOCs in sediment.

In surface water, five metals exceeded the LOC at one or two surface water locations. The maximum concentrations of four metals occurred at 169SW-2: 1,800 µg/L aluminum, 0.36 µg/L cadmium, 2,900 µg/L iron, and 160 µg/L zinc. The maximum concentration of lead was detected in sample 169SW-1 (10 µg/L).

The explosive RDX was detected in groundwater in a concentration slightly greater than the LOC at 169MW-1 at a concentration of 2.7 µg/L. The nearby wells (169 MW-2 and 91MW-4) did not have LOC exceedances for RDX, which would indicate that this exceedance is an isolated occurrence. Two naturally occurring metals, aluminum and iron, were also detected in excess of the LOC at this location. Aluminum was detected at 1,900 µg/L and iron was detected at 2,400 µg/L.

Site 171

The site layout is shown on **Figure 27**. PICA 171 (PICA 171)/Site 171 consists of Buildings 3106, 3109 and 3111, which were all used as magazines while under naval ownership. All three of these buildings have been renovated for use as ordnance testing facilities. Physical and environmental tests are currently carried out on ordnance and associated items at these three buildings.

Building 3106 was constructed in 1934 as a magazine (dry storage) on the foundation of a structure, which was destroyed in the 1926 Lake Denmark explosion. It was modified for use as an environmental test facility in 1964-65 and is still used for that purpose. The building is currently occupied by the Explosive Test Unit, Environmental Test Section Systems Test Branch.

In 1948, the building was used to store 245,000 pounds of magnesium powder. At the time of the building's transition from Navy to Army control, the building contained oxidizers, explosives, and rocket fuels. A request to cancel the explosive allowance for the building was submitted in 1963, but it is unknown if the explosive allowance was canceled or when the last time explosives were stored in the building. The building was renovated in 1964-1965 for use as an ordinance testing facility.

Building 3109 was originally constructed by the Navy in 1943 as a magazine. In 1960, additions were constructed to the north and south ends of the original building when it was renovated for use as an environmental testing facility, which is its current function. As an environmental testing facility, packaging materials and ordnance components are subjected to physical stresses while responses are measured.

Prior to 1989, eight transformers were located inside the building. In 1985, the building experienced an electrical fire in the transformer room. Reportedly, no release of dielectric fluids from the transformers occurred; however, there was limited damage to the room. All of the transformers were removed in 1989. Additionally, there are three transformers located on a pad (TR-3109) 100 ft northeast of the building. These transformers were documented to be PCB transformers until the 1980s when the transformers were retrofitted. According to the 1988 Picatinny transformer database, these transformers were in fair condition and some had experienced leaks.

Building 3109 has two RCRA-permitted satellite waste accumulation areas, one in the north wing of the building and one in the south wing. Reportedly, very limited amounts of waste are generated at the building and the satellite status of the building is maintained for convenience when repairing equipment. These repairs generate small quantities of oil and oily rags. According to the facilities Hazardous Waste Minimization plan, hazardous wastes generated in Building 3109 are limited to hydraulic oil (60 gallons/year) and oily rags (5 gallons/year) generated during the servicing of machinery.

During the building's tenure as an environmental testing facility, a small number of incidents have occurred. In 1967, a canister of button bomblettes ruptured during testing. This incident reportedly caused no damage to equipment or the building. Also in 1967, during the vibration test of XM411 rounds, one of the rounds malfunctioned. This resulted in a fire which reportedly damaged the building. This incident is thought to have had a limited impact on the environment because the entire explosive was thought to have burned before fire-fighting activities would have the opportunity to wash any contaminants away.

Tritium-containing equipment underwent a variety of tests in the building. According to a radiation area survey conducted in the late 1970s, swipe sampling of equipment after testing indicated that no release occurred and no residual contamination existed.

Building 3111 was constructed by the Navy in 1943 for use as a smokeless powder storage building. Building 3111 was transitioned from Navy ownership to Army ownership with the rest of the buildings in the area in the early 1960s. In the early 1960s, the building was converted for use as an air gun facility. The building has served that purpose since that time. These guns use compressed air to fire pistons containing ordnance components to test the response to high G forces.

Two additions were made in 1965, one to the west side of the building with a shed roof and the other on the south side of the building. According to a Public Works project list, the third and final addition to Building 3111 to fully house the third air gun was completed in 1988. This addition is on the west side of the building.

Building 3111 contains a RCRA permitted satellite waste accumulation area which stores accumulated hydraulic oil (60 gallons per year) and oily rags (5 gallons per year) from servicing compressors and machinery. In addition, small amounts of other chemicals are used in the development of new testing equipment and procedures.

The building is equipped with a flammable materials storage cabinet in the third air gun room. The cabinet is used for the storage of small amounts of paints and petroleum products used in the maintenance of the compressors and building equipment.

Building 3111 also houses a "dynamic machine" which was designed to simulate the forces inflicted on a shell upon conventional firing. The project was initiated in the 1980s and development continued until the 1990s. The system was never perfected and never used on a regular basis. However, when used, the

machine released "biodegradable hydraulic fluid" to a floor drain. Engineering drawings do not detail the discharge point of this floor drain.

When the original building was renovated for use as an air gun facility in the 1960s, a small drum was half-buried and the compressor vent discharged to this drum. When air is compressed a small amount of oil enters the air. Releasing the pressure releases the oil. The drum was not designed to contain the entire oil vapor and soil staining resulted. This drum was removed and soil was removed at the same time.

In March 2004, approximately 180 CY of soil were excavated from Site 171 as identified in the Lead Site Removal Action Workplan (Shaw, 2004a).

In surface soil samples, no VOCs were detected at concentrations exceeding the LOCs. Three SVOCs, benzo(a)pyrene (1.7 mg/kg), benzo(b)fluoranthene (2.4 mg/kg), and dibenz(a,h)anthracene (0.24 mg/kg) were detected at concentrations greater than the LOC at one location, L-171-SS-001 (0 – 1 ft). No explosives exceeded the LOCs in surface soil samples. Aroclor 1242 was detected at a concentration of 2.5 mg/kg at one location, L-171-SS-008, 0 -1 ft, but was not detected in the duplicate sample from the same location. Three metals, cadmium, lead, and zinc, were detected at concentrations exceeding the LOC in several surface soil samples. The maximum concentrations of cadmium (260 mg/kg), lead (8710 mg/kg), and zinc (230,000 mg/kg) were all detected at sample location L-171-SS-003, 0 - 1 ft. No other constituents in surface soil were detected at concentrations exceeding their respective LOCs.

No VOCs, SVOCs, or explosives exceeded the LOCs in subsurface soil. As in surface soil, one metal, lead (955 mg/kg), was found in exceedances of the LOC at one location, L-171-SB-001 (5.3 – 5.8 ft).

In surface water, only one VOC, TCE, was detected at concentrations exceeding the LOC (1 µg/L) in samples collected at two locations, L-171-SW-002 (1.7 µg/L) and L-171-SW-003 (6 µg/L). There were no other constituents that exceeded LOCs in surface water at Site 171.

In groundwater samples, one VOC, TCE, was detected at a concentration greater than its LOC (1 µg/L) at one location, L-171-MW-002 (22 µg/L). Three likely naturally-occurring metals, aluminum, iron and manganese, were detected at concentrations slightly exceeding the LOCs in one or two monitoring well locations. Groundwater at this site is being addressed as part of the Mid-Valley Groundwater Operable Unit.

2.6 CURRENT AND POTENTIAL FUTURE LAND USE

Picatinny's Master Plan designates future land use of Areas D, I, K, and L as military and industrial conducted in a secured area. There are no plans to change this land use in the foreseeable future.

2.7 SUMMARY OF SITE RISKS

Baseline human health risk assessments (HHRA), lead blood models (for sites where lead was present), and ecological risk assessments (ERAs) were conducted in accordance with 40 Code of Federal Regulations (CFR) 300.430(d)(4) for the sites as part of the various RIs that evaluated these sites. Additional evaluation/reevaluation of some of the human health risk assessments/lead blood levels was conducted for some of the sites since the RI to account for changes in USEPA guidance on risk assessments including soil to skin adherence factors, soil ingestion rates and other updates in regulation since the original risk assessments were conducted. Potential risks to human health are evaluated quantitatively by combining calculated exposure levels and toxicity data. A distinction is made between noncarcinogenic and carcinogenic endpoints, and two general criteria are used to describe risk: the hazard quotient (HQ) for noncarcinogenic effects and excess lifetime cancer risk (ELCR) for contaminants evaluated as human carcinogens. The HQs are summed to calculate the hazard index (HI). The HI is the sum of all the HQs for all COCs that affect the same target organ, or that act through the same mechanism of action within a medium, to which a given individual may reasonably be exposed. The regulatory benchmark for noncancer health effects is 1. An HI less than or equal to 1 indicates that toxic noncarcinogenic health effects should not likely occur; an HQ or HI that exceeds 1 does not imply that health effects will occur, but that health effects are possible. The USEPA considers an ELCR within the target risk range of 1E-04 to 1E-06 as generally acceptable cancer risk. If the ELCR exceeds the 1E-04 target risk level, site-specific remedial goal options are derived for the relevant contaminants and exposure scenarios.

As discussed previously, the sites are currently used for military/industrial purposes with no plans to change the use in the foreseeable future. The risk assessments were conducted to evaluate the potential risk associated with exposure to chemicals in soil, sediment, groundwater, and surface water. Risks were calculated for the reasonably anticipated future land use as well as hypothetical residential use scenarios. Potential receptors considered during the risk evaluations for current and future exposure scenarios are the industrial/research worker, the construction excavation worker, the on-site visitor, the adult resident, the child resident and the combined adult and child resident. However, the adult resident, child resident, and combined adult/child resident scenarios are not reasonably anticipated future land use scenarios. Thus, annual monitoring, as described in Section 1.3, will be conducted at these sites to ensure land use has not changed, as they cannot be released for unrestricted (residential) use. In 2014 USEPA and the Army jointly evaluated the potential risk for an additional receptor (outdoor maintenance worker) and confirmed the risks calculated for the construction excavation worker (ARCADIS, 2014) at Site 17, 35, 108, and 199 to address specific NJDEP concerns at those sites.

A summary of the results of the human health and ecological risk assessments and the lead blood model are included below for each of the sites evaluated within this ROD. **Table 2** summarizes all of the human health risks evaluated for each site.

2.7.1 Area D Site

Site 189

Based on the HHRA performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk range is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

An ERA was not conducted for Site 189 because ecological exposures are expected to be extremely limited. The site, which measures approximately 4 acres, is currently mowed and this maintenance is expected to continue in the future. In addition, Site 189 is located in a high-use area near the cafeteria, golf course, and several housing units. This high level of activity would discourage most ecological receptors except those adapted to an urban environment.

2.7.2 Area I Sites

Site 16

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is at or less than 1; and
- Lead is not a concern at this site.

Site 16 was evaluated in the Phase II ERA (IT, 2000). Bioassays were performed on three samples collected from the open trench portion of the GCL. Although these samples were characterized as sediment during the Phase II RI, samples collected for the bioassays were dry and characterized as soil. The bioassay results indicated that the elevated explosives and metal concentrations identified along the GCL are not toxic to the test organisms (i.e., earthworms). Chemical analysis of the earthworms following the bioassays revealed concentrations of explosives and metals. Since the earthworms were not depurated, it is likely that some of the detected compounds were only present in the intestinal contents and not in the worm tissue itself. These results indicate there is a potential risk to the white-footed mouse from exposure to arsenic and selenium. Risks to terrestrial wildlife, however, are not likely to occur via direct contact or via the food web for the majority of the constituents of potential ecological concern (COPECs) evaluated in the Phase II ERA. Although the direct contact HQs and the food-web based HQs for certain constituents exceed 1, the limited extent, ecological conditions at the site, and/or constituent occurrence conditions at the site suggest that the calculated risks are likely overestimated for these constituents. In addition, the PHST facility has been constructed at this site since the ERA was conducted.

Site 32

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Site 32 is an open field bordered by mature trees. The site was included in the Phase II ERA (IT, 2000) with Sites 105 and 150 in Area I. Ecological risk to terrestrial Environmental Effects Quotients (EEQs) for the COPECs detected in soil samples from these sites were less than 1 for all the chemicals with the exception of arsenic in the white-footed mouse. Arsenic had an EEQ of 4.71 for the white-footed mouse based on a soil concentration of 11.5 mg/kg; however, numerous conservative assumptions are used in the terrestrial wildlife model. This ensures that risks are not underestimated, but also makes it more likely that risks are overestimated. Thus, exceedance of conservative toxicity reference values (TRVs) does not necessarily indicate that adverse effects are occurring. Moreover, no areas of concern were identified at the site due to the low levels of contamination. Based on the minimal presence of potential food chain risks, it appears that populations of terrestrial receptors are not significantly affected by COPECs in soil.

Site 33

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Site 33 was evaluated in the Phase II ERA. Arsenic was the only risk driver identified in surface soil at Site 33 and contamination is limited to a localized area. The site was not evaluated for potential risk to terrestrial receptors during the Phase II ERA. Due to the small size of the Site (0.2 acres) and low levels of contamination; minimal potential risk for terrestrial species is expected at Site 33. Risk drivers in sediment samples were evaluated as part of the separate FS addressing the lakes at Picatinny.

Site 46

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is at or less than 1; and
- Lead is not a concern at this site.

A site-specific ERA was not conducted at this site because the site consists of a building (507). Therefore, there is not sufficient food or cover to provide sufficient habitat for terrestrial wildlife.

Site 50

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

All buildings at Site 50 have been demolished and as a result the habitat is of poor quality. Regardless, Site 50 was evaluated along with adjacent Site 147 for ecological risk. The ERA suggests that there is little potential risk to small mammals, vermivorous birds, and predatory birds from soil exposure at the site.

Site 63/65

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- Though the total HI is greater than the USEPA's target noncancer hazard threshold of 1, hazards are less than 1 when broken down by target organ; and
- Lead is not a concern at this site.

A site-specific ERA was not conducted at this site because the site consists of a building (506). Therefore, there is not sufficient food or cover to provide sufficient habitat for terrestrial wildlife. Building 506 has been demolished, and the site is relatively flat, with no evidence of erosion.

Site 97

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Site 97 is a small area (0.2 acres). A strip of maintained lawn between Building 501 and Picatinny Lake is the only possible habitat. Because the site is less than an acre in area, the site was not evaluated in the Phase II ERA. The majority of the site is flat, with the steepest part being right at the edge of the lake, which is vegetated and would help to buffer/intercept runoff from this site.

Site 105

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Although Site 105 is relatively small (0.3 acre), it was evaluated in the Phase II ERA (IT, 2000), because the site is reverting to a more natural state with suitable cover for terrestrial wildlife. Soil samples from Site 105 were evaluated along with soil samples from neighboring Sites 32 and 150 to determine potential ecological risk to terrestrial receptors. EEQs for the COPECs detected in soil samples from Sites 32, 105, and 150 were less than 1 for all chemicals with the exception of arsenic in the white-footed mouse. Arsenic had an EEQ of 4.71 for the white-footed mouse based on a soil concentration of 11.5 mg/kg; however, numerous conservative assumptions are used in the terrestrial wildlife model. This ensures that risks are not underestimated, but also makes it more likely that risks are overestimated. Thus, exceedance of conservative TRVs does not necessarily indicate that adverse effects are occurring. Based on the minimal potential of food chain risks, it appears that populations of terrestrial receptors are not significantly affected by COPECs in soil.

Site 108

Based on the human health risk assessments performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The estimated hazards have been recalculated and are now less than the USEPA's target noncarcinogenic hazard threshold of 1, due to the removal of mercury by earlier actions; and
- Lead is not a concern at this site.

Although the site habitat value is low (much is asphalt-covered), the site borders forested areas and Picatinny Lake. Thus, Site 108 was evaluated in the Phase II ERA to determine potential risk to terrestrial and aquatic receptors. Results of a soil bioassay indicated that the soil sample with high mirex concentration did not pose any significant toxicity to the test organisms, and in addition, mirex

contamination around Building 732 (AOC 3) has been removed. Based on the results of the food chain analysis, potential risks were identified to small mammals based on slightly elevated EEQs for two chemicals (mirex and arsenic) for the white-footed mouse. However, the slightly elevated EEQs were not considered to be ecologically significant. In addition, soils were not significantly toxic to test organisms in the bioassay tests, and the site is considered to have low habitat value. Therefore, the results of the ERA indicate that there are no ecologically significant risks at Site 108.

Site 113

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

In addition, the residential risk scenarios evaluated for Site 113 were also within the generally acceptable risk range of 1E-04 and 1E-06, which indicates that this site meets the requirements to allow unrestricted use.

This site was evaluated in the Phase II ERA (IT, 2000) for aquatic and terrestrial species. The aquatic (i.e., sediment) evaluation is from samples collected from Picatinny Lake, which is addressed in the Picatinny Lakes FS. Ecological risk to terrestrial EEQs for the COPECs detected in soil samples collected at Site 113 and adjacent site 178 (Building 565) were less than 1 for all with the exception of arsenic in the white-footed mouse. Arsenic had an EEQ of 3.69 for the white-footed mouse; however, numerous conservative assumptions are used in the terrestrial wildlife model. This ensures that risks are not underestimated, but also makes it more likely that risks are overestimated. Thus, exceedance of conservative TRVs does not necessarily indicate that adverse effects are occurring. Moreover, no areas of concern were identified at the site due to the low levels of contamination. Based on the minimal presence of potential food chain risks, it appears that populations of terrestrial receptors are not significantly affected by COPECs in soil.

Site 147

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Site 147 is an open field with scattered grass. Despite the poor habitat quality due to bulldozing the buildings, Site 147 was evaluated along with adjacent Site 50 for ecological risk. COCs detected in soil samples collected at Sites 50 and 147 suggest that there is little potential risk to small mammals, vermivorous birds, and predatory birds from soil exposure at the site.

Site 148

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is at or less than 1; and
- Lead is not a concern at this site.

With the demolition of the building, Site 148 (which covers approximately 1.3 acres) is reverting back to original habitat. Therefore, ecological risk was evaluated for terrestrial species. COCs detected in the soil at Site 148 during the Round 1 investigation suggest that there is little potential risk to small mammals, vermivorous birds, and predatory birds from soil exposure at the site.

Site 150

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is at or less than 1; and
- The site has been redeveloped as part of the pyrotechnic facility and the lead in soils were capped during construction.

The site was evaluated along with adjacent Sites 32 and 105 for ecological risk to terrestrial species. EEQs for the COPECs detected in soil samples from Sites 32, 105, and 150 were less than 1 for all chemicals with the exception of arsenic (4.71) in the white-footed mouse. Numerous conservative assumptions are used in the terrestrial wildlife model. Although this ensures that risks are not underestimated, it also increases the likelihood that risks are overestimated. Thus, exceedance of conservative TRVs does not necessarily indicate that adverse effects are occurring. Based on the minimal potential of food chain risks, it appears that populations of terrestrial receptors are not significantly affected by COPECs in soil. In addition, construction of the Pyrotechnics Facility has drastically changed the landscape of this site and greatly reduced the potential habitat at this site.

Site 184

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Due to the small size of the site (approximately 0.5 acre) and the limited number of samples collected at the site, Site 184 was not evaluated for ecological risk.

2.7.3 Area K Site

Site 199

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

The carcinogenic risk range is within the generally acceptable range of 1E-04 and 1E-06;

- The noncarcinogenic hazard is at or less than 1; and
- Lead is not a concern at this site.

No ERA has been conducted; ecological risks are not a concern because potential contaminants are not bioavailable.

2.7.4 Area L Sites

Site 17

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

The Screening Level Ecological Risk Assessment (SLERA) identified lead and tetryl as the principal COPECs. While soils containing tetryl have been excavated, SVOC and lead contamination remains near the tetryl pits and former buildings. Site 17 presents a heavily vegetated habitat. Terrestrial receptors (e.g., small mammals and birds) may be exposed to SVOCs and lead in the soils or in their food items (such as invertebrates and plants). Though the food web exposure models indicated that adverse effects on reproduction in small mammals or birds could occur given sufficient exposure to site COPECs in Northeastern Area L, the Phase III ERA field investigations and Rodent Sperm Analysis indicated that effects, if any, were not impacting the local population of small mammals or birds.

Site 18

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is at or less than 1; and
- Lead is not a concern at this site.

Site 18 contains a woody, shrubby habitat as well as a marshy area to the west. Wastes generated at the site included tetryl waste, acid (possibly nitric acid), water, lead, and sellite. This site is currently inactive. The 2007 Phase III ERA indicated that the marshy area had reverted to woody shrubby habitat (potentially as a result of the cessation of site activities) and that it was unlikely that ecological communities are at any significant risk from site contaminants.

Site 35

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Site 35 is about 1.5 acres in size. Drainage gutters and ditches, as well as an intermittent stream, run through Site 35. The SLERA identified COPECS in both surface water and sediment in this stream. Metals, particularly lead, were identified as COPECS for surface water and soil. Several metals, PCBs, PAHs, and RDX were identified as COPECs for sediment. PCBs were also identified as COPECs for soil. Site 35 contains a considerable amount of marshy, shrubby habitat that may be utilized by ecological receptors. The numerous gutters, troughs, and ditches provide a potential for transport of contaminants to tributaries to Green Pond Brook. Though various metals were detected at elevated concentrations in some of the sediments, lead and PCBs pose the greatest concern. The Baseline Ecological Risk Assessment conducted benthic community surveys in the stream downstream of drainage from Sites 35 and 167. Also, a small survey, wildlife exposure modeling, rodent sperm analyses, and a breeding bird survey were conducted in southern area L to evaluate any potential risk from Site 35. Rodent sperm analyses did not show significant differences between the study sites and the reference site. Based on these evaluations, ecological risks at this site are not considered to be significant.

Site 91

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

The ERA indicated that terrestrial wildlife may be exposed to contaminants in the soil and in the surface water and sediment of the intermittent stream. However, the stream itself does not represent a significant aquatic habitat. Though the food web exposure models indicate that adverse effects on reproduction in small mammals or birds could occur given sufficient exposure to site COPECs in Southern Area L, the field investigations and Rodent Sperm Analysis indicated that effects, if any, were not impacting the local populations of small mammals or birds. Based on these evaluations, ecological risks at this site are not considered to be significant.

Site 161

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and

- Lead is not a concern.

Due to the removal action conducted in 2004 and the low concentrations of other compounds in soil at Site 161, no ecological risk assessment is anticipated for terrestrial receptors in the vicinity of Site 161. The SLERA identified several metals (e.g., copper, lead, and zinc) in surface water or sediment of nearby Robinson Run as COPECs; however, based on the ERA conducted on Robinson Run the benthic community of Robinson Run does not appear to be at any significant risk from the potential presence of contaminants from Area L sites in the surface water or sediment. Based on these evaluations, ecological risks at this site are not considered to be significant.

Site 162

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is at or less than 1; and
- Lead is not a concern at this site.

A removal action at Building 1071 conducted in 2004 eliminated former potential contamination sources (catch tanks, filter box) and, accordingly, an ERA was not recommended for Site 162. Confirmation soil sampling determined elevated explosives levels had been removed in these areas. Remaining concentrations of explosives at the site are localized in extent and are not likely to pose significant potential risks to populations and communities of ecological receptors.

Site 166

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

A site-specific ERA was not conducted at this site because the site consists of three buildings (1354, 1357, and 1359). There are no anticipated ecological risks.

Site 168

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Surface soils near building 1400 and 1402 contain elevated levels of arsenic and lead. Sediment of the catch tanks and sewer outfalls near Building 1403 that discharge into a wooded area north of Building 1403 contain elevated metals and PAHs. Wooded habitat within Site 168 can be used by terrestrial receptors that may be exposed to metals and PAHs in soil. Though the food web exposure models indicated that adverse effects on reproduction in small mammals or birds could occur given sufficient exposure to site COPECs in Southern Area L, the field investigations and Rodent Sperm Analysis indicated that effects, if any, were not impacting the local populations of small mammals or birds. Based on these evaluations, ecological risks at this site are not considered to be significant.

Site 169

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk is within or less than the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Elevated lead concentrations were identified in one sample at Site 169 related to a possible spill near building 1411 and in several samples in the drainage ditch that runs through Site 169 between the catch tank of Building 1408C and Rocket Production Road. Wildlife receptors may be exposed to contaminants in the drainage ditch. A small mammal survey, wildlife exposure modeling, rodent sperm analyses, and a breeding bird survey were conducted to assess the potential risk to wildlife. Though the food web exposure models indicated that adverse effects on reproduction in small mammals or birds could occur given sufficient exposure to site COPECs in Southern Area L, the field investigations and Rodent Sperm Analysis indicated that effects, if any, would not impact the local populations of small mammals or birds. Therefore, ecological risks are expected to be minimal.

Site 171

Based on the HHRAs performed for this site, for current and reasonably anticipated future land use:

- The carcinogenic risk range is within the generally acceptable range of 1E-04 and 1E-06;
- The noncarcinogenic hazard is less than 1; and
- Lead is not a concern at this site.

Soil samples collected in Site 171 revealed levels of cadmium, lead, and zinc in soils near Building 3109 that were elevated compared to ecological criteria. Elevated levels of PCBs were also found in soil near the discharge of the floor drain from Building 3109. Suitable habitat exists in Site 171 that could be used by wildlife. Wildlife receptors may be exposed to metals or PCB in soils near Building 1309. A small mammal survey, wildlife exposure modeling, rodent sperm analyses, and a breeding bird survey were conducted in Northern Area L to assess this potential risk. Though the food web exposure models indicated that adverse effects on reproduction in small mammals or birds could occur given sufficient exposure to site COPECs in northeastern Area L, the field investigations and Rodent Sperm Analysis indicated that effects, if any, were not impacting the local populations of small mammals or birds. Therefore, ecological risks are expected to be minimal.

2.8 DOCUMENTATION OF SIGNIFICANT CHANGES TO THE PREFERRED RESPONSE ACTION FROM THE PROPOSED PLAN

No significant changes have been made to this ROD from the PP, with the exception of the RA selected for Site 113. Due to the human health risk assessment results, which indicate that this site has residential risk results that are within the generally acceptable risk range of 1E-04 and 1E-06, and an HI of 1 or less, Site 113 may be released for unrestricted use. Therefore, the RA for Site 113 has been changed from No Further Action with Monitoring of Land Use to No Further Action.

3.0 PART 3: RESPONSIVENESS SUMMARY

The final component of this ROD is the Responsiveness Summary. The purpose of the Responsiveness Summary is to provide a summary of the stakeholders' comments, concerns, and questions about the Selected RA for the 26 Picatinny Sites and the Army's responses to these concerns.

The Army has fulfilled the public participation requirements identified in 40 CFR 300.430(f), and Title 10 United States Code 2705(b)(2), and maintained an administrative record, which is available for the public, in accordance with 40 CFR 300.800. The 26 Picatinny sites have been the topic of presentations at the PAERAB. PAERAB members have provided comments regarding the proposed RA. A copy of the PP was given to the PAERAB's co-chair and a copy was offered to all PAERAB members. A final PP for 26 Picatinny Sites was completed and released to the public on February 22, 2013 at the information repositories listed in Section 2.3.

Multiple newspaper notifications were made to inform the public of the start of the PP comment period, solicit comments from the public, and announce the public meeting. The notification was run in the Daily Record on February 22, 2013 and in the Star Ledger on February 22, 2013. Copies of the certificates of publication are provided in **Appendix A**. A public meeting was held on March 7, 2013 to inform the public about the Selected RA for the 26 Picatinny sites and to seek public comments. At this meeting, representatives from the U.S. Army, NJDEP, USEPA, and the Army's contractor, ARCADIS, were present to answer questions about the site and response actions under consideration. A public comment period was held from March 7, 2013 to April 6, 2013 during which comments from NJDEP were received and four written comments from the public were received.

All comments and concerns summarized below have been considered by the Army and USEPA in selecting the final cleanup methods for the Site.

3.1 PUBLIC ISSUES AND LEAD AGENCY RESPONSES

As of the date of this ROD, the Army and the USEPA endorse the Selected RA for the 26 Sites. Comments received during the public comment period on the PP are summarized below. The comments are categorized by source.

3.1.1 Summary of Written Comments Received during the Public Comment Period

WRITTEN COMMENTS

Comment No. 1, Michael Glaab, Restoration Advisory Board Community Member: Unfortunately, I am persuaded by the facts, as presented, to neither concur with – nor to approve of the 25/26 Site Proposed Plan as currently envisaged. Logic compels rejection of this plan's apparent lack of conformance to relevant New Jersey state cleanup standards which have presumably been properly and legally promulgated. As a resident of the state of New Jersey who resides in a community immediately adjacent to Picatinny Arsenal it is my expectation that my state's legally promulgated cleanup standards will be adhered to if and when those standards are scientifically valid, practicable to achieve, and legally promulgated in the requisite manner.

Response to Comment No. 1: The subject of compliance with the NJDEP soil remediation standards has been discussed at numerous meetings between the USEPA, NJDEP, and Army teams. Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance, and no unacceptable risk has been found for the current and reasonably anticipated future land use. Further, there are no adverse impacts to ecological receptors. As such, no action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains military/industrial and that existing controls which prevent unrestricted use remain in place, as described in Section 1.3. If land use is no longer military/industrial, the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.

Comment No. 2, Michael Glaab: I am concerned that the proposed plan envisages that too little effort will be devoted to the actual removal of contaminants. It appears that this plan's primary focus is rather the problematic isolation and mere monitoring of contaminated regions until their contaminants either migrate offsite and/or degrade naturally.

Response to Comment No. 2: As stated during the public meeting, and detailed in the PP, USEPA-approved risk assessments indicate that there are no unacceptable human health risks for the current and reasonably anticipated future land use at these sites. CERCLA (Superfund) is the governing law for Picatinny Arsenal and unacceptable site-related risks are required for an action to be taken. These sites do not pose unacceptable human health risks for the current and reasonably anticipated future land use nor do they pose unacceptable impacts to ecological receptors. Annual monitoring will be conducted to ensure site use remains consistent with the assumptions of the risk assessment.

Comment No. 3, Michael Glaab: One should avoid the inadvertent obscuring and possible minimizing of the true extent of contamination at specific sites by inappropriately averaging over both contaminated and uncontaminated areas.

Response to Comment No. 3: Risk assessments followed USEPA requirements and were conducted correctly. No inappropriate averaging was conducted.

Comment No. 4, Henry VanDyke, Restoration Advisory Board Community Member: (Mr. VanDyke indicated he concurred with the remedy of No Further Action with Monitoring of Land Use.) I know some of the areas from work but primarily due to hunting and fishing via the Rod & Gun Club. Since the 80s, there has been no or minimal human traffic on or through them, southwest of Lake Picatinny might be the exception. I hope common sense applies.

Response to Comment No. 4: The comment is acknowledged and appreciated.

Comment No. 5, Kenneth J. Kloo, Director Division of Remediation Management, NJDEP (Letter to Mr Ted Gabel and Walter Mugdan dated March 7 2013):

> Re: The New Jersey Department of Environmental Protection's (Department) Review of the Department of the Army's (Army) February 6, 2013 Final Proposed Plan (25 Sites PP) for 25 Picatinny Sites within PICA 001, 006, 022, 085, 143, 163, 171, 192, and 199 at Picatinny Arsenal, Dover, New Jersey
>
> Dear Mr. Gabel and Mr. Mugdan:
>
> The Army's February 6, 2013 25 Sites PP, which proposes no further action with monitoring of land use is not acceptable to the Department as it is not protective of human health or the environment. The 25 Sites PP does not address significant contamination that is present in several areas of concern and avoids using Applicable or Relevant and Appropriate Requirements (ARARS).
>
> > *Response to point #1: Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance, and no unacceptable risk has been found for the current and reasonably anticipated future land use. Further, there are no adverse impacts to ecological receptors. As such, no action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains military/industrial, as described in Section 1.3. If land use is no longer military/industrial, the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.*
>
> The NJDEP letter continues:
>
> It is the Department's position that the Army's proposed plan is also precedent setting and will have negative impacts on remedial decisions made at other National Priorities List sites, Federal Facilities and other responsible party sites across the country. The United States Environmental

Protection Agency (EPA) should reconsider the ramifications of choosing a no action remedy of monitoring and existing land use controls for sites where significant contamination is present above the State's duly promulgated remediation standards. Below are the Department's concerns with the 25 Sites PP.

> *Response to point #2: All NPL sites are evaluated individually based on site-specific conditions in accordance with CERCLA and the NCP.*

The NJDEP letter continues*:*

General Concerns:

The Department issued comprehensive technical comments to the Army on September 29, 2011 regarding the Feasibility Study for the 25 sites addressed in this proposed plan. To date, the Department's comments have not been addressed in any detail. Significant contamination has been identified in many of the areas and the remedial investigation and delineation has not been completed. In summary, a proposal for no action is not supported by the data. The Feasibility Study comments must be adequately addressed and the 25 Sites PP be amended accordingly.

> *Response to Point #3: The USEPA-approved risk assessments summarized in the FS indicate that there are no unacceptable human health risks for the current and reasonably anticipated future land use at these sites. CERCLA (Superfund) is the governing law for Picatinny Arsenal and unacceptable site-related risks are required for an action to be taken. These sites do not pose unacceptable human health risks for the current and reasonably anticipated future land use nor do they pose unacceptable impacts to ecological receptors. Annual monitoring will be conducted to ensure site use remains consistent with the assumptions of the risk assessment (military/industrial land use).*

The NJDEP letter continues:

The Army has proposed that contamination at the sites in the 25 Sites PP is within10-4 to 10-6 risk range and, therefore, no action is proposed." The Department disagrees with this assessment regarding the risk posed by these areas. An evaluation of the risk assessment indicates that data from many specific discharge areas were inappropriately averaged over large areas of the individual sites, including a large number of samples that were not impacted, thus diluting the average contaminant levels, and therefore masking the true risk to human health and the environment. Under the proposed plan, contamination would remain in surface soil in some areas that the Department considers hotspot or source material which clearly requires active remediation. Contaminant levels in surface soil include but are not limited to, lead at 19,500 ppm and polychlorinated biphenyls (PCBs) up to 143 ppm, barium 100,000 ppm, mercury 600 ppm, arsenic 251 ppm and DDT 16 ppm. Contaminated soils (PCBs and metals) in some areas have impacted sediments in Picatinny Lake and other wetland areas. These soils are not controlled and may continue to migrate into surface water/sediments in the future.

> *Response to Point #4: Risk assessments were conducted in accordance with the CERCLA process, and no inappropriate averaging was performed nor were they averaged over large unimpacted areas. The USEPA has approved the risk assessments conducted at these sites in the past. The NJDEP has reviewed all of the RI reports and agreed to issuance of final documents, which are in the administrative record. The approved risk assessments were, in some cases, updated in 2009 to account for changes in USEPA guidance on risk assessments including soil to skin adherence factors, soil ingestion rates and other updates in regulation since the original risk assessments were conducted and approved. There were no changes made to the exposure assessments, the data included in the risk assessment, or the way exposure point concentrations across the sites was calculated.*

The NJDEP letter continues:

In a letter dated November 27, 2012, the Department was notified that discussions regarding the 25 Sites PP had concluded between EPA and the Army and that compliance with ARARs would not be

necessary provided that certain institutional controls and monitoring are in place. Specifically, the Army and EPA's agreement includes existing land use controls and proposed land use monitoring as necessary requirements for the no action proposals. The Department was not part of the discussions that lead to these agreements. In accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance, a baseline risk assessment (OSWER 9355.0-30) "should not assume institutional controls or fences will account for risk reduction". The Department considers monitoring and institutional controls [See Institutional Controls: A guide to Planning, Implementing, Maintaining and Enforcing Institutional Controls (OSWER 9355.0-89)] to be response action under CERCLA which trigger ARARS. In 2009 EPA and the Army signed the Record of Decision (ROD) for Area C Ground Water at Picatinny Arsenal. This ROD considered monitoring a response action. Besides being counter to current EPA policy, the 25 Sites PP is not consistent with past remedial decisions at Picatinny Arsenal.

> *Response to Point #5: The purpose of the annual monitoring is to ensure the use of the sites remains military/industrial, which is the current and reasonably anticipated future land use of the sites. There are no unacceptable risks or hazards under that land use and the purpose of the institutional controls is not to "account for risk reduction." In regards to the perceived inconsistency with past remedial actions, the Army and USEPA believe CERCLA and the NCP are being applied consistently at Picatinny Arsenal. In the absence of unacceptable risk for the current and reasonably anticipated future use at the 25 Sites there is no need for a CERCLA response action to reduce risk to human health. As there is no expectation to change the current land use, only annual inspections are required to confirm site conditions remain protective of human health. These inspections to confirm site conditions do not constitute a response action under CERCLA. At Area C, the Army and USEPA took a response action under CERCLA and the NCP by collecting groundwater data to a) monitor the restoration of the aquifer to its beneficial use; and b) monitor site conditions at or near the southern boundary of the Installation to address a site risk.*

The NJDEP letter continues:

Finally, the Army has evaluated the site by separating it into hundreds of areas rather than evaluating site wide risk to determine what ARARs are appropriate. The Department agrees that remedial decisions should be evaluated on an area by area basis; however, ARARs must be addressed site wide. The Departments position is that ARARs have been triggered pursuant to CERCLA since significant contamination remains that require remedial action(s).

> *Response to Point #6: There are numerous specific sites at Picatinny that were used in the past for industrial processes or testing activities. All of these sites are being addressed under CERCLA. It is unrealistic, unnecessary, and technically incorrect to evaluate the Arsenal in its entirety as a single site as hundreds of acres remain pristine. Conducting a site-wide risk assessment would result in averaging in of pristine areas which the Department correctly points out is not technically defensible. Such an exposure assumption would be incorrect and would, through averaging, reduce calculated risk across the Arsenal and result in no unacceptable risks at any site on the arsenal. Remedial decisions are being made on a site by site basis as was agreed many years ago. Application of Applicable or Relevant and Appropriate Requirements (ARARs) across the entire Arsenal based on their triggering at individual sites is not consistent with CERCLA.*

The NJDEP letter continues:

Listed below are specific examples of sites which require a response action and other issues which must to be addressed by the Army in the 25 Sites PP. For a more detailed discussion all the sites that require a response action, as well as additional Department concerns, see the attached September 29, 2011 letter to the Department to the Army regarding the 2009 draft Feasibility Study.

<u>Specific Site Concerns</u>

<u>Site 108, Ordinance Facilities and Flare Testing Area:</u> In the draft Feasibility Study, the Army

proposed an 18-inch vegetated soil cap on 'Flare Island' to reduce some of the exposure potential due to the elevated concentrations of contaminants noted in soils on 'Flare Island' and sediments in Picatinny Lake surrounding this peninsula. Surface soils at Flare Island contain Mirex 300 ppm, lead 4480 ppm, arsenic 787 ppm, PCBs 2.2 ppm, mercury 610 ppm, and barium 100,000 ppm. Sediment data in Picatinny Lake exhibit similar impacts. As has been stated in the past, the risk assessment for Site 108 is flawed because clearly there is unacceptable risk to ecological and human receptors exposed to this unprotected source area. The Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) were both inadequate and did not properly assess the current and future risks associated with the high concentrations of contaminants detected in soils on the shore of Picatinny Lake and the sediments in Picatinny Lake. Contaminant delineation was incomplete when the risk assessment was conducted. Also, based on the historic usage, the distance between 'Flare Island' and the rest of Site 108 and the different constituents of concern in the two areas, the human health and ecological risk at 'Flare Island' should have been evaluated as a separate site from the rest of Site 108.

> *Response to Point #7: The overall size of the site, including the office buildings and 'Flare Island,' is approximately 8 acres. The two portions of the site are separated by only approximately 170 feet. The risk assessment was conducted during the RI and approved by the USEPA.*
>
> *In 2014, USEPA and the Army recalculated risk levels at Site 108 and found that the methodology for derivation of EPCs is appropriate for the current and reasonably anticipated land use. However, USEPA stresses the importance of monitoring land use as required in the ROD to ensure residential and trespasser site uses are prohibited.*
>
> *USEPA and the Army also found that for the current and reasonably anticipated future land use scenarios, evaluating Site 108 as one exposure unit is justified since exposures are not anticipated to occur in one area of the site over another. If future land use changes, then subdividing the site into different exposure areas may be required to determine if risk and noncancer hazards remain acceptable based on subdivided exposure areas.*
>
> *In addition, Picatinny conducted ecological studies at Site 108 which included sampling of likely exposure areas and field surveys and found that impacts to ecological receptors to be minimal. USEPA reviewed and approved the ecological studies performed by Picatinny for this site.*

The NJDEP letter continues:

Area K, Site 199, Abandoned Pistol Range: The document states on page 14 that 'the carcinogenic risk range is within the generally acceptable range of 1E-04 and 1E-06, the noncarcinogenic hazard is less than 1, lead is not a concern at this site, and no ERA was conducted because potential contaminants are not bioavailable'. The Department disagrees with all of these statements. Lead is clearly a concern at this site and in fact is present in surface soils at concentrations up to 16,000 ppm. Arsenic is present at concentrations up to up to 50 ppm; and polynuclear aromatic hydrocarbons (PAHs) are also elevated (benzo(a)pyrene {BaP} up to 42 ppm, Avg BaP= 3.9 ppm). This site is a large vacant wooden area with obvious ecological receptors and the Army has provided no evidence to support the claim that contaminants at this site are not bioavailable. In addition, no assessment of potential risk due to exposure to lead contaminated soils has been performed. The Department believes that it is premature and unacceptable to plan a no action remedy for this site when the human health and ecological risk has not been properly evaluated.

> *Response to Point #9: Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance and no unacceptable risk has been found for the current and reasonably anticipated future land use. The Additional Sites Investigation Remedial Investigation Report, Sites 3, 31, 192, and 199*

(Shaw, 2004b) was approved by the USEPA. The Biological Technical Assistance Group reviewed the document and provided comments, which were addressed; however, there were no comments regarding a request for further investigation of ERA for Site 199. No action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains military/industrial, as described in Section 1.3. If land use is no longer military/industrial, the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.

In 2014, USEPA and the Army recalculated risk levels at Site 199 and found that the human health risk assessment conclusions remain valid for lead for Site 199 (ARCADIS, 2014). In addition, the revised risk calculations by Arcadis in 2009 remain valid and are more conservative than USEPA default assumptions for an indoor worker.

USEPA also calculated arithmetic averages of lead in surface soil separately for the Pistol Range (AOC 1) and Former Dump (AOC 2), to determine if combining both AOCs underestimated the EPC for lead. It was found that the surface soil averages by AOC or by combining AOCs remain below the industrial worker PRG of 1,092 mg/kg. Furthermore, the horizontal and vertical delineation of lead in soil around the maximum detection does not suggest that there is a large source of lead.

USEPA also reviewed and approved the conclusion made by the Army for Site 199 that impacts to ecological receptors are minimal.

The NJDEP letter continues:

Site 35 Nitroglycerine Processing Area: There were five process buildings located on this 1.5 acre site. Remedial Investigation (RI) data document several hotspots with lead (up to 19500, 8820, 6440 mg/kg) and PCBs (up to 143 mg/kg) in site surface soil and sediment. There are four areas with discrete and limited lead and PCB hotspots at this site, which are related to wastewater discharges. The lead contamination detected in soil and sediment at this site is related to improper wastewater discharges from site operations. The contamination is not dispersed throughout the site and it is therefore inappropriate to average all the lead sample data at the entire site. The Department has previously noted that there may be flaws in the HHRA conducted for this site. The HHRA used an average lead surface soil concentration of 456 mg/kg to evaluate the adult lead model results. However, according to the 25 Site table, the data suggests that the average lead surface soil concentration is 736 mg/kg. This discrepancy has not been explained. The Department continues to believe that the lead and PCB hotspots at this site must be remediated to meet the New Jersey Soil Remediation Standards (NJSRS), which are ARARs.

Response to Point #10: The data used to calculate the average lead concentration in surface soil, which is defined as a depth of 0 to 2 feet below ground surface, in the Site 35 RI (Shaw, 2005e) was 456 mg/kg. This value is consistent with the historical data from the database presented for surface soil in the FS. The calculation for the average lead concentration in the 2010 Summary Table did not account for non-detect sample results, which resulted in a higher average. There is no impact on the Site 35 HHRA results, which correctly accounted for all lead data (detects and non-detections).

In 2014, USEPA and the Army recalculated risk levels at Site 35 and found that the exposure concentration derivation and exposure units evaluated in the HHRA for Site 35 were appropriate for the current and reasonably anticipated land use (ARCADIS, 2014). However, USEPA stresses the importance of the monitoring land use as required in the ROD to ensure residential and trespasser uses are prohibited. In addition, the horizontal and vertical delineation of lead in soil around the maximum detection does not suggest that there is a large source of lead.

The NJDEP letter continues:

Site 189 Apple Trees Recreational Area: The RI report indicates that arsenic and pesticides are elevated in surface soil: arsenic range 20.5 ppm to 251 ppm and pesticides - 4,4,DDT up to 16 ppm. The current and future land use indicated that this area is recreational with Army housing on the outer borders. The Army evaluated the site risk using a recreation exposure assessment. Due to the proximity of residences, the Department continues to believe that the risk scenarios evaluated in the recreational risk assessment may not be representative of the actual risk at the site. The Department does not agree with the proposed 'no action' remedy for this site. This site is easily accessible to site workers, residents and visitors and is located in a busy and accessible area of Picatinny Arsenal, near residences and the base cafeteria. The Department requires a more protective remedy, due to the elevated arsenic and pesticides present in surface soils and the proximity of the site to high human traffic areas.

Response to Point #11: Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance and no unacceptable risk has been found for the current and reasonably anticipated future land use. Further, there are no adverse impacts to ecological receptors. No action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains recreational, as described in Section 2.5. If land use is no longer recreational the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.

The NJDEP letter continues:

Site 17, Northern Tetryl Pits: This 1.88-acre site had a removal action to remediate tetryl (an explosive compound) contaminated soils in 2002. Remaining soils contain lead (max= 6750 mg/kg), PAHs (max BaP = 1.76 ppm), and one arsenic exceedance at 24.4 ppm. The average lead concentration is currently 986 ppm with numerous hotspots> 1000 up to 6750 ppm. The contamination at this site is localized around the former disposal pits. Averaging of lead soil samples throughout the 1.88 acre site is not appropriate due to the nature of contaminant distribution at this former disposal site. The Department believes that the appropriate remedy requires excavation and removal of the lead hotspots to achieve the NJ nonresidential SRS/ARAR of 800 ppm.

Response to Point #12: Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance and no unacceptable risk has been found for the current and reasonably anticipated future land use. No inappropriate averaging was conducted. Further, there are no adverse impacts to ecological receptors. No action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains military/industrial, as described in Section 1.3. If land use is no longer military/industrial, the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.

In 2014, USEPA and the Army recalculated risk levels at Site 17 and found that exposure media (e.g., soil and sediment) were appropriate based on the current and reasonably anticipated future land use (ARCADIS, 2014).

USEPA calculated the average surface soil lead concentrations for the tetryl pits and associated ditches and lines, excluding data from former buildings 1054 & 1067 to determine the effects of separating Site 17 into 2 exposure areas. The average lead

concentration in surface soil for the tetryl pits and associated drainage ditches and lines increased to 1,040 mg/kg. The average lead concentration in surface soil for the former building 1054 and 1067 area was calculated at 654 mg/kg, which is well below the PRG of 1,092 mg/kg (It should be noted that EPA calculates lead cleanup levels on a site-specific basis). Therefore, for lead in surface soil, subdividing Site 17 into two exposure areas would not result in different risk conclusions associated with current and reasonably anticipated land use. Furthermore, the horizontal and vertical delineation of lead in soil around the maximum detect does not suggest that there is a large source of lead.

The NJDEP letter continues:

Other Issues

ARARs: The Department's Remediation Standards (N.J.A.C. 7:26D et. seq.) implement the provisions of the Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10B-12, and other statutes, by establishing minimum standards for the remediation of contaminated ground water and surface water, and by establishing the minimum residential direct contact and non-residential direct contact Soil Remediation Standards. These are promulgated standards and are to be considered ARARs. In addition, while the 25 Site PP uses a baseline risk range of 10^{-4} to 10^{-6} it should be noted that by law, the Department is required to use a target risk of 10^{-6} for each individual carcinogen. The Department considers that the target carcinogenic risk of 10^{-6} is an ARAR. For more information on Soil Remediation Standards, please visit the Site Remediation's web site for remediation standards guidance at http://www.nj.govldep/srp/guidance/rs/ and a copy of the rules at Remediation Standards Rules.

Response to Point #13: Under CERCLA, the trigger for an ARAR analysis requires unacceptable health risks. Risks are acceptable for the current and reasonably anticipated land use, and, therefore, an ARAR analysis is not required.

The NJDEP letter continues:

Remedial Actions: Department regulations require that a remedial action be implemented when the concentration of any contaminant exceeds applicable remediation standards and / or the concentration of any contaminant exceeds aquatic surface water quality standards or ecological screening criterion (Technical Requirements for Site Remediation {N.J.A.C. 7:26E et. seq.) and Administrative Requirements for the Remediation of Contaminated Sites Rules {N.J.A.C. 7:26C et. seq.)). The 25 Sites PP selected preferred response action of "no action" for all 25 sites which is unacceptable. Department rules require a minimum of institution controls and appropriate engineering controls if the Army is leaving any contamination at concentrations greater than the applicable NJ Remediation Standards.

Response to Point #14: Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance and no unacceptable risk has been found for the current and reasonably anticipated future land use.

The NJDEP letter continues:

As noted above, according to Department regulations, a remedial action is required at many of these sites. These actions include engineering and institution controls for soils (N.J.A.C. 7:26C-7.2), which are considered a response actions under CERCLA. Therefore, according to CERCLA, ARARS are applicable and the Department's Soil Remediation Standards must be applied.

Sediment Criteria: The document notes that Sediment Ecological Risk was screened based on Canadian Interim Sediment Quality Guidelines and New York State Sediment Criteria. The Department has repeatedly requested that the ecological screening criteria at http://www.nj.govldep/srp/guidance/ecoscreening/ be used to evaluate sediment and soil in ecologically sensitive areas.

Response to Point #15: The screening level for sediments was selected as the lower of the Interim Sediment Quality Guidelines (ISQGs), New York Sediment Criteria (NYSC), and sediment quality benchmarks (SQBs). In the absence of the aforementioned guidance values, the NJDEP ecological screening criteria effects range-low criteria (ER-Ls) were used. If there were also no ER-Ls, the lower of industrial regional screening level and non residential Soil Remediation Standards (SRS) were selected for the preliminary screening criteria. If the Picatinny-specific background value was higher than the selected guidance criteria, the background value was selected as the screening criteria. For all but four parameters, which were not identified in Picatinny sediments to any extent, the ISQGs, NYSC, and the SQBs were lower than the New Jersey ecological screening criteria; therefore, the criteria selected for screening is a more conservative approach.

The NJDEP letter continues:

Risk Assessments: The risk assessments should be revised to evaluate the cumulative risk from all relevant media and exposure routes associated with current and future users at Picatinny Arsenal. This is appropriate according to CERCLA guidance.

Response to Point #16: The risk assessments for these sites are based on cumulative risk.

The NJDEP letter continues:

Impact to groundwater (IGW): The Department's Remediation Standards (N.J.A.C. 7:26D-1.1) and the Technical Requirements for Site Remediation (N.J.A.C. 7:26E-1.3) require the person responsible for conducting the remediation to develop site-specific soil remediation standards that are protective of ground water. A site-specific IGW soil remediation standard must be developed when a discharge to soil is known or suspected. This has not been completed at the sites addressed in the 25 Sites PP.

Response to Point #17: Groundwater sampling has occurred in areas of significant soil contamination to determine whether or not the soil contamination is impacting groundwater. Where impacts are found, they are addressed. Otherwise, where groundwater contamination is found, potential source areas are investigated and remediated as necessary. Groundwater at these sites is being handled under separate and previously approved RODs.

Furthermore, the leaching of lead and similar contaminants from soil to groundwater is very slow under most natural conditions; except for highly acidic situations. The conditions that induce leaching are the presence of lead in soil at concentrations that either approach or exceed the cation exchange capacity of the soil, the presence of materials in the soil that are capable of forming soluble chelates with lead, and a decrease in the pH of the leaching solution (e.g., acid rain). For example, the highest concentrations of lead detected at Site 199 (surface soil maximum of 16,000 mg/kg) were not leaching to the ground water. The RI shows that lead in Site 199 ground water is below detection in one well (3 U ug/L) and near the detection limit in two of the three wells (2.8J µg/L and 4.9 µg/L) which is below the NJDEP level of concern (LOC) of 10 µg/L. Based on the absence of elevated lead concentrations in groundwater, it appears that lead is forming insoluble compounds in the soil and therefore, is not leaching to the groundwater.

The NJDEP letter continues:

Ground Water Remediation Standards (GWRS): The GWRS are the minimum standards to which ground water shall be remediated. For Class II ground water, the Ground Water Quality Standards (GWQS) developed pursuant to N.A.C. 7:9C-1.7(c) and (d) are the GWRS. The GWQS are the higher of the Ground Water Quality Criteria and the Practical Quantitation Limit. Page 11 of the 25 Sites Plan, in the Levels of Concern Section, must be revised to reflect this.

Response to Point #18: Groundwater is being appropriately handled at these sites. In general, groundwater associated with the sites in this PP already has active and approved remedies in place under separate RODs.

The NJDEP letter continues:

Summary

As stated above the Department has a number of issues with the 25 Sites PP. Many of these issues have been brought to the attention of Army and EPA over the years during reviews of the remedial investigation and feasibility study related to the sites covered by the 25 Sites Proposed Plan. The Department would like to work with the Army and EPA to resolve these issues in the spirit of protecting human health and the environment.

Response to Point #19: The subject of compliance with the NJDEP soil remediation standards has been discussed at numerous meetings between the USEPA, NJDEP, and Army teams. Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance and no unacceptable risk has been found for the current and reasonably anticipated future land use. Further, there are no adverse impacts to ecological receptors. No action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains military/industrial, as described in Section 1.3. If land use is no longer military/industrial, the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.

3.1.2 Summary of Comments Received during the Public Meeting on the Proposed Plan and Agency Responses

COMMENTS FROM PUBLIC MEETING

Comment No. 1, Anne Pavelka, Case Manager NJDEP Site Remediation Program.

New Jersey DEP read the following prepared statement on Picatinny Arsenal's 25 Sites PP during the March 7, 2013 Public Meeting.

Good evening. My name is Anne Pavelka, I am a RAB member, and the case manager for Picatinny Arsenal, for the New Jersey Department of Environmental Protection's (NJDEP) Site Remediation Program. Today, I would like to discuss the NJDEP's position on the 25 Sites PP, which the Army has just presented to you.

The Army's February 6, 2013 25 Sites Proposed Plan, which proposes no further action with monitoring of land use and existing institutional controls, is not acceptable to the NJDEP. It is not protective of human health or the environment. The proposed plan does not address significant contamination that is present in several areas of concern and avoids using the New Jersey's Remediation Standards as Applicable or Relevant and Appropriate Requirements (ARARS).

New Jersey's Remediation Standards (N.J.A.C. 7:260 et. seq.) establish minimum standards for the remediation of contaminated ground water and surface water, as well as the minimum residential direct contact and non-residential direct contact SRS. These are promulgated standards and are to be considered ARARs. In addition, while the proposed plan uses a baseline risk range of 10-4 to 10-6, it should be noted that by law, the NJDEP is required to use a target risk of 10-6 for each individual carcinogen or cancer causing compound. The NJDEP considers that the target carcinogenic risk of 10-6 is an ARAR.

NJDEP regulations also require that a remedial action be implemented when the concentration of any contaminant exceeds applicable ground water, surface water, and soil remediation standards. Ecologically sensitive areas are remediated to the ecological screening criterion or the criterion developed through ecological risk assessment process.

NJDEP regulations require a minimum of institution controls and appropriate engineering controls if the Army is leaving any contamination at concentrations greater than the applicable NJ Soil Remediation Standards. The NJDEP considers institutional controls and engineering controls, as well as the land use monitoring and the existing institutional controls, discussed in this proposed plan to be response actions under CERCLA. Therefore, according to CERCLA, ARARS are applicable and the NJDEP's Soil Remediation Standards must be applied.

Significant contamination has been identified in a number of areas. Contaminant delineation, which is part of the remedial investigation, has not been completed. In summary, a proposal for no action is not supported by the data. In 2011 the NJDEP submitted comments to the Army on the feasibility study for the 25 sites in a letter dated September 29, 2011. These comments have not been addressed in detail. These feasibility study comments must adequately addressed and the proposed plan amended accordingly.

The Army has proposed that contamination at the sites in the proposed plan is within the 10-4 to 10-6 risk range and, therefore, no action is proposed. The NJDEP disagrees with this assessment regarding the risk posed by these areas. An evaluation of the risk assessment indicates that data from many specific discharge areas, where significant contamination is present, were inappropriately averaged over large areas of the individual sites. This averaging included a large number of samples that were not impacted. The average contaminant levels in the discharge areas were diluted, therefore masking the true risk to human health and the environment. Under the proposed plan, contamination would remain in surface soil in some areas that the NJDEP considers hotspot or source material which clearly requires active remediation. Contaminant levels in surface soil include but are not limited to, lead up to 19,500 ppm (non-residential direct contact SRS 800 ppm), polychlorinated biphenyls (PCBs) up to 143 ppm (non-residential direct contact SRS 1 ppm), barium up to 100,000 ppm (non-residential direct contact SRS 59,000 ppm), mercury up to 600 ppm (non-residential direct contact SRS 65 ppm), arsenic up to 251 ppm (non-residential direct contact SRS 19 ppm) and DDT up to 16 ppm (non-residential direct contact SRS 8 ppm). Contaminated soils (PCBs and metals) in some areas have impacted sediments in Picatinny Lake and other wetland areas. These soils are not controlled and may continue to migrate into surface water/sediments in the future.

Significant discharge areas that require additional cleanup in accordance with New Jersey's Remediation Standards include but are not limited to:

- Site 108, Ordinance Facilities and Flare Testing Area, which includes flare island on the shore of Picatinny Lake:
- Area K, Site 199, Abandoned Pistol Range:
- Site 35 Nitroglycerine Processing Area:
- Site 189 Apple Trees Recreational Area:
- Site 17, Northern Tetryl Pits:

The NJDEP would also like to put on the public record a more detailed written response to the proposed plan than has been discussed here. I have copies of the NJDEP's March 7, 2013 comments on the proposed plan, as well as the NJDEP's September 29, 2011 comments on the feasibility study, if anyone is interested.

I have with me today Jim Kealy, the NJDEP's Technical Coordinator for Picatinny Arsenal. Jim and I would be happy to address any concerns you have on our position on the proposed plan.

Thank you.

Response to Comment No. 1: The subject of compliance with the NJDEP soil remediation standards, which Ms. Pavelka raised at the public meeting, has been discussed at numerous meetings between the USEPA, NJDEP, and Army teams. Under the CERCLA process (Superfund) under which Picatinny Arsenal is governed, unacceptable site-related risks are required before restoration actions are needed and can be taken. Risk assessments have been conducted at each of these sites in accordance with USEPA risk assessment guidance and no unacceptable risk has been found for the current and

reasonably anticipated future land use. Further, there are no adverse impacts to ecological receptors. No action is appropriately recommended under the CERCLA process. The Army and the USEPA consider that the recommended remedy is fully protective of human health and the environment. The Army will certify annually that the land use remains military/industrial, as described in Section 1.3. If land use is no longer military/industrial, the Army and USEPA will evaluate whether the remedy remains protective for the new land use. If it is not protective due to changed land use, the Army and USEPA will select another remedy.

Comment No. 2, Barbara Dolce, Subsurface Solutions, Consultant to Community Members of Picatinny Restoration Advisory Board: Without the State's concurrence, can the remedy be implemented?

Response to Comment No. 2: Yes, the remedy can be implemented. The State's input is one of the modifying criteria in evaluating alternatives.

Comment No. 3, Tom Brackin, Green Pond, Community Member of Picatinny Restoration Advisory Board: Is there any room for negotiation or agreement between CERCLA and the NJDEP standards for industrial exposure?

Response to Comment No. 3: The CERCLA standard is different than the NJDEP standards. The Army, USEPA, and CERCLA say the standard being used is safe for workers. It may not be safe if we build a residential facility, but it is safe now according to the risk assessment performed for soil following CERCLA guidance. Remediation of the contaminated groundwater is being addressed through a separate ROD.

Comment No. 4, Barbara Dolce: Will a decision for no further action with monitoring of land use controls set a precedent for other sites at Picatinny?

Response to Comment No. 4: The Army will continue to follow CERCLA, and the risk assessment process as regulated by USEPA for other sites at Picatinny.

COMMENTS FROM FACT SHEET COMMENT FORM

Comment No. 1, Henry VanDyke, Restoration Advisory Board Community Member: (Mr. VanDyke indicated he concurred with the remedy of No Further Action with Monitoring of Land Use.) I know some of the areas from work but primarily due to hunting and fishing via the Rod & Gun Club. Since the 80s, there has been no or minimal human traffic on or through them, southwest of Lake Picatinny might be the exception. I hope common sense applies.

Response to Comment No. 1: The comment is acknowledged and appreciated.

3.2 TECHNICAL AND LEGAL ISSUES

The NJDEP have submitted a letter regarding compliance with their SRS as documented above. The Army and the USEPA have agreed that under CERCLA in the absence of risk for the current and reasonably anticipated future land use and the absence of CERCLA action, an Applicable or Relevant and Appropriate Requirement analysis is not required. Although the NJDEP have indicated they will not concur with the remedy at these sites it is the position of the Army and USEPA that the remedy is protective of human health and the environment.

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4.0 PART 4: REFERENCES

ARCADIS, 2009. Final Feasibility Study PICA 001, 006, 022, 085, 143, 146, 163, 171, 192, and 199. Picatinny Arsenal, New Jersey. September.

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Argonne National Laboratory (ANL), 1991. Final Remedial Investigation Concept Plan for Picatinny Arsenal, Volume 2: Descriptions for Remedial Investigation Sites. Argonne National Laboratory, Environmental Assessment, and Information Sciences Division. Argonne, Illinois. March.

IT Corporation, 2000. Phase II Ecological Risk Assessment. Picatinny Arsenal, New Jersey. February.

Shaw Environmental, Inc. (Shaw), 2001. Picatinny Task Order 19 – Site 16 Guncotton Line Investigation and Removal Report.

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Shaw, 2004b. Picatinny Task Order 17 Additional Site Investigations Remedial Investigation Report Sites: 3, 31,192, & 199 Volume 1. Final.

Shaw, 2005a. Picatinny Task Order 17 Phase II Remedial Investigation Report, Rounds 1 and 2, Volume 3 – Area I 500 Area Sites. Draft Final.

Shaw, 2005b. Picatinny Task Order 19, Report on the Investigation of Sumps and Dry Wells with Previously Identified COCs at Various Sites, Volume 1. Draft Final. June.

Shaw, 2005c. Picatinny Task Order 17 Phase II Remedial Investigation Report, Rounds 1 and 2, Volume 3 – Area I remaining Sites. Draft Final.

Shaw, 2005d. Lead Removal Action Data Report. October.

Shaw, 2005e. Picatinny Task Order 17 Phase III-1A Sites Remedial Investigation Report Area L Volume 2 Binder 2 Sites 5, 6, 18, 35, 167). Final.

Tables

Table 1
Chronology of Investigatory Events
Sites within PICA 001, 006, 022, 085,143, 146, 171, 192, and 199
Picatinny Arsenal, New Jersey

EVENT	DATE RANGE
1. Preliminary Assessments/Site Investigations (PA/SI)	1988 - 1998
2. Remedial Investigations (RI)	1994 - 2003
3. Follow up activities on RI (additional sampling and/or focused remedial actions)	1990-2005
4. Feasibility Study (FS)	2009- 2012

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
001/17	Surface Soil	Current and Future	Industrial/Research Worker	4.E-05	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker	3.E-07	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	3.E-08	NR	<1	NH	NE
	Sediment	Current and Future	On-Site Youth Visitor	5.E-07	NR	NE	NH	NE
	Mixed Surface/ Subsurface Soil	Current and Future	Adult Resident	NE	NE	NE	NE	Concern
	GW/Soil/Sed	Current and Future	Adult Resident	3.E-04	RDX	5	RDX, TNT	NE
	GW/Soil/Sed	Current and Future	Child Resident	2.E-04	RDX	11	RDX	NE
	GW/Soil/Sed	Current and Future	Adult + Child Resident	5.E-04	RDX	NE	NE	NE
001/18	Surface Soil	Current and Future	Industrial/Research Worker[5]	2.E-05	NR	1	NH	NE
	Subsurface Soil	Current and Future	Construction Excavation Worker	2.E-06	NR	<1	NH	NE
	Mixed Soil	Current and Future	Adult Resident	3.E-04	Benzo(a)pyrene	73	Amino-DNTs	NE
	Mixed Soil	Current and Future	Child Resident	2.E-04	Benzo(a)pyrene	190	Amino-DNTs	NE
	Mixed Soil	Current and Future	Adult + Child Resident	5.E-04	Benzo(a)pyrene	NE	NE	NE
006/16	Soil	Current and Future	Construction Excavation Worker	2.E-06	NR	1	NH	NE
	Sediment	Current and Future	Construction Excavation Worker	8.E-06	NR	<1	NH	No concern
	Sediment	Current and Future	On-Site Youth Visitor	8.E-05	NR	3	Vanadium	No concern
22/50	Surface Soil	Current and Future	Industrial/Research Worker Chemical Risk	8.E-06	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker Chemical Risk	8.E-07	NR	<1	NH	No concern
	Groundwater	Current and Future	Construction Excavation Worker Chemical Risk	3.E-08	NR	<1	NH	NE
	Soil	Current and Future	Construction Excavation Worker Radiological Risk	2.E-07	NR	NE	NE	NE
22(47)/63/65	*Surface Soil*	*Current and Future*	*Industrial/Research Worker*	*2.E-04*	*Benzo(a)pyrene, Arsenic, Benzo(b)fluoranthene*	1	NH	*NE*
	Revised Cumulative Risk[1]	Current and Future	Industrial/Research Worker	4.E-05	NR	NE	NE	NE

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
22(47)/63/65	Soil	Current and Future	Construction Excavation Worker	1.E-05	NR	2*	Arsenic	NE
85(73)/32	Surface Soil	Current	Industrial/Research Worker	9.E-06	NR	<1	NH	NE
85(74)/33	Surface Soil	Current and Future	Industrial/Research Worker	8.E-05	NR	<1	NH	NE
	Soil	Current and Future	Construction Excavation Worker	2.E-06	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	NE	NE	<1	NH	NE
85/46	*Surface Soil*	*Current and Future*	*Industrial Research Worker*	*4.E-04*	*Benzo(a)pyrene, Arsenic Benzo(b)fluoranthene Benzo(a)anthracene*	1	NH	NE
	Revised Cumulative Risk[1]	Current and Future	Industrial Research Worker	1.E-04	NR	NE	NE	NE
	Soil	Current and Future	Construction Excavation Worker	3.E-06	NR	<1	NH	NE
85(140)/97	*Surface Soil*	*Current and Future*	*Industrial/Research Worker*	*5.E-04*	*Benzo(a)pyrene*	<1	NH	NE
	Revised Cumulative Risk[1]	Current and Future	Industrial/Research Worker	9.E-05	NR	NE	NE	NE
	Soil	Current and Future	Construction Excavation Worker	8.E-07	NR	<1	NH	NE
85(142)/105	Surface Soil	Current and Future	Industrial/Research Worker Chemical Risk	9.E-05	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker	4.E-07	NR	<1	NH	NE
	Soil	Current and Future	Industrial/Research Worker Radiological Risks	5.E-05	NR	NE	NE	NE
85(64)/147	Surface Soil	Current	Industrial/Research Worker	1.E-05	NR	<1	NH	No concern
85(148)/148	*Surface Soil*	*Current and Future*	*Industrial/Research Worker*	*4.E-04*	*Benzo(a)pyrene, Arsenic Benzo(b)fluoranthene Benzo(a)anthracene Indeno(1,2,3-cd) pyrene Dibenzo(1,2,3-cd)pyrene*	*2*	*Arsenic, Manganese*	NE
	Revised Cumulative Risk[1] and Hazard[2]	Current and Future	Industrial/Research Worker	9.E-05	NR	1	NH	NE

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
85(148)/148	Soil	Current and Future	Construction Excavation Worker	5.E-06	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	1.E-09	NR	<1	NH	NE
85(150)/150	Surface Soil	Current and Future	Industrial/Research Worker	9.E-06	NR	<1	NH	Concern but development of Pyro Facility hasl mitigated risk
	Soil	Current and Future	Construction Excavation Worker	3.E-07	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	2.E-09	NR	<1	NH	NE
85(156)/184	Surface Soil	Current	Industrial/Research Worker	5.E-06	NR	<1	NH	NE
	Soil	Current	Construction Excavation Worker	1.E-06	NR	<1	NH	NE
143/108	*Soil*	*Current and Future*	*Industrial/Research Worker - Chemical Risk*	*1.E-04*	*NR*	*5*	*Aroclor-1254, Mercury*	No concern
	Revised Cumulative Risk[1] and Hazard[3]	Current and Future	Industrial/Research Worker - Chemical Risk	2.E-05	NR	1	NH	NE
	Soil	Current and Future	Construction/Excavation Worker/ Chemical Risk	7.E-06	NR	<1	NH	Not a COPC - NE
	Groundwater	Current and Future	Construction/Excavation Worker/ Chemical Risk	6.E-09	NR	<1	NH	NE
	Soil	Current and Future	Industrial/Research Worker - Radiological Risks	5.E-05	NR	NE	NE	NE

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
163(21)/35	Surface Soil	Current and Future	Industrial/Research Worker	1.E-05	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker	3.E-07	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	2.E-08	NR	<1	NH	NE
	SW/Sediment	Current and Future	On-Site Youth Visitor	1.E-04	NR	38	Aroclor-1254	NE
	Surface Soil	Current and Future	On-Site Youth Visitor	NE	NR	NE	NE	No concern
	Sediment	Current and Future	On-Site Youth Visitor	NE	NE	NE	NE	Potential concern
	Soil/SW/Sediment	Current and Future	Adult Resident	2.E-03	Aroclor-1254	130	Aroclor-1254	Concern
	Soil	Current and Future	Adult Resident	NE	NE	NE	NE	Potential concern
	Sediment	Current and Future	Adult Resident	NE	NE	NE	NE	Concern
	Soil/SW/Sediment	Current and Future	Child Resident	1.E-03	Aroclor-1254	330	Aroclor-1254	NE
	Soil/SW/Sediment	Current and Future	Adult + Child Resident	3.E-03	Aroclor-1254	NE	NE	NE
163/91	Surface Soil	Current and Future	Industrial/Research Worker	2.E-05	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker	3.E-07	NR	<1	NH	No concern
	Groundwater	Current and Future	Construction Excavation Worker	2.E-11	NR	<1	NH	NE
	Groundwater	Future	Industrial/Research Worker	4.E-07	NR	<1	NH	NE
	Surface Soil	Current	On-Site Youth Visitor	NE	NE	NE	NE	No concern
	SW/Sediment	Current and Future	On-Site Youth Visitor	Not reported	NR	Not reported	NH	NE
	Mixed Surface/ Subsurface Soil	Current	Adult Resident	NE	NE	NE	NE	Concern
	SW/Sed/GW/Soil	Current and Future	Adult Resident	5.E-05	NR	<1	NH	NE
	SW/Sed/GW/Soil	Current and Future	Child Resident	4.E-05	NR	3	Iron	NE
	SW/Sed/GW/Soil	Current and Future	Adult + Child Resident	9.E-05	NR	NE	NE	NE
163(172)/161	Surface Soil	Current and Future	Industrial/Research Worker	2.E-05	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker	9.E-07	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	5.E-07	NR	<1	NH	NE

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
163(172)/161	Sediment	Current and Future	On-Site Youth Visitor	3.E-06	NR	<1	NH	No concern
	Soil/Sediment	Current and Future	Adult Resident	8.E-05	NR	1	NH	Concern
	Soil/Sediment	Current and Future	Child Resident	6.E-05	NR	3	Amino DNT's	NE
	Soil/Sediment	Current and Future	Adult + Child Resident	1.E-04	NR	NE	NE	NE
163(174)/166	Surface Soil	Current and Future	Industrial/Research Worker	1.E-05	NR	<1	NH	NE
	Soil	Current and Future	Adult Resident	3.E-05	NR	<1	NH	NE
	Soil	Current and Future	Child Resident	3.E-05	NR	1	NH	NE
	Soil	Current and Future	Adult + Child Resident	6.E-05	NR	NE	NE	NE
163(168)/168	*Surface Soil*	*Current and Future*	*Industrial/Research Worker*	*2.E-04*	*Benzo(a)pyrene*	<1	NH	No concern
	Revised Cumulative Risk[1]	Current and Future	Industrial/Research Worker	3.E-05	NR	NE	NR	NE
	Soil	Current and Future	Construction Excavation Worker	2.E-07	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	2.E-11	NR	<1	NH	NE
	Groundwater	Future	Industrial/Research Worker	4.E-07	NR	<1	NH	NE
	SW/Sediment	Current and Future	On-Site Youth Visitor	4.E-05	NR	<1	NH	NE
	Sediment	Current and Future	On-Site Youth Visitor	NE	NE	NE	NE	No concern
	Sediment	Current	Adult Resident	NE	NE	NE	NE	NE
	Mixed Surface/ Subsurface Soil	Current	Adult Resident	NE	NE	NE	NE	Concern
	Mixed Surface/ Subsurface Soil	Current	On-Site Youth Visitor	NE	NE	NE	NE	No concern
	SW/Sed/GW/Soil	Current and Future	Adult Resident	1.E-03	Benzo(a)pyrene	2	Arsenic, Iron	NE
	SW/Sed/GW/Soil	Current and Future	Child Resident	6.E-04	Benzo(a)pyrene	6	Arsenic, Iron	NE
	SW/Sed/GW/Soil	Current and Future	Adult + Child Resident	2.E-03	Benzo(a)pyrene	NE	NE	NE
163(169)/169	Surface Soil	Current and Future	Industrial/Research Worker	9.E-06	NR	<1	NH	No concern
	Groundwater	Current and Future	Construction Excavation Worker	3.E-11	NR	<1	NH	NE
	Sediment	Current and Future	On-Site Youth Visitor	4.E-06	NR	<1	NH	No concern
	Surface Water	Current and Future	On-Site Youth Visitor	4.E-06	NR	<1	NH	No concern

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
163(169)/169	Soil/SW/Sediment	Current and Future	Adult Resident	9.E-05	NR	2	Iron	Concern
	Soil/SW/Sediment	Current and Future	Child Resident	1.E-04	NR	16	Iron	NE
	Soil/SW/Sediment	Current and Future	Adult + Child Resident	2.E-04	Arsenic	NE	NE	NE
171(173)/162	Surface Soil	Current and Future	Industrial/Research Worker	2.E-05	NR	<1	NH	NE
	Soil	Current and Future	Construction Excavation Worker	5.E-06	NR	1	NH	NE
	Soil	Current and Future	Adult Resident	6.E-05	NR	1	NH	NE
	Soil	Current and Future	Child Resident	6.E-05	NR	4	Iron	NE
	Soil	Current and Future	Adult + Child Resident	1.E-04	NR	NE	NE	NE
171/171	Surface Soil	Current and Future	Industrial/Research Worker	3.E-05	NR	<1	NH	No concern
	Soil	Current and Future	Construction Excavation Worker	NE	NE	<1	NH	No concern
	Groundwater	Current and Future	Construction Excavation Worker	3.E-08	NR	<1	NH	NE
	Mixed Surface/ Subsurface Soil	Current	Adult Resident	NE	NE	NE	NE	Concern
	Soil	Current and Future	Adult Resident	1.E-04	NR	2	Cadmium, Zinc	NE
	Soil	Current and Future	Child Resident	8.E-05	NR	17	Zinc	NE
	Soil	Current and Future	Adult + Child Resident	2.E-04	Benzo(a)pyrene	NE	NE	NE
192/189	Surface Soil	Current and Future	Recreational User[4]	6.E-06	NR	<1	NH	NE
	Soil	Current and Future	Construction Excavation Worker	1.E-06	NR	<1	NH	NE
	Groundwater	Current and Future	Construction Excavation Worker	1.E-08	NR	<1	NH	NE
	Soil	Current and Future	On-site Youth visitor[4]	3.E-06	NR	<1	NH	NE
	Soil	Current and Future	Residential Child[4]	3.E-05	NR	1	NH	NE
	Soil	Current and Future	Industrial/Research Worker	1.E-04	NR	1	NH	NE
	Soil	Current and Future	Adult Resident	3.E-04	Arsenic	2	Arsenic	NE
	Soil	Current and Future	Child Resident	3.E-04	Arsenic	7	Arsenic	NE
	Soil	Current and Future	Adult + Child Resident	5.E-04	Arsenic	NE	NE	NE
199/199	*Surface Soil*	*Current and Future*	*Industrial/Research Worker*	*4.E-04*	*Arsenic, Benzo(a)pyrene*	<1	NH	*Concern*
	Revised Cumulative Risk[1]	Current and Future	Industrial/Research Worker	4.E-05	NR	NE	NE	No concern

Table 2
Summary of Human Health Risk Assessment Conclusions
PICA 001, 006, 022, 085, 143, 163, 171, 192 and 199
Picatinny Arsenal, New Jersey

Major PICA (Minor PICA)/ RI Site	Media	Land Use Scenario	Population	Carcinogenic Risk	Risk Drivers	Noncarcinogenic Hazard	Hazard Drivers	Lead
199/199	Groundwater	Future	Industrial/Research Worker	3.E-05	NR	2*****	Iron	NE
	Soil	Current and Future	Construction Excavation Worker	6.E-06	NR	<1	NH	No concern
	Groundwater	Current and Future	Construction Excavation Worker	NE	NE	<1	NH	NE
	Mixed Surface/ Subsurface Soil	Current	Adult Resident	NE	NE	NE	NE	Concern
	Soil, GW	Future	Adult Resident	6.E-04	Arsenic, Benzo(a)pyrene, Dibenzo(a,h)anthracene	6	Iron	NE
	Soil, GW	Future	Child Resident	3.E-04	Arsenic, Benzo(a)pyrene, Dibenzo(a,h)anthracene	16	Iron, Aluminum	NE
	Soil, GW	Future	Adult + Child Resident	9.E-04	Arsenic, Benzo(a)pyrene, Dibenzo(a,h)anthracene	NE	NE	NE

Notes: *Italics = original risk/hazard/lead scenario that has since been re-evaluated*

Blue text = re-evaluated risk/hazard/lead information

Shaded rows are not reasonably anticipated future land use of the site.

[1]Cumulative risk was recalculated in 2007 based on a review of exposure pathways and updates to dermal exposure assumptions. See Appendix D of FS.

[2]Cumulative hazard was recalculated in 2007 based on a review of exposure pathways and updates to dermal exposure assumptions. See Appendix D of FS.

[3]Cumulative hazard was recalculated in 2008 following a review of site data and elimination of excavated samples from the database. See Appendix D of FS.

[4]Calculated value is based on the recreational exposure HHRAs.

[5]Potential noncarcinogenic hazards to industrial workers was recalculated in 2009 using revised toxicity values. See Appendix D of FS.

***** The HI for each target organ/effect is less than or equal to one, indicating adverse noncancer effects are unlikely.

COC = Constituent of Concern

GW = groundwater

NA = not applicable. Indicates risk or hazard drivers not determined for any media as risks/hazards are within acceptable ranges

NE = Not evaluated

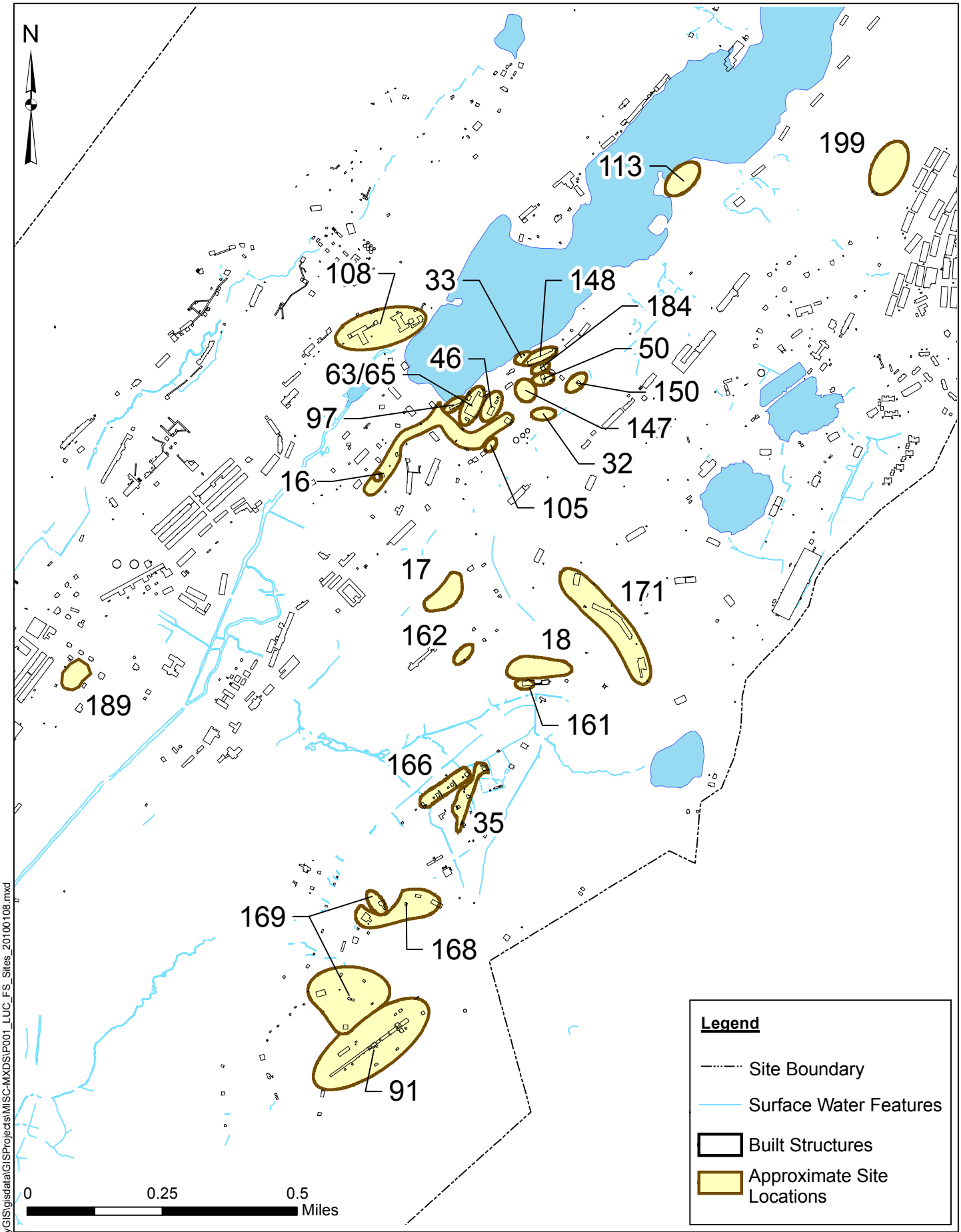
NH = No hazard driver identified because hazard index < 1 or pathway not evaluated

NR = No risk driver identified because risk < 1.E-06 or pathway not evaluated

Sed = Sediment

SW = Surface Water

Figures



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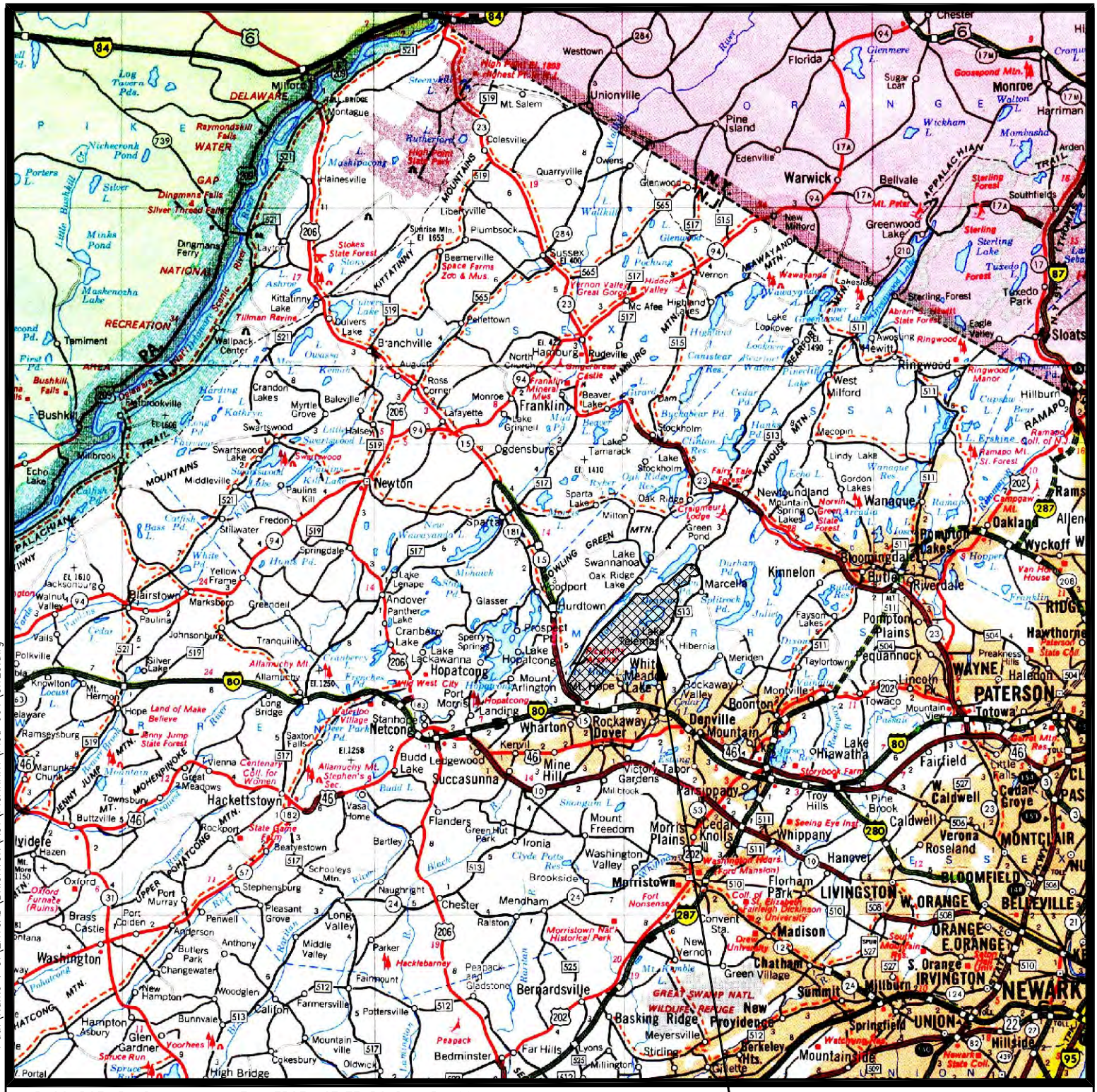
SITE LOCATIONS
PICATINNY ARSENAL, NEW JERSEY

PROJECT MANAGER T. LLEWELLYN	DEPARTMENT MANAGER M. MOHUIDDIN
DRAWN M. GRESS	CHECKED K. TIPTON
PROJECT NUMBER GP06PICA.P011.NJ001	DRAWING NUMBER 1



MAP SOURCE: RAND McNALLY, NEW JERSEY STATE ROAD MAP 1991

NEW JERSEY

N

0 1000 2000

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Date\Time : Mon, 11 Jan 2010 - 9:12am

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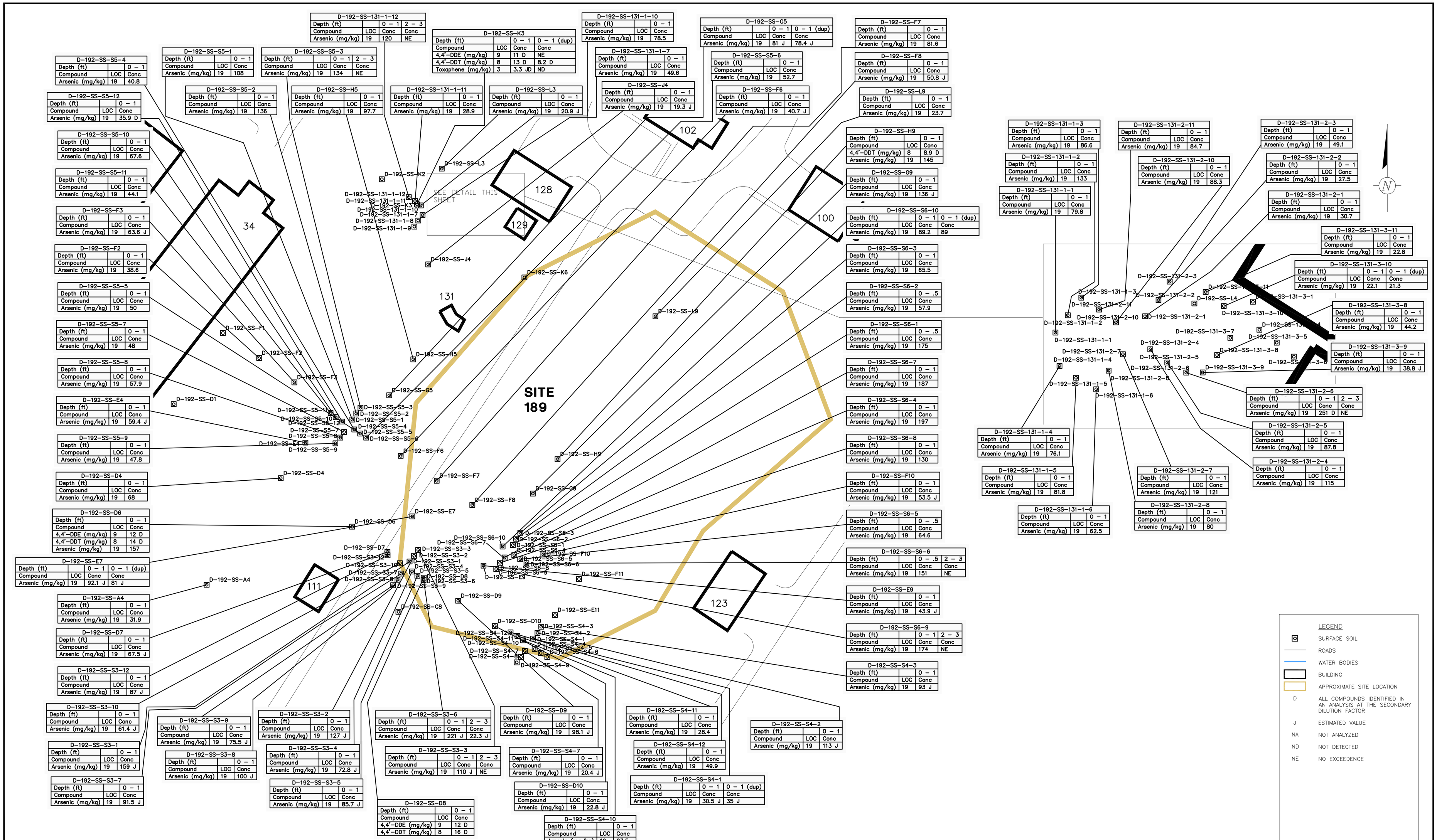
SITE LOCATION MAP

PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER
TL	PJS
DRAFTER	CHECKED
JSG	GSK
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.001	2



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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 189/PICA 192
APPLE TREES RECREATION AREA

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX

PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	3

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

Date\Time : Fri, 30 Jul 2010 – 11:13am
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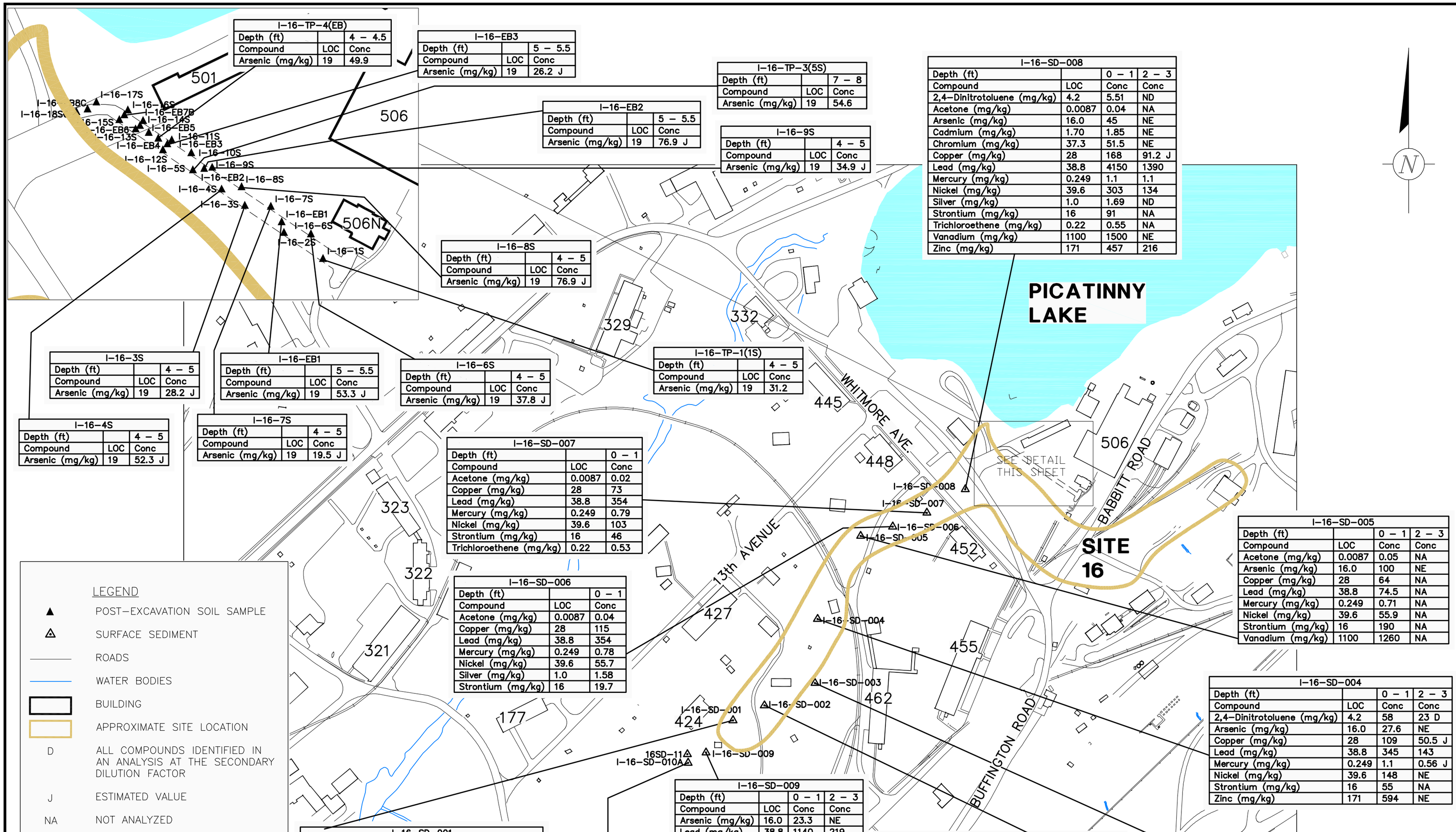

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PROJECT TITLE

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PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE

HISTORICAL DATA
EXCEEDING LOCs AT
RI SITE 16/PICA 006
GUNCOTTON LINE

TASK/PHASE NUMBER	DRAWN BY
EA002	A. FOX

PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	4

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User Name : AFOX
Date\Time : Wed, 02 May 2012 - 9:03am
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User Name : AFOX

Date\Time : Wed, 28 Jul 2010 - 9:24am
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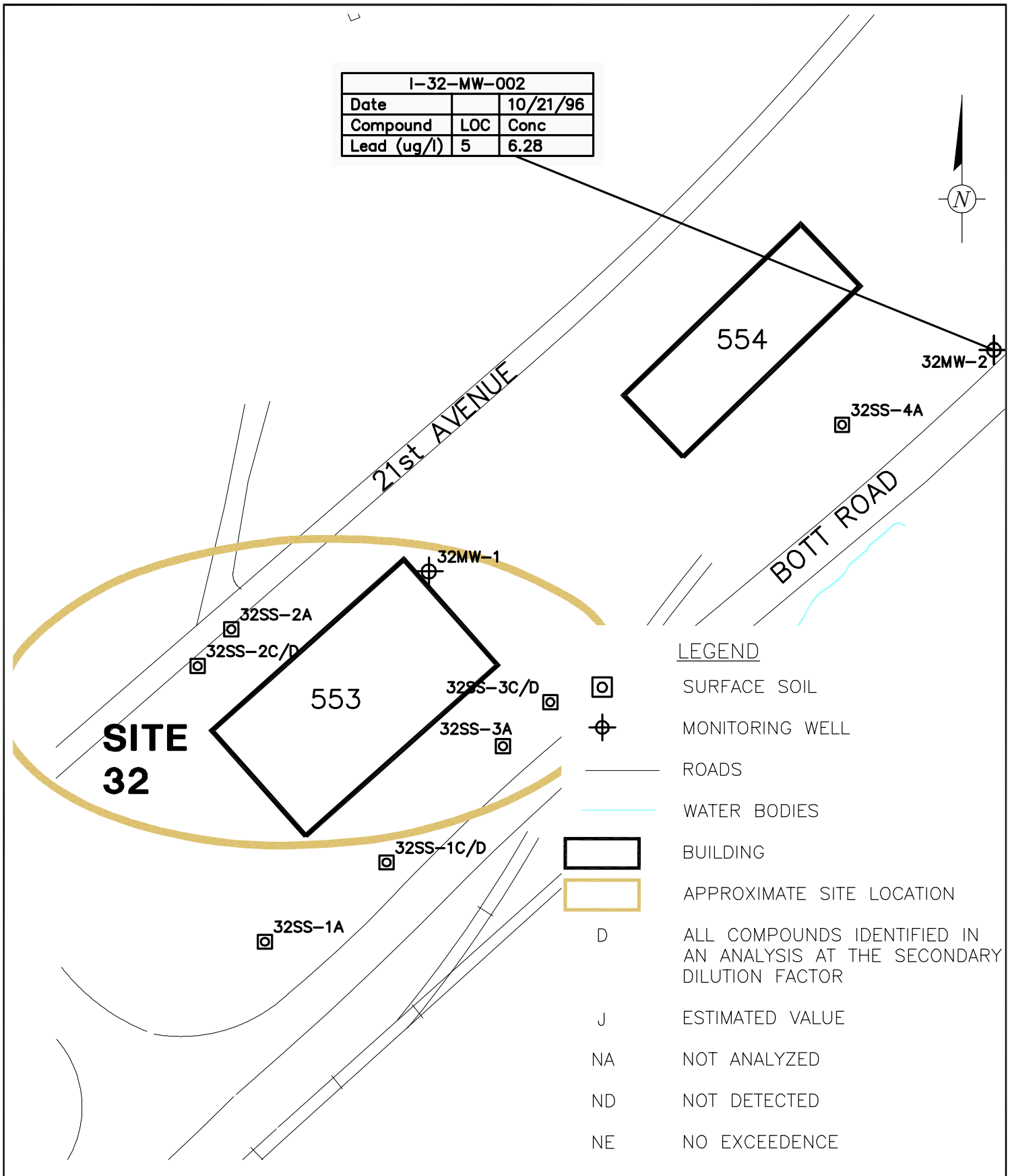

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PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN
SHEET TITLE: HISTORICAL DATA EXCEEDING LOCs DATA AT RI SITE 32/PICA 073 STORAGE TANKS (BUILDING 553)		TASK/PHASE NUMBER: EA001	DRAWN BY: A. FOX
		PROJECT NUMBER: GP06PICA.P001	DRAWING NUMBER: 5

PICATINNY LAKE

I-33-SD-003		
Depth (ft)		0 – 1
Compound	LOC	Conc
Anthracene (mg/kg)	0.03162	0.06
Copper (mg/kg)	28	38.1
Fluoranthene (mg/kg)	0.06423	0.39
Lead (mg/kg)	38.8	199
Mercury (mg/kg)	0.249	0.37
Phenanthrene (mg/kg)	0.0419	0.11
Pyrene (mg/kg)	0.0530	0.29
Zinc (mg/kg)	171	288

I-33-SD-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
Copper (mg/kg)	28	51
Lead (mg/kg)	38.8	145
Mercury (mg/kg)	0.249	0.44
Pyrene (mg/kg)	0.0530	0.09
Silver (mg/kg)	1.0	1.69

33SW-3
33SD-3
33SW-1
33SD-1

I-33-SB-004					
Depth (ft)		0 – 1	6 – 6.5	6 – 6.5 (dup)	10 – 10.5
Compound	LOC	Conc	Conc	Conc	Conc
Arsenic (mg/kg)	19	56.7	NE	NE	NE

33SD-2
33SW-2

527A

I-33-SS-001				
Depth (ft)		0.5	0 – 1	2 – 3
Compound	LOC	Conc	Conc	Conc
2,4-Dinitrotoluene (mg/kg)	4.2	15.9	ND	ND

33SS-2
33SS-1
33SS-5
33MW-1

I-33-MW-001			
Depth (ft)		0 – 2	5 – 7
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	84	43
Benzo(a)pyrene (mg/kg)	0.2	0.5 J	ND

33SB-1
33SB-4

SITE 33

I-33-MW-001.			
Date		10/23/96	10/23/96 (dup)
Compound	LOC	Conc	Conc
bis(2-Ethylhexyl)phthalate (ug/l)	3	6.3	ND
Methylene chloride (ug/l)	3	6.9	3.9

33SB-2
33SB-3
33SS-4
33SS-3

I-33-SD-002		
Depth (ft)		0 – 1
Compound	LOC	Conc
Acenaphthylene (mg/kg)	0.00587	0.09
Acetone (mg/kg)	0.0087	0.12
Anthracene (mg/kg)	0.03162	0.17
Benz(a)anthracene (mg/kg)	0.0317	0.85
Benzo(a)pyrene (mg/kg)	0.0319	0.94
Benzo(b)fluoranthene (mg/kg)	0.0272	1.1
Benzo(k)fluoranthene (mg/kg)	0.0272	0.3
Chrysene (mg/kg)	0.0571	1.2
Copper (mg/kg)	28	43.3
Fluoranthene (mg/kg)	0.06423	1.6
Fluorene (mg/kg)	0.0212	0.11
Lead (mg/kg)	38.8	136
Mercury (mg/kg)	0.249	5.2
Naphthalene (mg/kg)	0.03275	0.13
Phenanthrene (mg/kg)	0.0419	0.76
Pyrene (mg/kg)	0.0530	1.9

33SS-6

527

I-33-SS-003		
Depth (ft)		0.5
Compound	LOC	Conc
2,4-Dinitrotoluene (mg/kg)	4.2	57

I-33-SB-003				
Depth (ft)		0 – 1	6 – 6.5	10 – 10.5
Compound	LOC	Conc	Conc	Conc
Arsenic (mg/kg)	19	34.3	NE	NE

BABBITT ROAD

I-33-SB-002				
Depth (ft)		0 – 1	6 – 6.5	10 – 10.5
Compound	LOC	Conc	Conc	Conc
Arsenic (mg/kg)	19	72	NE	NE

I-33-SS-006		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	23.5 J

I-33-SB-001				
Depth (ft)		0 – 1	6 – 6.5	10.7 – 11.2
Compound	LOC	Conc	Conc	Conc
Arsenic (mg/kg)	19	32 J /36.2	NE	NE

LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- MONITORING WELL
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
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SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 33/PICA 074 STORAGE TANKS (BUILDING 527A)

TASK/PHASE NUMBER	DRAWN BY
EA001	A. SANTINI
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	6

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

Date\Time : Wed, 28 Jul 2010 - 9:47am
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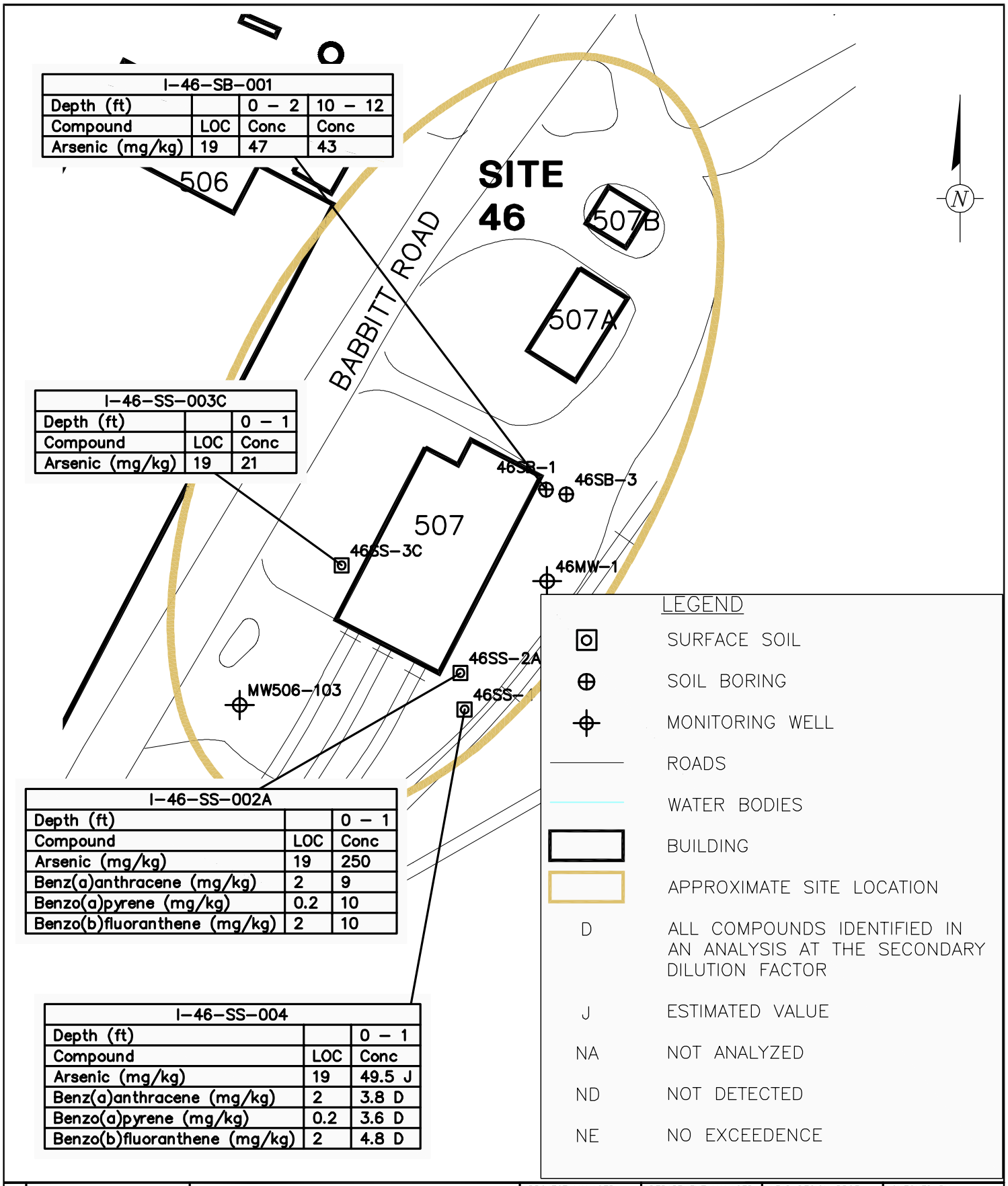

I-46-SB-001			
Depth (ft)		0 - 2	10 - 12
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	47	43

I-46-SS-003C		
Depth (ft)		0 - 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	21

I-46-SS-002A		
Depth (ft)		0 - 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	250
Benz(a)anthracene (mg/kg)	2	9
Benzo(a)pyrene (mg/kg)	0.2	10
Benzo(b)fluoranthene (mg/kg)	2	10

I-46-SS-004		
Depth (ft)		0 - 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	49.5 J
Benz(a)anthracene (mg/kg)	2	3.8 D
Benzo(a)pyrene (mg/kg)	0.2	3.6 D
Benzo(b)fluoranthene (mg/kg)	2	4.8 D

LEGEND

	SURFACE SOIL
	SOIL BORING
	MONITORING WELL
	ROADS
	WATER BODIES
	BUILDING
	APPROXIMATE SITE LOCATION
D	ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
J	ESTIMATED VALUE
NA	NOT ANALYZED
ND	NOT DETECTED
NE	NO EXCEEDENCE

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SHEET TITLE: HISTORICAL DATA EXCEEDING LOCs AT RI SITE 46/PICA 085 90-DAY WASTE ACCUMULATION (BUILDING 507)		TASK/PHASE NUMBER: EA001	DRAWN BY: A. FOX
		PROJECT NUMBER: GP06PICA.P001	DRAWING NUMBER: 7

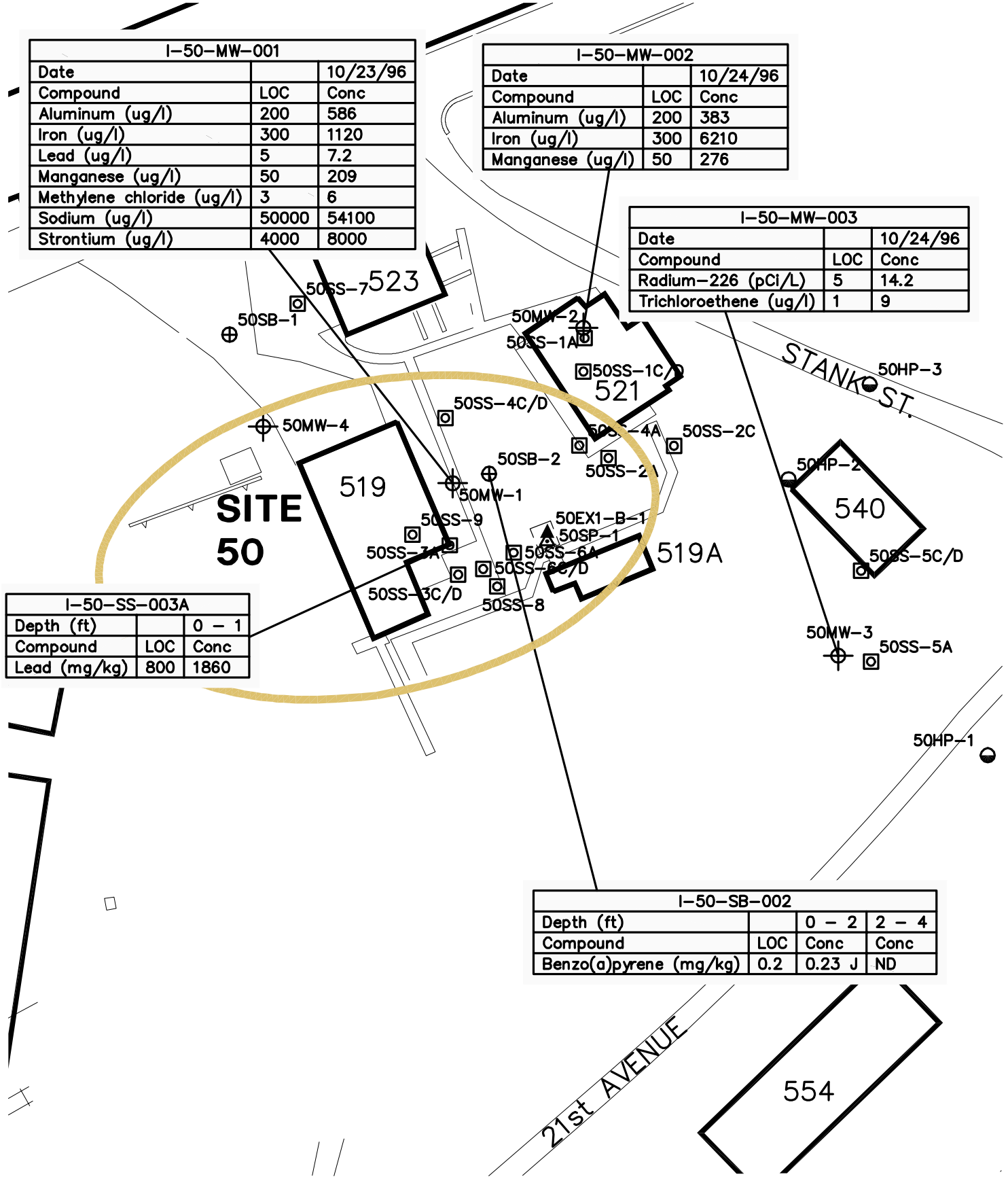
I-50-MW-001		
Date		10/23/96
Compound	LOC	Conc
Aluminum (ug/l)	200	586
Iron (ug/l)	300	1120
Lead (ug/l)	5	7.2
Manganese (ug/l)	50	209
Methylene chloride (ug/l)	3	6
Sodium (ug/l)	50000	54100
Strontium (ug/l)	4000	8000

I-50-MW-002		
Date		10/24/96
Compound	LOC	Conc
Aluminum (ug/l)	200	383
Iron (ug/l)	300	6210
Manganese (ug/l)	50	276

I-50-MW-003		
Date		10/24/96
Compound	LOC	Conc
Radium-226 (pCi/L)	5	14.2
Trichloroethene (ug/l)	1	9

I-50-SS-003A		
Depth (ft)		0 - 1
Compound	LOC	Conc
Lead (mg/kg)	800	1860

I-50-SB-002			
Depth (ft)		0 - 2	2 - 4
Compound	LOC	Conc	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.23 J	ND



LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- MONITORING WELL
- HYDROPUNCH
- POST-EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

Date\Time : 11, 30 Jul 2010 - 11:10am
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\SITE 50\DWG\SITE-50.dwg - Layout Tab : DWG #
AcadVersion : R18.0s (LMS Tech)
User Name : AFOX

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0 50
SCALE IN FEET

PLOT SCALE 11x17

REV. ISSUED DATE DESCRIPTION

KEYPLAN

ARCADIS
1114 Benfield Blvd. Suite A
Millersville, MD 21108
Tel: 410-987-4392 Fax: 410-987-0032
www.arcadis-us.com

PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	K. TIPTON
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 50/PICA 022 STILL HOUSE AND HAZARDOUS WASTE STORAGE TANK		EA001	A. FOX
		PROJECT NUMBER	DRAWING NUMBER
		GP06PICA.P001	8

I-65-SD-003		
Depth (ft)		0 – 1
Compound	LOC	Conc
2-Methylnaphthalene (mg/kg)	0.0202	1
Acenaphthene (mg/kg)	0.00671	2
Anthracene (mg/kg)	0.03162	1
Benz(a)anthracene (mg/kg)	0.0317	3
Benzo(a)pyrene (mg/kg)	0.0319	3
Benzo(b)fluoranthene (mg/kg)	0.0272	5
Benzo(k)fluoranthene (mg/kg)	0.0272	1
Chrysene (mg/kg)	0.0571	4
Copper (mg/kg)	28	71
Dibenzofuran (mg/kg)	0.42	0.8
Fluoranthene (mg/kg)	0.06423	9
Fluorene (mg/kg)	0.0212	1
Lead (mg/kg)	38.8	71.3
Naphthalene (mg/kg)	0.03275	2
Phenanthrene (mg/kg)	0.0419	9
Pyrene (mg/kg)	0.0530	7
Strontium (mg/kg)	16	47 J

I-65-SD-002				
Depth (ft)		0 – 1	1 – 2	1 – 2 (dup)
Compound	LOC	Conc	Conc	Conc
1,2-Dichlorobenzene (mg/kg)	0.12	5.2	NA	NA
1,3-Dichlorobenzene (mg/kg)	0.12	0.78	NA	NA
1,4-Dichlorobenzene (mg/kg)	0.12	1.3	NA	NA
2-Methylnaphthalene (mg/kg)	0.0202	0.36	NA	NA
Acenaphthene (mg/kg)	0.00671	0.1	ND	ND
Acetone (mg/kg)	0.0087	0.13	NA	NA
Anthracene (mg/kg)	0.03162	0.31	0.12 J	0.15 J
Aroclor 1260 (mg/kg)	0.0341	0.14	ND	ND
Arsenic (mg/kg)	16.0	26.4	34.8 J	21.3 J
Benz(a)anthracene (mg/kg)	0.0317	1.1	1.1	1.9
Benzo(a)pyrene (mg/kg)	0.0319	1.3	1	1.9
Benzo(b)fluoranthene (mg/kg)	0.0272	1.8	1.2	2
Benzo(g,h,i)perylene (mg/kg)	0.29	0.54	0.4 J	0.86
Benzo(k)fluoranthene (mg/kg)	0.0272	0.43	0.69	1.6
Chrysene (mg/kg)	0.0571	1.4	1.2	2
Copper (mg/kg)	28	181	228 J	150 J
Dibenz(a,h)anthracene (mg/kg)	0.00622	ND	0.14 J	0.32 J
Fluoranthene (mg/kg)	0.06423	2.1	1.6	2.7
Fluorene (mg/kg)	0.0212	0.16	ND	ND
Indeno(1,2,3-c,d)pyrene (mg/kg)	0.078	0.67	0.41 J	0.92
Lead (mg/kg)	38.8	212	199 J	122 J
Mercury (mg/kg)	0.249	10	11.2 JD	5.3 JD
Naphthalene (mg/kg)	0.03275	0.29	ND	ND
Phenanthrene (mg/kg)	0.0419	1	0.39 J	0.38 J
Pyrene (mg/kg)	0.0530	2	1.4	1.9
Strontium (mg/kg)	16	84 J	NA	NA
Zinc (mg/kg)	171	253	268 J	233 J

I-65-SD-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
2-Methylnaphthalene (mg/kg)	0.0202	0.5
Anthracene (mg/kg)	0.03162	0.3
Chrysene (mg/kg)	0.0571	2
Copper (mg/kg)	28	157
Fluoranthene (mg/kg)	0.06423	2
Fluorene (mg/kg)	0.0212	0.5
Lead (mg/kg)	38.8	189
Mercury (mg/kg)	0.249	2.2
Phenanthrene (mg/kg)	0.0419	2
Pyrene (mg/kg)	0.0530	1
Strontium (mg/kg)	16	27.7 J
Zinc (mg/kg)	171	181

I-65-SW-001		
Date		07/11/96
Compound	LOC	Conc
Mercury (ug/l)	.05	0.38

I-65-SS-023		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	22.4 J

I-65-SS-016		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	55 J
Benz(a)anthracene (mg/kg)	2	4.2 D
Benzo(a)pyrene (mg/kg)	0.2	5.7 D
Benzo(b)fluoranthene (mg/kg)	2	9.8 D
Dibenz(a,h)anthracene (mg/kg)	0.2	1 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	2.7 D

I-65-SS-015			
Depth (ft)		0 – 1	0 – 1 (dup)
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	55.4 J	49.7 J
Benzo(a)pyrene (mg/kg)	0.2	0.48 J	0.29 J

I-65-MW-002			
Depth (ft)		0 – 2	10 – 12
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	79	NE
Benz(a)anthracene (mg/kg)	2	20	ND
Benzo(a)pyrene (mg/kg)	0.2	30	ND
Benzo(b)fluoranthene (mg/kg)	2	50	ND
Dibenz(a,h)anthracene (mg/kg)	0.2	2.6	ND
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	10	ND

I-65-MW-002.		
Date		10/14/96
Compound	LOC	Conc
Manganese (ug/l)	50	164
Sodium (ug/l)	50000	439000

I-65-SS-012		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	54.3 J
Benzo(a)pyrene (mg/kg)	0.2	1.5
Benzo(b)fluoranthene (mg/kg)	2	2.6
Dibenz(a,h)anthracene (mg/kg)	0.2	0.24 J

I-65-SS-013		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	22.5 J

I-65-SS-024		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	24.8 J

I-65-SS-003C		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.4

I-65-SD-004		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	38.8	51.9
Mercury (mg/kg)	0.249	0.31
Phenanthrene (mg/kg)	0.0419	0.7
Pyrene (mg/kg)	0.0530	0.7

I-65-SS-005C		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.57

I-65-MW-003		
Date		10/24/96
Compound	LOC	Conc
Manganese (ug/l)	50	59.7

I-65-SS-022		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	28 J

I-65-SS-004A		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	940

I-65-SB-004			
Depth (ft)		3 – 3.5	6.2 – 6.7
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	179 J	75.6 J

I-MW506-103			
Date		10/11/96	01/17/03
Compound	LOC	Conc	Conc
Aluminum (ug/l)	200	290	NA
Benzene (ug/l)	1	1.8	ND
Iron (ug/l)	300	13200	NA
Lead (ug/l)	5	5.18	NA
Manganese (ug/l)	50	832	NA
Nitroglycerin (ug/l)	3.7	14	NA

I-65-SS-017		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	29.6 J

I-65-MW-005		
Date		10/28/96
Compound	LOC	Conc
Manganese (ug/l)	50	106

I-65-SB-002		
Depth (ft)		0 – 2
Compound	LOC	Conc
Arsenic (mg/kg)	19	80

I-65-SS-018		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	20 J

I-65-SS-021		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	33.3 J

I-65-MW-001		
Depth (ft)		0 – 2
Compound	LOC	Conc
Arsenic (mg/kg)	19	110

I-65-SS-020		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	19.1 J

I-65-SB-001		
Depth (ft)		0 – 2
Compound	LOC	Conc
Arsenic (mg/kg)	19	23

I-65-MW-004		
Date		10/28/96
Compound	LOC	Conc
Sodium (ug/l)	50000	151000

I-MW506-104		
Date		10/11/96
Compound	LOC	Conc
Aluminum (ug/l)	200	11100
Iron (ug/l)	300	44200
Lead (ug/l)	5	36.4
Manganese (ug/l)	50	396

PICATINNY LAKE

SITE 63/65

506A 506 506N 501 507B 507A 507

BABBITT ROAD

WHITMORE AVENUE

WATER ROAD

I-65-SD-001
I-65-SW-001
I-65-SW-002
I-65-SD-002
65SS-23
65SS-16
65SS-15
65MW-2
65SS-12
65SS-13
65SS-4A
65SS-14
65SS-3C
65SS-10C
65MW-4A
I-65-SW-003
I-65-SD-003
I-65-SW-004
I-65-SD-004
65SS-5C
65MW-3
65MW-4
65SB-1
65SS-11A
65MW-1A
65SS-19
65SS-20
65MW-1
65SS-21
65SS-22
65SS-7A
65SS-17
65MW-5
65SB-2
65SS-18
65SS-6C
65SS-2C
65MW-6R
65MW-6
65SS-1A
MW506-103
MW506-104R
MW506-104
65SS-9A
65SS-8A
65SS-2A

LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- MONITORING WELL
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

N

Date\Time : Wed, 29 Jul 2010 – 2:43pm
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\SITE 63-65\DWG\SITE-63-65.dwg – Layout Tab : LAYOUT1

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

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0 50
SCALE IN FEET

PLOT SIZE: 22x34

REV. ISSUED DATE DESCRIPTION

KEYPLAN

SEAL

ARCADIS
1114 Benfield Blvd.
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Millersville, MD 21108
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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 63/65 /PICA 047 STEAM AND POWER PLANT (BUILDING 506)

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX

PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	9

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

Date\Time : Wed, 28 Jul 2010 - 10:06am
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\SITE 97\DWG\SITE-97.dwg - Layout Tab : DWG #

PICATINNY LAKE

I-97-SB-003				
Depth (ft)		0 - 1	5 - 7	10 - 12
Compound	LOC	Conc	Conc	Conc
Benz(a)anthracene (mg/kg)	2	9.9 D	NE	NE
Benzo(a)pyrene (mg/kg)	0.2	12 D	NE	1.4
Benzo(b)fluoranthene (mg/kg)	2	15 D	NE	NE
Dibenz(a,h)anthracene (mg/kg)	0.2	2.1 JD	ND	0.22 J
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	7.7 D	NE	NE

I-97-SS-001		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.28 J

SITE 97

97SS-1
97SB-1
97SB-2
97SB-3
97SS-2
501

I-97-SB-001			
Depth (ft)		0 - 2	15 - 17
Compound	LOC	Conc	Conc
Benz(a)anthracene (mg/kg)	2	30	NE
Benzo(a)pyrene (mg/kg)	0.2	30	0.93
Benzo(b)fluoranthene (mg/kg)	2	30	NE
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	20	NE

I-97-SS-002		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	10 D
Benzo(a)pyrene (mg/kg)	0.2	12 D
Benzo(b)fluoranthene (mg/kg)	2	15 D
Dibenz(a,h)anthracene (mg/kg)	0.2	2.3 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	8 D

LEGEND

⊡	SURFACE SOIL
⊕	SOIL BORING
———	ROADS
———	WATER BODIES
▭	BUILDING
▭	APPROXIMATE SITE LOCATION
D	ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
J	ESTIMATED VALUE
NA	NOT ANALYZED
ND	NOT DETECTED
NE	NO EXCEEDENCE

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0 40
SCALE IN FEET

ARCADIS
www.arcadis-us.com

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN
SHEET TITLE: HISTORICAL DATA EXCEEDING LOCs AT RI SITE 97/PICA 140 POST ENGINEERING MAINTENANCE SHOP		TASK/PHASE NUMBER: EA001	DRAWN BY: A. FOX
		PROJECT NUMBER: GP06PICA.P001	DRAWING NUMBER: 10

I-105-SD-001		
Depth (ft)		0 - 1
Compound	LOC	Conc
Copper (mg/kg)	28	42.8
Lead (mg/kg)	38.8	268
Mercury (mg/kg)	0.249	0.26
Silver (mg/kg)	1.0	2.2
Strontium (mg/kg)	16	35.9
Zinc (mg/kg)	171	239

105SD-1
105SW-1

I-511-EX1-B1-1		
Depth (ft)		4 - 4
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.27 J

S11-EX1-SWN-1
S11EX1-BDX-1
S11EX1-B1-1
S11EX1-B2-1
S11-EX1-SWE-1
S11EX1-SWS-1

S11EX2-BW-1
S11EX2-BN-1
S11EX2-BS-1

105SB-1

105SS-3C

SITE
105

I-105-SS-002A		
Depth (ft)		0 - 1
Compound	LOC	Conc
Aroclor 1260 (mg/kg)	1	1.2 J
Benz(a)anthracene (mg/kg)	2	4
Benzo(a)pyrene (mg/kg)	0.2	5
Benzo(b)fluoranthene (mg/kg)	2	4

I-105-SS-009		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.27 J

I-105-SS-011		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	3.9 D
Benzo(a)pyrene (mg/kg)	0.2	3.9 D
Benzo(b)fluoranthene (mg/kg)	2	4.7 D

105SS-9
105SS-2A
105SS-11
105SS-12
105SS-6
105SS-10
105SS-5
105SS-8
105SS-7
105SS-4

510

511

BOTT ROAD

I-105-SS-001C		
Depth (ft)		0 - 1
Compound	LOC	Conc
Lead (mg/kg)	800	4680

LEGEND

▣	SURFACE SOIL
△	SURFACE WATER AND/OR SEDIMENT
⊕	SOIL BORING
▲	POST-EXCAVATION SAMPLE
———	ROADS
———	WATER BODIES
▭	BUILDING
▭	APPROXIMATE SITE LOCATION
D	ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
J	ESTIMATED VALUE
NA	NOT ANALYZED
ND	NOT DETECTED
NE	NO EXCEEDENCE

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0 30
SCALE IN FEET

ARCADIS
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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 105/PICA 142 PROPELLANT PLANT

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	11

Acad Version : R18.0s (LMS Tech)
User Name : AFOX
Date\Time : Fri, 30 Jul 2010 - 11:19am
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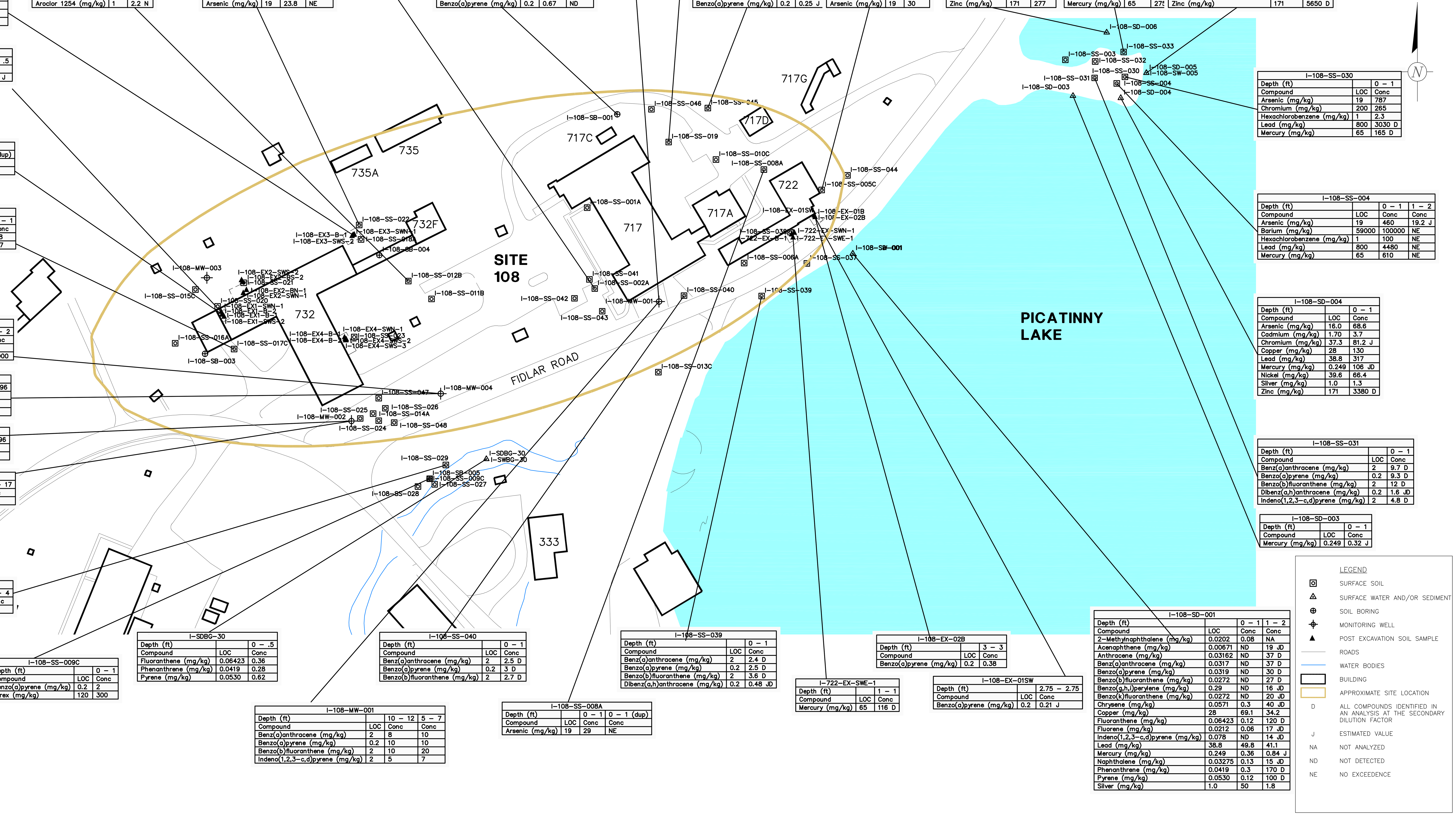

I-108-SW-002

Date		07/12/96
Compound	LOC	Conc
Aluminum (ug/l)	190	1830
Arsenic (ug/l)	1.38	2.59
Copper (ug/l)	9.4	20.7
Cyanide (ug/l)	5.2	5.82
Iron (ug/l)	1790	3570
Lead (ug/l)	3.2	43.6
Manganese (ug/l)	383	1480
Mirex (ug/l)	.001	8.2
Zinc (ug/l)	122	241

I-108-SS-012B

Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	2.2 N

I-108-SS-022

Depth (ft)		0 – 1	2 – 4
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	23.8	NE

I-108-SS-002A

Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.9
Lead (mg/kg)	800	953

I-108-SB-001

Depth (ft)		0 – 2	5 – 7
Compound	LOC	Conc	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.67	ND

I-108-MW-001

Date		10/21/96
Compound	LOC	Conc
Arsenic (ug/l)	3	7.32
Iron (ug/l)	300	7450
Manganese (ug/l)	50	2360

I-108-SS-019

Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	NE /14 D
Benzo(a)pyrene (mg/kg)	0.2	0.46 /17 D
Benzo(b)fluoranthene (mg/kg)	2	NE /20 D
Dibenz(a,h)anthracene (mg/kg)	0.2	ND /2.7 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	ND /9.5 D

I-108-SS-045

Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.25 J

I-108-SS-005C

Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	30

I-108-SD-006

Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	16.0	30.7
Copper (mg/kg)	28	153
Lead (mg/kg)	38.8	45.7
Mercury (mg/kg)	0.249	1 J
Zinc (mg/kg)	171	277

I-108-SS-033

Depth (ft)		0 -
Compound	LOC	Cor
Arsenic (mg/kg)	19	29(
Barium (mg/kg)	59000	60:
Lead (mg/kg)	800	89
Mercury (mg/kg)	65	27

I-108-SD-005

Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	16.0	243
Benzo(b)fluoranthene (mg/kg)	0.0272	0.24 J
Cadmium (mg/kg)	1.70	5.9
Chromium (mg/kg)	37.3	69.7 J
Chrysene (mg/kg)	0.0571	0.19 J
Copper (mg/kg)	28	151
Fluoranthene (mg/kg)	0.06423	0.28 J
Lead (mg/kg)	38.8	706
Mercury (mg/kg)	0.249	113 JD
Pyrene (mg/kg)	0.0530	0.24 J
Zinc (mg/kg)	171	5650 D

I-108-EX1-SWN-1

Depth (ft)		.5 – .5
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.22 J

I-108-EX1-B-1

Depth (ft)		1 – 1	1 – 1 (dup)
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	856 J	NE

I-108-SS-017C

Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	1.8
Benzo(b)fluoranthene (mg/kg)	2	2.7

I-108-SS-030

Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	787
Chromium (mg/kg)	200	265
Hexachlorobenzene (mg/kg)	1	2.3
Lead (mg/kg)	800	3030 D
Mercury (mg/kg)	65	165 D

I-108-SS-004

Depth (ft)		0 – 1	1 – 2
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	460	19.2 J
Barium (mg/kg)	59000	100000	NE
Hexachlorobenzene (mg/kg)	1	100	NE
Lead (mg/kg)	800	4480	NE
Mercury (mg/kg)	65	610	NE

I-108-MW-004

Depth (ft)		0 – 2
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.7
Manganese (mg/kg)	5900	10000

I-108-MW-004

Date		10/21/96
Compound	LOC	Conc
Iron (ug/l)	300	1080
Manganese (ug/l)	50	947

I-108-SD-004

Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	16.0	68.6
Cadmium (mg/kg)	1.70	3.7
Chromium (mg/kg)	37.3	81.2 J
Copper (mg/kg)	28	130
Lead (mg/kg)	38.8	317
Mercury (mg/kg)	0.249	106 JD
Nickel (mg/kg)	39.6	66.4
Silver (mg/kg)	1.0	1.3
Zinc (mg/kg)	171	3380 D

I-108-MW-002

Date		10/22/96
Compound	LOC	Conc
Manganese (ug/l)	50	159

I-108-MW-002

Depth (ft)		10 – 12	15 – 17
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	NE	27

I-108-SS-031

Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	9.7 D
Benzo(a)pyrene (mg/kg)	0.2	9.3 D
Benzo(b)fluoranthene (mg/kg)	2	12 D
Dibenz(a,h)anthracene (mg/kg)	0.2	1.6 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	4.8 D

I-108-SD-003

Depth (ft)		0 – 1
Compound	LOC	Conc
Mercury (mg/kg)	0.249	0.32 J

I-108-SS-029

Depth (ft)		0 – 1	2 – 4
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	36	NE

I-108-SS-009C

Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	2
Mirex (mg/kg)	120	300

I-SDBG-30

Depth (ft)		0 – .5
Compound	LOC	Conc
Fluoranthene (mg/kg)	0.06423	0.36
Phenanthrene (mg/kg)	0.0419	0.28
Pyrene (mg/kg)	0.0530	0.62

I-108-SS-040

Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	2.5 D
Benzo(a)pyrene (mg/kg)	0.2	3 D
Benzo(b)fluoranthene (mg/kg)	2	2.7 D

I-108-MW-001

Depth (ft)		10 – 12	5 – 7
Compound	LOC	Conc	Conc
Benz(a)anthracene (mg/kg)	2	8	10
Benzo(a)pyrene (mg/kg)	0.2	10	10
Benzo(b)fluoranthene (mg/kg)	2	10	20
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	5	7

I-108-SS-008A

Depth (ft)		0 – 1	0 – 1 (dup)
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	29	NE

I-108-SS-039

Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	2.4 D
Benzo(a)pyrene (mg/kg)	0.2	2.5 D
Benzo(b)fluoranthene (mg/kg)	2	3.6 D
Dibenz(a,h)anthracene (mg/kg)	0.2	0.48 JD

I-722-EX-SWE-1

Depth (ft)		1 – 1
Compound	LOC	Conc
Mercury (mg/kg)	65	116 D

I-108-EX-02B

Depth (ft)		3 – 3
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.38

I-108-EX-01SW

Depth (ft)		2.75 – 2.75
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.21 J

I-108-SD-001

Depth (ft)		0 – 1	1 – 2
Compound	LOC	Conc	Conc
2-Methylnaphthalene (mg/kg)	0.0202	0.08	NA
Acenaphthene (mg/kg)	0.00671	ND	19 JD
Anthracene (mg/kg)	0.03162	ND	37 D
Benz(a)anthracene (mg/kg)	0.0317	ND	37 D
Benzo(a)pyrene (mg/kg)	0.0319	ND	30 D
Benzo(b)fluoranthene (mg/kg)	0.0272	ND	27 D
Benzo(g,h,i)perylene (mg/kg)	0.29	ND	16 JD
Benzo(k)fluoranthene (mg/kg)	0.0272	ND	20 JD
Chrysene (mg/kg)	0.0571	0.3	40 JD
Copper (mg/kg)	28	69.1	34.2
Fluoranthene (mg/kg)	0.06423	0.12	120 D
Fluorene (mg/kg)	0.0212	0.06	17 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	0.078	ND	14 JD
Lead (mg/kg)	38.8	49.8	41.1
Mercury (mg/kg)	0.249	0.36	0.84 J
Naphthalene (mg/kg)	0.03275	0.13	15 JD
Phenanthrene (mg/kg)	0.0419	0.3	170 D
Pyrene (mg/kg)	0.0530	0.12	100 D
Silver (mg/kg)	1.0	50	1.8

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PLOT SIZE: 22x34

0 60 SCALE IN FEET

REV. ISSUED DATE DESCRIPTION

KEYPLAN

SEAL

ARCADIS

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PROJECT TITLE

PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE

HISTORICAL DATA EXCEEDING
LOCs AT RI SITE 108/PICA 143
ORDNANCE FACILITIES AND
FLARE TESTING LABORATORY

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	12

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

Date\Time : Wed, 28 Jul 2010 - 10:44am
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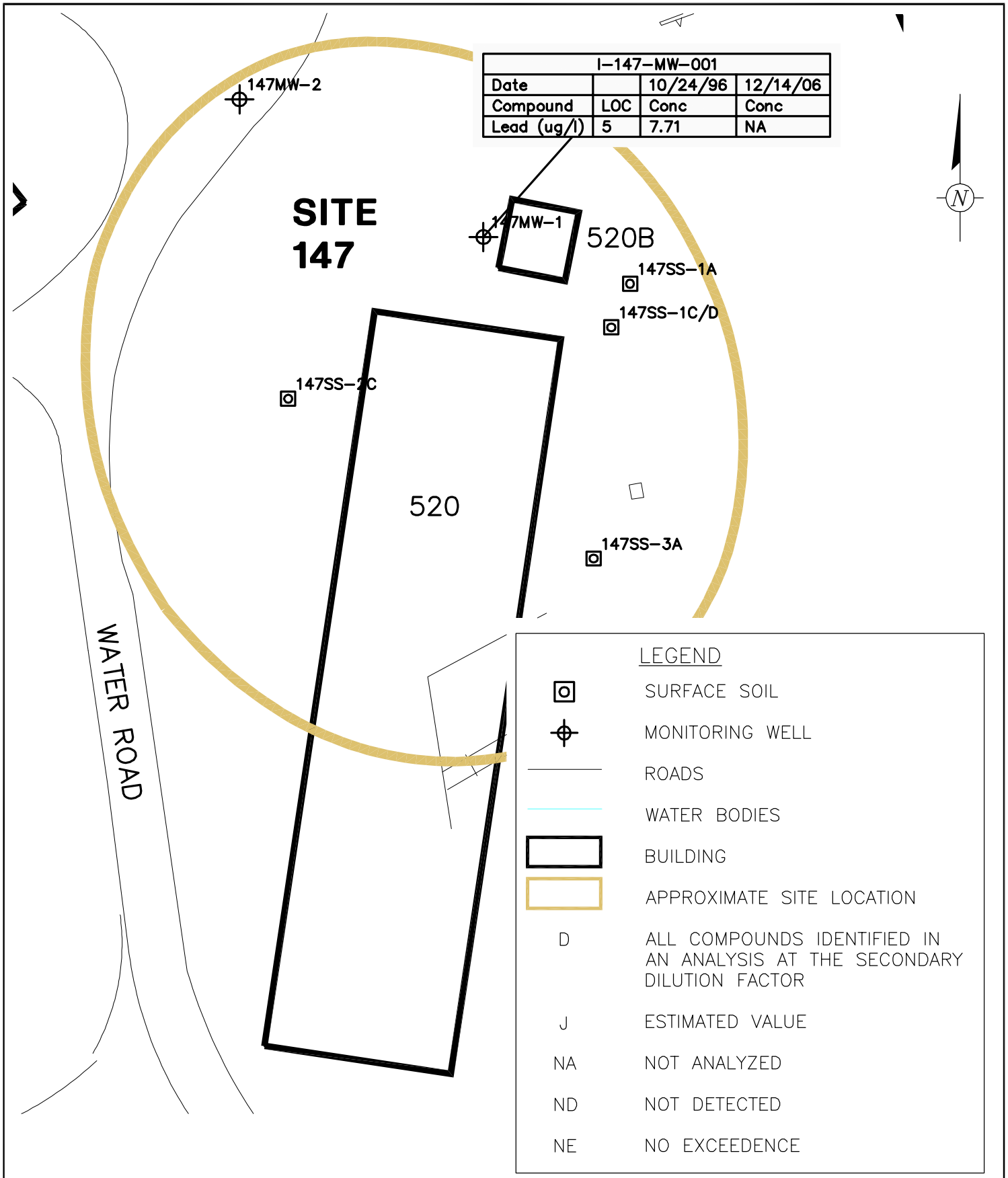

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PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 147/PICA 064 POACH HOUSE

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX

PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	13

I-148-MW-001.		
Date		10/24/96
Compound	LOC	Conc
Aluminum (ug/l)	200	1450
Iron (ug/l)	300	615
Manganese (ug/l)	50	83.3

I-148-SS-017		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	35.6 J

I-148-SS-011		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	250 J

I-148-SS-005C		
Depth (ft)		0 – 1
Compound	LOC	Conc
2,4-Dinitrotoluene (mg/kg)	4.2	5.59
Arsenic (mg/kg)	19	71

I-148-SS-013		
Depth (ft)		2 – 3
Compound	LOC	Conc
Arsenic (mg/kg)	19	64.2 J

I-148-MW-001			
Depth (ft)		5 – 7	10 – 12
Compound	LOC	Conc	Conc
Arsenic (mg/kg)	19	47	NE
Benzo(a)pyrene (mg/kg)	0.2	1	ND

I-148-SS-022		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.55 JD

I-148-SS-010A		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	126 J

I-148-SS-019		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	60.2 J

I-148-SD-003		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(b)fluoranthene (mg/kg)	0.0272	0.03 J
Lead (mg/kg)	38.8	67

I-148-SD-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	0.0317	0.04 J
Benzo(b)fluoranthene (mg/kg)	0.0272	0.04 J
Pyrene (mg/kg)	0.0530	0.06 J

I-148-SD-002		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	38.8	58

I-148-SS-004A		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	19.6

I-148-MW-002		
Date		10/24/96
Compound	LOC	Conc
Iron (ug/l)	300	4020
Manganese (ug/l)	50	624

I-148-SS-012		
Depth (ft)		2 – 3
Compound	LOC	Conc
Arsenic (mg/kg)	19	42.8 JD

I-148-SS-009		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.44

I-148-SB-001			
Depth (ft)		0 – 2	5 – 7
Compound	LOC	Conc	Conc
Benz(a)anthracene (mg/kg)	2	30	NE
Benzo(a)pyrene (mg/kg)	0.2	40	2
Benzo(b)fluoranthene (mg/kg)	2	30	NE
Dibenz(a,h)anthracene (mg/kg)	0.2	5	ND
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	20	NE

I-148-SS-002C		
Depth (ft)		0 – 1
Compound	LOC	Conc
2,4-Dinitrotoluene (mg/kg)	4.2	4.23
Manganese (mg/kg)	5900	60000

I-148-SS-006A		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	42
Benzo(a)pyrene (mg/kg)	0.2	0.55

I-148-MW-003			
Depth (ft)		0 – 2	5 – 7
Compound	LOC	Conc	Conc
Benzo(a)pyrene (mg/kg)	0.2	1	0.4

PICATINNY LAKE

SITE 148

I-148-SS-017
I-148-SS-011
I-148-SS-022
I-148-MW-001
I-148-MW-003
I-148-SS-006A
I-148-SS-012
I-148-TP-001
I-148-SS-019
I-148-SS-010A
I-148-SS-005C
I-148-SS-013
I-148-SD-003
I-148-SS-021
I-148-SS-003A
I-148-SD-001
I-148-SS-020
I-148-SS-004A
I-148-MW-002
I-148-SS-014
I-148-SS-015
I-148-SD-002
I-148-SS-002C
I-148-SS-016
I-148-SS-001A
I-148-SS-007
I-148-SS-008
I-148-SB-001
I-148-SS-009

534
527A
527
523
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BABBITT ROAD
STANK RD.

N

LEGEND

- SURFACE SOIL
- MONITORING WELL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- TEST PIT
- ROADS
- WATER BODIES
- BUILDING
- FORMER BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

Date\Time : Fri, 30 Jul 2010 - 12:02pm
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SCALE IN FEET

PLOT SIZE: 17x22

REV. ISSUED DATE DESCRIPTION

SEAL

ARCADIS
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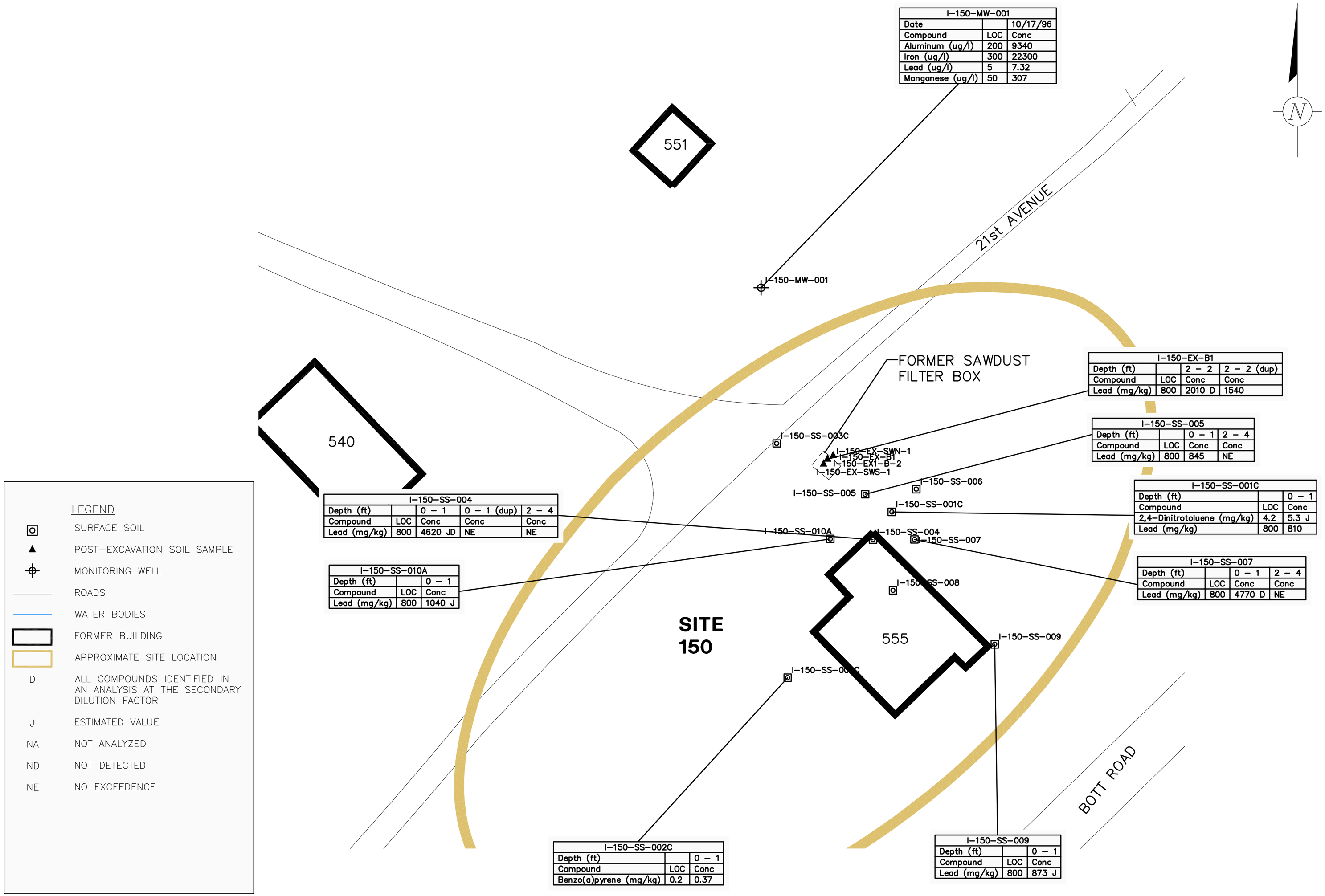
PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA
EXCEEDING LOCs AT
RI SITE 148/PICA 148
NITROCELLULOSE PRODUCTION FACILITY

TASK/PHASE NUMBER	DRAWN BY
EA002	A. FOX

PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	14



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Acad Version : R18.0s (LMS Tech)
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SCALE IN FEET

PLOT SIZE: 17x22

REV.	ISSUED DATE	DESCRIPTION

SEAL

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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA
EXCEEDING LOCs AT
RI SITE 150/PICA 150
PROPELLANT PLANT

TASK/PHASE NUMBER	DRAWN BY
EA002	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	15

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

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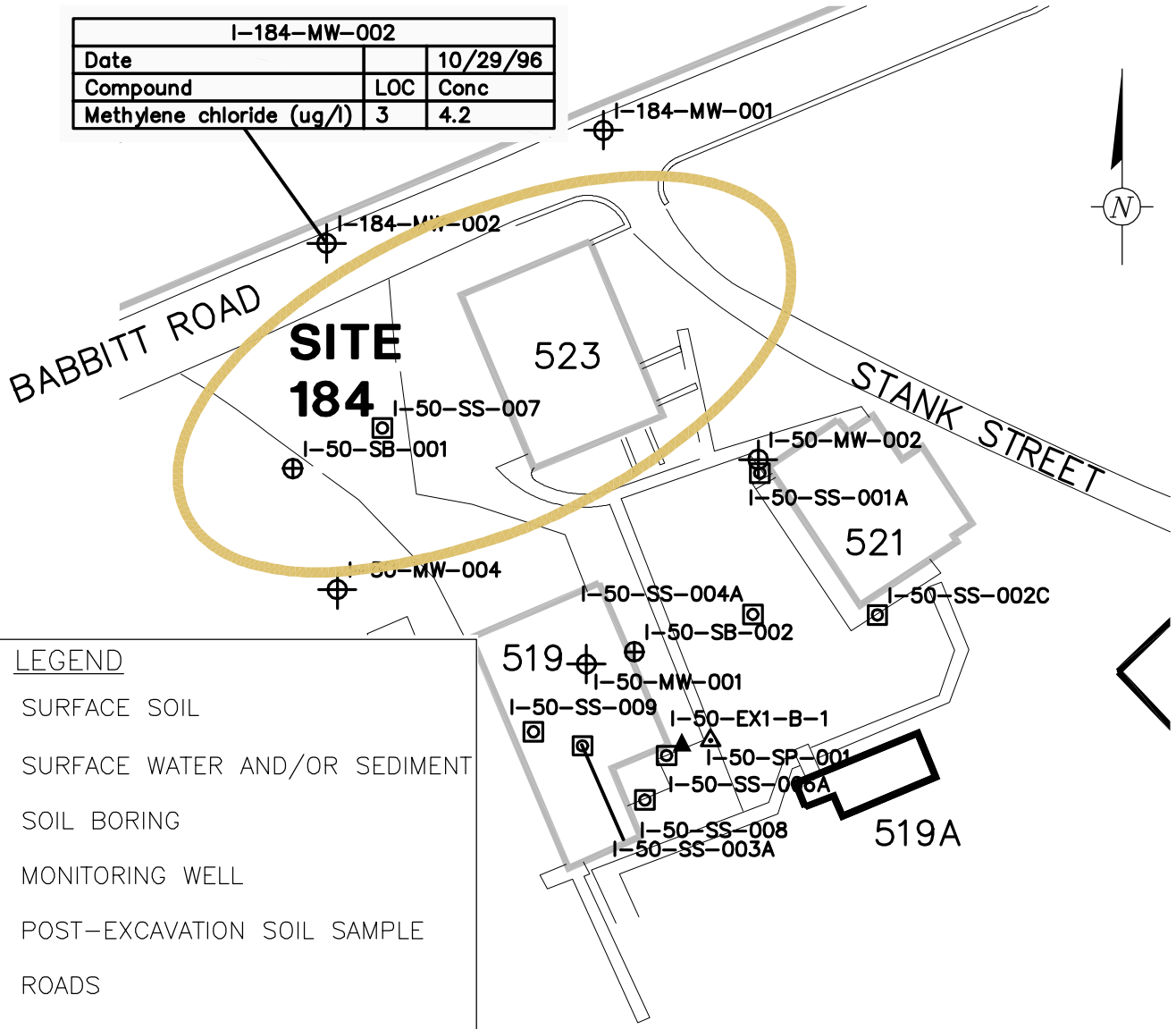

LEGEND

▣	SURFACE SOIL
△	SURFACE WATER AND/OR SEDIMENT
⊕	SOIL BORING
⌖	MONITORING WELL
▲	POST-EXCAVATION SOIL SAMPLE
———	ROADS
———	WATER BODIES
▭	FORMER BUILDING
▭	APPROXIMATE SITE LOCATION
D	ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
J	ESTIMATED VALUE
NA	NOT ANALYZED
ND	NOT DETECTED
NE	NO EXCEEDENCE

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PROJECT MANAGER T. LLEWELLYN	DEPARTMENT MANAGER M. MOHIUDDIN	LEAD DESIGN PROF. K. PANHORST	CHECKED BY T. LLEWELLYN
SHEET TITLE HISTORICAL DATA EXCEEDING LOCs AT RI SITE 184/PICA 056 REFRIGERATION AND INERT GAS PLANT		TASK/PHASE NUMBER EA001	DRAWN BY A. FOX
		PROJECT NUMBER GP06PICA.P001	DRAWING NUMBER 16

K-199-MW-003		
Date		05/23/00
Compound	LOC	Conc
Aluminum (ug/l)	200	24300
Arsenic (ug/l)	3	4.8
Chromium (ug/l)	70	95
Iron (ug/l)	300	37800
Manganese (ug/l)	50	470
Thallium (ug/l)	.5	1.3 J

K-199-SB-M9				
Depth (ft)		2 – 3	5 – 7	10 – 12
Compound	LOC	Conc	Conc	Conc
Benz(a)anthracene (mg/kg)	2	4 D	NE	NE
Benzo(a)pyrene (mg/kg)	0.2	3.7 D	0.98	NE
Benzo(b)fluoranthene (mg/kg)	2	4.4 D	NE	NE
Dibenz(a,h)anthracene (mg/kg)	0.2	0.52 JD	NE	ND
Indeno(1,2,3–c,d)pyrene (mg/kg)	2	2.6 D	NE	NE
Lead (mg/kg)	800	1200 JD	NE	NE

K-199-GR-M9		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	23.8 D
Benz(a)anthracene (mg/kg)	2	25 D
Benzo(a)pyrene (mg/kg)	0.2	24 D
Benzo(b)fluoranthene (mg/kg)	2	30 D
Dibenz(a,h)anthracene (mg/kg)	0.2	2.5 JD
Indeno(1,2,3–c,d)pyrene (mg/kg)	2	14 D
Lead (mg/kg)	800	7400 JD

K-199-GR-J8		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	5040 JD

K-199-GR-L8		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2620 JD

K-199-MW-002		
Date		05/23/00
Compound	LOC	Conc
Aluminum (ug/l)	200	19200
Arsenic (ug/l)	3	3.8
Iron (ug/l)	300	24400
Manganese (ug/l)	50	280
Thallium (ug/l)	.5	1.1 J

K-199-GR-N10		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	54 D
Benzo(a)pyrene (mg/kg)	0.2	42 D
Benzo(b)fluoranthene (mg/kg)	2	52 D
Indeno(1,2,3–c,d)pyrene (mg/kg)	2	24 JD
Lead (mg/kg)	800	1210 J

K-199-GR-I7		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1370 J

K-199-MW-001		
Date		05/24/00
Compound	LOC	Conc
Aluminum (ug/l)	200	450
Iron (ug/l)	300	620

K-199-GR-I8		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	5110 JD

K-199-GR-M10		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	2.2
Benzo(a)pyrene (mg/kg)	0.2	2.3
Benzo(b)fluoranthene (mg/kg)	2	3
Dibenz(a,h)anthracene (mg/kg)	0.2	0.36 J
Lead (mg/kg)	800	2230 JD

K-199-GR-I9		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1050 JD

K-199-SB-I9					
Depth (ft)		2 – 3	5 – 7	10 – 12	15 – 17
Compound	LOC	Conc	Conc	Conc	Conc
Lead (mg/kg)	800	4620 JD	NE	NE	NE

K-199-SB-L10					
Depth (ft)		2 – 3	5 – 7	10 – 12	15 – 17
Compound	LOC	Conc	Conc	Conc	Conc
Arsenic (mg/kg)	19	19.9	NA	NA	NA
Lead (mg/kg)	800	4700 JD	NE	NE	NE

K-199-GR-G10		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1190 J

K-199-SB-G10				
Depth (ft)		2 – 3	5 – 7	8 – 10
Compound	LOC	Conc	Conc	Conc
Lead (mg/kg)	800	2840 JD	NE	NE

K-199-GR-K8		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2330 JD

K-199-GR-I10		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1030 J

K-199-GR-L10		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	50.4
Benzo(a)pyrene (mg/kg)	0.2	0.28 J
Lead (mg/kg)	800	16000 JD

SITE 199

K-199-MW-003
K-199-MW-002
K-199-TP-001
K-199-GR-J3
K-199-GR-J4
K-199-GR-I3
K-199-GR-I4
K-199-GR-J6
K-199-GR-I5
K-199-GR-I6
K-199-GR-H5
K-199-GR-H6
K-199-GR-I7
K-199-GR-J8
K-199-GR-H8
K-199-MW-004
K-199-GR-H9
K-199-GR-G8
K-199-GR-G9
K-199-GR-F8
K-199-GR-F9
K-199-GR-F10
K-199-GR-F11
K-199-GR-F12
K-199-GR-G10
K-199-SB-G10
K-199-GR-H10
K-199-GR-I8
K-199-SB-I8
K-199-GR-I9
K-199-SB-I9
K-199-GR-J9
K-199-GR-J10
K-199-GR-I10
K-199-SB-I10
K-199-GR-I11
K-199-GR-I12
K-199-GR-H11
K-199-GR-H12
K-199-GR-G11
K-199-GR-G12
K-199-GR-K6
K-199-GR-L7
K-199-GR-M8
K-199-GR-N9
K-199-GR-O10
K-199-GR-O11
K-199-SB-M9
K-199-GR-M9
K-199-GR-N10
K-199-GR-N11
K-199-GR-L8
K-199-TP-002
K-199-GR-M10
K-199-GR-K7
K-199-GR-L9
K-199-GR-M11
K-199-GR-K8
K-199-GR-L10
K-199-SB-L10
K-199-GR-M12
K-199-GR-K9
K-199-GR-L11
K-199-GR-M13
K-199-GR-K10
K-199-GR-L12
K-199-TP-003
K-199-GR-K11
K-199-GR-L13
K-199-GR-K12
K-199-GR-K13
K-199-MW-001
BELT ROAD
3349
3058
3054

N

LEGEND

- SURFACE SOIL
- SOIL BORING
- MONITORING WELL
- TEST PIT
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

Acad Version : K18.0s (LMS Tech)
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0 50
SCALE IN FEET

PLOT SIZE: 17x22

REV. ISSUED DATE DESCRIPTION

SEAL

ARCADIS
1114 Benfield Blvd.
Suite A
Millersville, MD 21108
Tel: 410-987-4392 Fax: 410-987-0032
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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER: T. LLEWELLYN
DEPARTMENT MANAGER: M. MOHIUDDIN
LEAD DESIGN PROF.: K. PANHORST
CHECKED BY: T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA
EXCEEDING LOCs AT
RI SITE 199/PICA 199
ABANDONED PISTOL RANGE

TASK/PHASE NUMBER: EA001
DRAWN BY: A. FOX
PROJECT NUMBER: GP06PICA.P001
DRAWING NUMBER: 17

L-DM17-2					
Date		03/09/99	11/20/03	09/29/08	09/29/08 (dup)
Compound	LOC	Conc	Conc	Conc	Conc
bis(2-Ethylhexyl)phthalate (ug/l)	3	6.09 J	NA	NA	NA
Manganese (ug/l)	50	110	NA	NA	NA
Trichloroethene (ug/l)	1	8.39	9.2	2.95	3.08

L-DM17-3							
Date		03/09/99	02/18/02	11/11/03	02/07/08	09/29/08	10/01/08
Compound	LOC	Conc	Conc	Conc	Conc	Conc	Conc
RDX (ug/l)	2	14	3.6	11 D	5.02	NA	NE
Trichloroethene (ug/l)	1	9.89	9.9	12	NA	2.15	NA

L-17-SB-021			
Depth (ft)		0 – 1	2 – 3
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	3170	NE

L-17-SS-034		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1520

L-17-MW-002				
Date		03/05/99	11/18/03	09/29/08
Compound	LOC	Conc	Conc	Conc
Trichloroethene (ug/l)	1	9	5	2.66

L-17-SS-028		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1300

L-DM17-1				
Date		03/23/99	11/19/03	09/29/08
Compound	LOC	Conc	Conc	Conc
Aluminum (ug/l)	200	2400	NA	NA
Iron (ug/l)	300	3800	NA	NA
Lead (ug/l)	5	46	NA	NA
Manganese (ug/l)	50	260	NA	NA
Trichloroethene (ug/l)	1	8	1.9	NE

L-17-SS-031		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	909

L-17-SS-032		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1230

L-17-SS-044		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1670 D

L-17-SS-030		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2370

L-17-SS-029		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1220

L-17-SS-023		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1150 J

L-17-SS-040		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1790

L-17-MW-001					
Date		03/05/99	11/19/03	09/29/08	09/30/08
Compound	LOC	Conc	Conc	Conc	Conc
bis(2-Ethylhexyl)phthalate (ug/l)	3	3.09 J	NA	NA	NA
RDX (ug/l)	2	NE	2.3	NA	NE
Trichloroethene (ug/l)	1	4.8	1.7	2.19	NA

L-17-SS-008		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	24.4

L-17-SD-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
Anthracene (mg/kg)	0.03162	0.05 J
Benz(a)anthracene (mg/kg)	0.0317	0.18
Benzo(a)pyrene (mg/kg)	0.0319	0.17 J
Benzo(b)fluoranthene (mg/kg)	0.0272	0.22
Benzo(k)fluoranthene (mg/kg)	0.0272	0.17
Chrysene (mg/kg)	0.0571	0.24
Fluoranthene (mg/kg)	0.06423	0.39
Phenanthrene (mg/kg)	0.0419	0.3
Pyrene (mg/kg)	0.0530	0.34

L-17-SB-008			
Depth (ft)		0 – 1	1 – 2
Compound	LOC	Conc	Conc
Benzo(a)pyrene (mg/kg)	0.2	1.76 J	1.52
Benzo(b)fluoranthene (mg/kg)	2	2.79 J	2.06 J
Dibenz(a,h)anthracene (mg/kg)	0.2	0.29 J	0.25 J
Lead (mg/kg)	800	1300 D	NE

L-17-SB-022			
Depth (ft)		0 – 1	2 – 3
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	6750	NE

L-17-MW-004						
Date		03/09/99	02/18/02	11/06/03	02/08/08	10/02/08
Compound	LOC	Conc	Conc	Conc	Conc	Conc
Manganese (ug/l)	50	78	NA	NA	NA	NA
RDX (ug/l)	2	71 D	70 D	39 D	12.2	11

L-17-MW-003		
Date		03/09/99
Compound	LOC	Conc
Aluminum (ug/l)	200	220
Beryllium (ug/l)	1	1.39 J
Iron (ug/l)	300	1300
Manganese (ug/l)	50	170

L-17-MW-005							
Date		07/20/99	02/20/02	11/06/03	06/09/04	02/06/08	10/01/08
Compound	LOC	Conc	Conc	Conc	Conc	Conc	Conc
Aluminum (ug/l)	200	3300	NA	NA	NA	NA	NA
Iron (ug/l)	300	2500	NA	NE	NA	NA	NA
Manganese (ug/l)	50	160	NA	NA	NA	NA	NA
RDX (ug/l)	2	190 D	62 D	69 D	55 D	80.4	87.1

L-17-SS-015		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.21 J

L-17-MW-005B				
Date		06/08/04	02/06/08	10/01/08
Compound	LOC	Conc	Conc	Conc
RDX (ug/l)	2	30 D	13.5	6.83

L-17-SS-027		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	4160 D

L-17-SB-020			
Depth (ft)		0 – 1	2 – 3
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	3100	NE

L-17-SB-023			
Depth (ft)		0 – 1	1 – 1.5
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	3970	NE

SITE 17

SEE DETAIL THIS SHEET

17th AVENUE

18th AVENUE

12th STREET

13th STREET

BOTT ROAD

1095 1053 1093 1094 1074

DM17-2 DM17-3 DM17-1 17MW-1 17MW-2 17MW-3 17MW-4 17MW-5 17MW-5B

17SS-1 17SS-2 17SS-3 17SS-4 17SS-5 17SS-6 17SS-7 17SS-8 17SS-9 17SS-10 17SS-11 17SS-12 17SS-13 17SS-14 17SS-15 17SS-16 17SS-17 17SS-18 17SS-19 17SS-20 17SS-21 17SS-22 17SS-23 17SS-24 17SS-25 17SS-26 17SS-27 17SS-28 17SS-29 17SS-30 17SS-31 17SS-32 17SS-33 17SS-34 17SS-35 17SS-36 17SS-37 17SS-38 17SS-39 17SS-40 17SS-41 17SS-42 17SS-43 17SS-44 17SS-45 17SS-46 17SS-47 17SS-48 17SS-49

17SB-1 17SB-2 17SB-3 17SB-4 17SB-5 17SB-6 17SB-7 17SB-8 17SB-9 17SB-10 17SB-11 17SB-12 17SB-13 17SB-14 17SB-15 17SB-16 17SB-17 17SB-18 17SB-19 17SB-20 17SB-21 17SB-22 17SB-23 17SB-24 17SB-25

17GR-A8 17GR-A9 17GR-B10 17GR-C1 17GR-C2 17GR-C3 17GR-C4 17GR-C8 17GR-D1 17GR-D4 17GR-D7 17GR-D9 17GR-E1 17GR-E2 17GR-E3 17GR-E4 17GR-E8 17GR-F1 17GR-F2 17GR-G1 17GR-H1 17GR-H2 17GR-J1 17GR-J2 17GR-J3 17GR-K1 17GR-K2 17GR-K3 17GR-K4-1 17GR-K4-2 17GR-L1 17GR-L3 17GR-M1 17GR-M2

17SD-1

17-P4-SW-W(A) 17-P4-SW-S(A) 17-P4-SW-N(A) 17-P4-SW-E(A) P4-B2 P3-SW-W P3-SW-N P3-SW-S P3-SW-E P3-B P2-SW-W P2-SW-N P2-SW-S P2-SW-E P2-B P1-SW-W P1-SW-N P1-SW-S P1-SW-E P1-B

N

LEGEND

- SURFACE SOIL
- SOIL BORING
- MONITORING WELL
- POST-EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- LIMITS OF TETRYL-CONTAMINATED SOIL REMOVED AND TREATED
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

0 80 SCALE IN FEET

PLOT SIZE: 17x22

REV. ISSUED DATE DESCRIPTION

SEAL

ARCADIS
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Millersville, MD 21108
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PROJECT TITLE

PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE

HISTORICAL DATA
EXCEEDING LOCs AT
RI SITE 17/PICA 001
NORTHERN TETRYL PITS

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	18

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User Name : AFOX
Date\Time : Fri, 30 Jul 2010 - 11:42am
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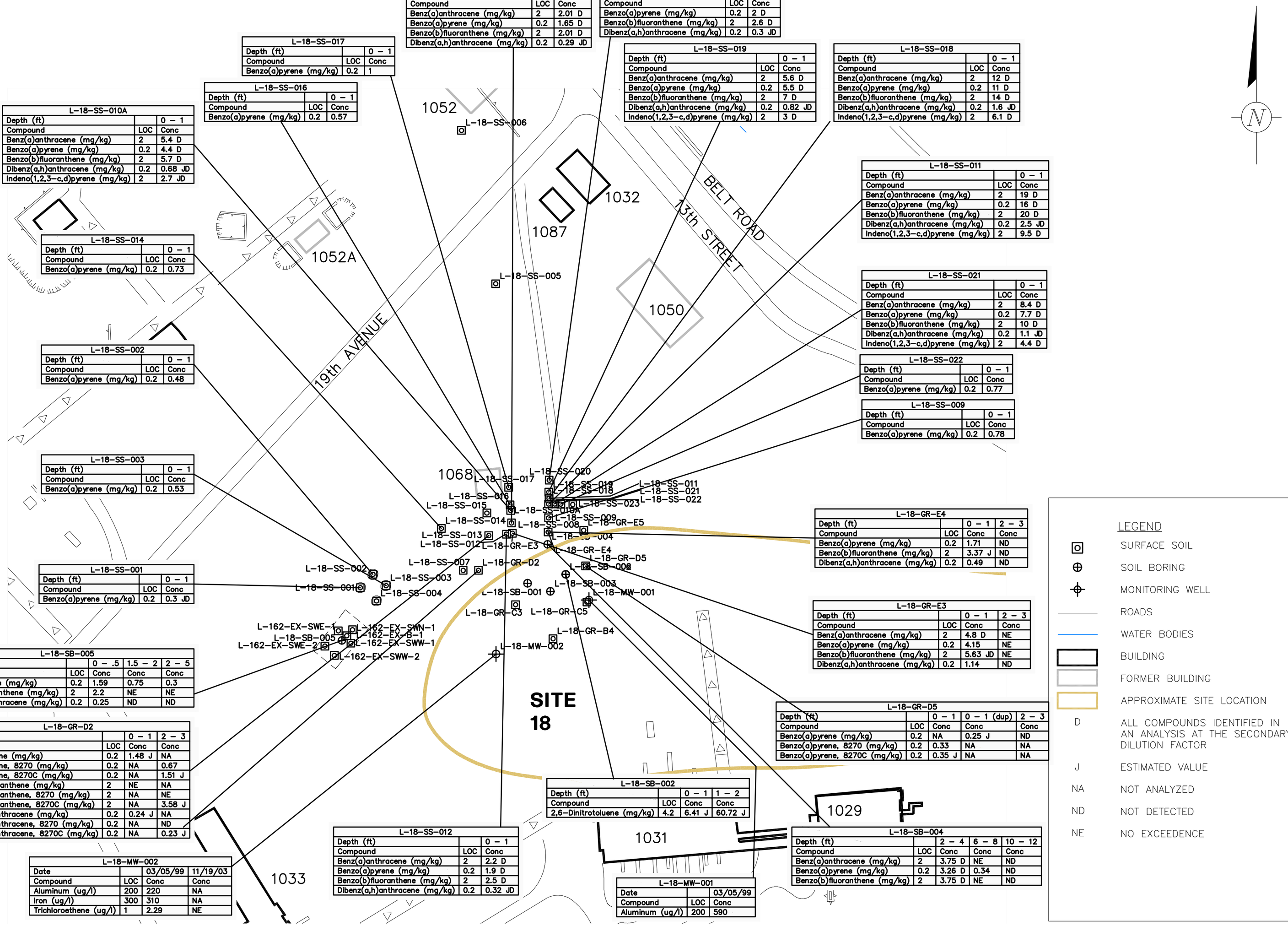

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0 60
SCALE IN FEET

PLOT SIZE: 17x22

REV. ISSUED DATE DESCRIPTION

SEAL

ARCADIS
1114 Benfield Blvd.
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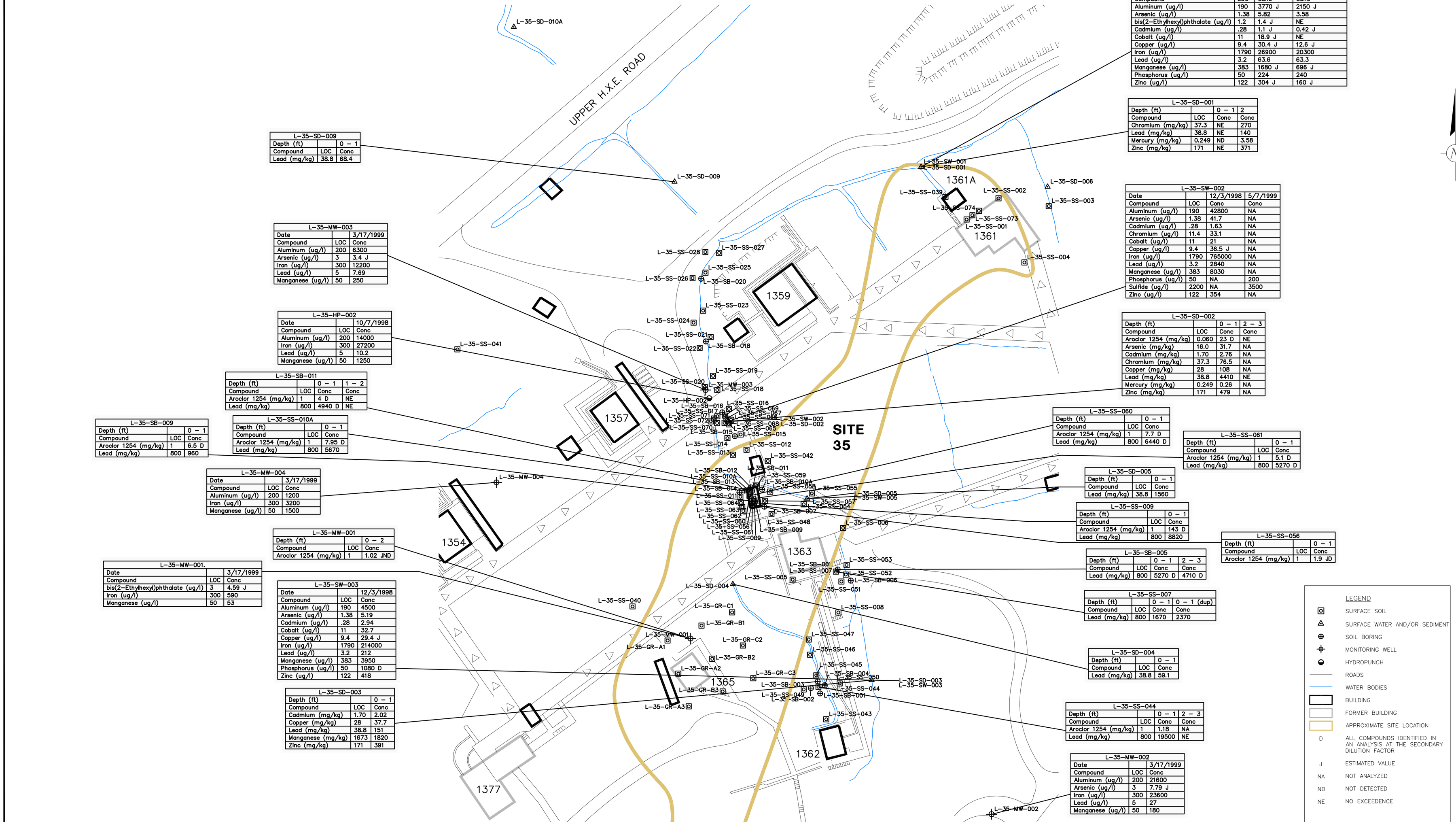
Millersville, MD 21108
Tel: 410-987-4392 Fax: 410-987-0032
www.arcadis-us.com

PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 18/PICA 001 SOUTHERN TETRYL PITS

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	19



L-35-SD-009		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	38.8	68.4

L-35-MW-003		
Date		3/17/1999
Compound	LOC	Conc
Aluminum (ug/l)	200	6300
Arsenic (ug/l)	3	3.4 J
Iron (ug/l)	300	12200
Lead (ug/l)	5	7.69
Manganese (ug/l)	50	250

L-35-HP-002		
Date		10/7/1998
Compound	LOC	Conc
Aluminum (ug/l)	200	14000
Iron (ug/l)	300	27200
Lead (ug/l)	5	10.2
Manganese (ug/l)	50	1250

L-35-SB-011			
Depth (ft)		0 – 1	1 – 2
Compound	LOC	Conc	Conc
Aroclor 1254 (mg/kg)	1	4 D	NE
Lead (mg/kg)	800	4940 D	NE

L-35-SB-009		
Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	6.5 D
Lead (mg/kg)	800	960

L-35-SS-010A		
Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	7.95 D
Lead (mg/kg)	800	5670

L-35-MW-004		
Date		3/17/1999
Compound	LOC	Conc
Aluminum (ug/l)	200	1200
Iron (ug/l)	300	3200
Manganese (ug/l)	50	1500

L-35-MW-001		
Depth (ft)		0 – 2
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	1.02 JND

L-35-MW-001.		
Date		3/17/1999
Compound	LOC	Conc
bis(2-Ethylhexyl)phthalate (ug/l)	3	4.59 J
Iron (ug/l)	300	590
Manganese (ug/l)	50	53

L-35-SW-003		
Date		12/3/1998
Compound	LOC	Conc
Aluminum (ug/l)	190	4500
Arsenic (ug/l)	1.38	5.19
Cadmium (ug/l)	.28	2.94
Cobalt (ug/l)	11	32.7
Copper (ug/l)	9.4	29.4 J
Iron (ug/l)	1790	214000
Lead (ug/l)	3.2	212
Manganese (ug/l)	383	3950
Phosphorus (ug/l)	50	1080 D
Zinc (ug/l)	122	418

L-35-SD-003		
Depth (ft)		0 – 1
Compound	LOC	Conc
Cadmium (mg/kg)	1.70	2.02
Copper (mg/kg)	28	37.7
Lead (mg/kg)	38.8	151
Manganese (mg/kg)	1673	1820
Zinc (mg/kg)	171	391

L-35-SW-001			
Date		12/8/1998	12/08/98 (dup)
Compound	LOC	Conc	Conc
Aluminum (ug/l)	190	3770 J	2150 J
Arsenic (ug/l)	1.38	5.82	3.58
bis(2-Ethylhexyl)phthalate (ug/l)	1.2	1.4 J	NE
Cadmium (ug/l)	.28	1.1 J	0.42 J
Cobalt (ug/l)	11	18.9 J	NE
Copper (ug/l)	9.4	30.4 J	12.6 J
Iron (ug/l)	1790	26900	20300
Lead (ug/l)	3.2	63.6	63.3
Manganese (ug/l)	383	1680 J	696 J
Phosphorus (ug/l)	50	224	240
Zinc (ug/l)	122	304 J	160 J

L-35-SD-001			
Depth (ft)		0 – 1	2
Compound	LOC	Conc	Conc
Chromium (mg/kg)	37.3	NE	270
Lead (mg/kg)	38.8	NE	140
Mercury (mg/kg)	0.249	ND	3.58
Zinc (mg/kg)	171	NE	371

L-35-SW-002			
Date		12/3/1998	5/7/1999
Compound	LOC	Conc	Conc
Aluminum (ug/l)	190	42800	NA
Arsenic (ug/l)	1.38	41.7	NA
Cadmium (ug/l)	.28	1.63	NA
Chromium (ug/l)	11.4	33.1	NA
Cobalt (ug/l)	11	21	NA
Copper (ug/l)	9.4	36.5 J	NA
Iron (ug/l)	1790	765000	NA
Lead (ug/l)	3.2	2840	NA
Manganese (ug/l)	383	8030	NA
Phosphorus (ug/l)	50	NA	200
Sulfide (ug/l)	2200	NA	3500
Zinc (ug/l)	122	354	NA

L-35-SD-002			
Depth (ft)		0 – 1	2 – 3
Compound	LOC	Conc	Conc
Aroclor 1254 (mg/kg)	0.060	23 D	NE
Arsenic (mg/kg)	16.0	31.7	NA
Cadmium (mg/kg)	1.70	2.76	NA
Chromium (mg/kg)	37.3	76.5	NA
Copper (mg/kg)	28	108	NA
Lead (mg/kg)	38.8	4410	NE
Mercury (mg/kg)	0.249	0.26	NA
Zinc (mg/kg)	171	479	NA

L-35-SS-060		
Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	7.7 D
Lead (mg/kg)	800	6440 D

L-35-SS-061		
Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	5.1 D
Lead (mg/kg)	800	5270 D

L-35-SD-005		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	38.8	1560

L-35-SS-009		
Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	143 D
Lead (mg/kg)	800	8820

L-35-SS-056		
Depth (ft)		0 – 1
Compound	LOC	Conc
Aroclor 1254 (mg/kg)	1	1.9 JD

L-35-SB-005			
Depth (ft)		0 – 1	2 – 3
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	5270 D	4710 D

L-35-SS-007			
Depth (ft)		0 – 1	0 – 1 (dup)
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	1670	2370

L-35-SD-004		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	38.8	59.1

L-35-SS-044			
Depth (ft)		0 – 1	2 – 3
Compound	LOC	Conc	Conc
Aroclor 1254 (mg/kg)	1	1.18	NA
Lead (mg/kg)	800	19500	NE

L-35-MW-002		
Date		3/17/1999
Compound	LOC	Conc
Aluminum (ug/l)	200	21600
Arsenic (ug/l)	3	7.79 J
Iron (ug/l)	300	23600
Lead (ug/l)	5	27
Manganese (ug/l)	50	180

LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- MONITORING WELL
- HYDROPUNCH
- ROADS
- WATER BODIES
- BUILDING
- FORMER BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

Date\Time : Fri, 30 Jul 2010 – 12:39pm
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User Name : AFOX

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0 40
SCALE IN FEET

PLOT SIZE: 22x34

REV. ISSUED DATE DESCRIPTION

KEYPLAN

SEAL

ARCADIS
1114 Benfield Blvd.
Suite A
Millersville, MD 21108
Tel: 410-987-4392 Fax: 410-987-0032
www.arcadis-us.com

PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER: T. LLEWELLYN
DEPARTMENT MANAGER: M. MOHIUDDIN
LEAD DESIGN PROF.: K. PANHORST
CHECKED BY: T. LLEWELLYN
SHEET TITLE: HISTORICAL DATA EXCEEDING LOCs AT RI SITE 35/PICA 021 NITROGLYCERINE PROCESSING AREA
TASK/PHASE NUMBER: EA001
DRAWN BY: A. FOX
PROJECT NUMBER: GP06PICA.P001
DRAWING NUMBER: 20

L-91-SW-002		
Date		12/07/98
Compound	LOC	Conc
Aluminum (ug/l)	190	1480
Arsenic (ug/l)	1.38	3.4
Cadmium (ug/l)	.28	0.38
Cobalt (ug/l)	11	27.5
Iron (ug/l)	1790	12100
Lead (ug/l)	3.2	15.2
Manganese (ug/l)	383	2210

L-91-SW-001		
Date		05/11/99
Compound	LOC	Conc
Phosphorus (ug/l)	50	60 J

L-91-SB-004		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2500

L-91-SS-016		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1410

L-91-SS-008		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	55.4
Lead (mg/kg)	800	2090 J

L-91-SS-011		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.26

L-91-SS-005		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	22.7

L-91-SB-008			
Depth (ft)		0 – 1	1 – 1.5
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	943 D	NE

L-91-SB-002			
Depth (ft)		0 – 1	1 – 2
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	895	NE

L-91-SS-014		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1430

L-91-SB-001			
Depth (ft)		1 – 2	2 – 3
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	2130 D	920

L-91-SS-002		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1520 J

L-91-SS-003		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	830 J

L-91-SS-026		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2200 JD

L-91-SUMPA-SWS-1		
Depth (ft)		3 – 4
Compound	LOC	Conc
Lead (mg/kg)	800	1280

L-91-SUMPA-B-1		
Depth (ft)		4 – 5
Compound	LOC	Conc
Lead (mg/kg)	800	1500

L-91-MW-002A		
Date		07/19/99
Compound	LOC	Conc
Aluminum (ug/l)	200	2100
Iron (ug/l)	300	2600

ROCKET PRODUCTION

DOUBLE BASE ROAD

UPPER DOUBLE BASE ROAD

1411 1408 1408B 1408C 1410 1307 1301 1308 1303 1302 1304 1305 1306

L-91-SW-002 L-91-SD-002 L-91-MW-004 L-91-SD-001 L-91-SW-001

L-91-SB-010A L-91-SB-009 L-91-SB-008 L-91-SB-007 L-91-SB-006 L-91-SB-012 L-91-SB-011 L-91-SB-018 L-91-SB-016 L-91-SB-015 L-91-SB-014 L-91-SB-013 L-91-SB-021 L-91-SB-022 L-91-SB-026 L-91-SB-025 L-91-SB-029 L-91-SB-028 L-91-SB-012 L-91-SB-033 L-91-SB-032

L-91-SS-005 L-91-SS-014 L-91-SS-001 L-91-SS-002 L-91-SS-015 L-91-SS-004 L-91-SS-003 L-91-SS-007 L-91-SS-006 L-91-SS-017 L-91-SS-004 L-91-SS-016 L-91-SS-008 L-91-SS-009 L-91-SS-010 L-91-SS-011 L-91-SS-013

L-91-TP-SWW-1 91TP-SWW-1A L-91-TP-SWW-1 91TP-SWW-2A 91TP-SWW-1B L-91-TP-SWW-2 L-91-TP-SWW-3A 91TP-B-2X L-91-TP-B-2 L-91-SS-028 L-91-SS-023 L-91-SS-027 L-91-SS-022 L-91-SS-024 L-91-SS-025 L-91-MW-002 91SUMPA-SWN-1D 91SUMPA-SWS-1D L-91-SUMPA-B-1 91SUMPA-SWN-3D 91SUMPA-SWW-1D CATCH TANK B CATCH TANK E L-91-CS-001 CATCH TANK D CATCH TANK F L-91-SS-019 L-91-SS-002 L-91-SS-018 L-91-SS-022A L-91-SS-014A L-91-MW-001 L-91-SS-015A L-91-CS-003 CATCH TANK C L-91-MW-003 L-91-SS-003A CATCH TANK M CATCH TANK X L-91-SS-013A L-91-SS-004A L-91-SS-021 L-91-SS-012A L-91-SS-020 L-91-CS-005 L-91-SS-011A L-91-SS-005A L-91-MW-002A CATCH TANK G L-91-SS-010A L-91-SS-006A CATCH TANK H L-91-SS-016A L-91-SS-009A L-91-SS-007A L-91-SS-030A L-91-SS-008A L-91-SS-031A L-91-SS-017A CATCH TANK N L-91-SS-029A L-91-SS-028A L-91-SS-018A L-91-SS-027A L-91-SS-019A L-91-SS-026A L-91-SS-020A L-91-SS-021A L-91-SS-025A L-91-SS-022A L-91-SS-024A L-91-SS-023A CATCH TANK J CATCH TANK K CATCH TANK L L-91-SS-001

91SUMP"Y"-SWN-1D
91SUMP"Y"-SWW-1D 91SUMP"Y"-SWE-1D
91SUMP"Y"-B-1E
91SUMP"Y"-SWS-1D
TYPICAL SAMPLE LOCATIONS FOR TANK AND CATCH BASINS B, C, D, E, F, G, H, I, J, K, L, M, AND X

SITE 91

N

LEGEND
- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- MONITORING WELL
- TEST PIT
- POST-EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

Acad Version : R18.0s (LMS Tech)
User Name : AFOX

Date\Time : Wed, 28 Jul 2010 – 2:19pm
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\SITE 91\DWG\SITE-91.dwg – Layout Tab : LAYOUT1

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0 100 SCALE IN FEET

PLOT SIZE: 22x34

REV. ISSUED DATE DESCRIPTION

KEYPLAN

SEAL

ARCADIS
1114 Benfield Blvd.
Suite A
Millersville, MD 21108
Tel: 410-987-4392 Fax: 410-987-0032
www.arcadis-us.com

PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 91/PICA 163 ROCKET MOTOR ASSEMBLY PLANT

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	21

L-161-GR-B-15-4A		
Depth (ft)		0 - 1
Compound	LOC	Conc
Lead (mg/kg)	800	981 D

L-161-EX1-SW-4A		
Depth (ft)		2.5 - 2.5
Compound	LOC	Conc
Lead (mg/kg)	800	1610 D

L-161-EX1-SW-1A		
Depth (ft)		2 - 2
Compound	LOC	Conc
Lead (mg/kg)	800	1460

L-161-EX1-SW-6A		
Depth (ft)		1.5 - 1.5
Compound	LOC	Conc
Lead (mg/kg)	800	817

L-161-EX1-B-7A			
Depth (ft)		3 - 3	3 - 3 (dup)
Compound	LOC	Conc	Conc
Lead (mg/kg)	800	927	NE

L-161-SW-001		
Date		12/02/98
Compound	LOC	Conc
Trichloroethene (ug/l)	1	1.6 J

L-161-SW-002		
Date		12/02/98
Compound	LOC	Conc
Trichloroethene (ug/l)	1	1.5 J

L-161-SW-003		
Date		12/01/98
Compound	LOC	Conc
Copper (ug/l)	9.4	12.8 J
Trichloroethene (ug/l)	1	1.4 J

L-161-SD-003		
Depth (ft)		0 - 1
Compound	LOC	Conc
Copper (mg/kg)	28	32.64
Lead (mg/kg)	38.8	270.72
Manganese (mg/kg)	1673	1852.33
Zinc (mg/kg)	171	449.48

L-161-MW-002						
Date		03/19/99	02/18/02	11/06/03	02/06/08	09/29/08
Compound	LOC	Conc	Conc	Conc	Conc	Conc
Trichloroethene (ug/l)	1	14	41 D	21	9.82	22.4

L-161-SW-007		
Date		11/14/03
Compound	LOC	Conc
Trichloroethene (ug/l)	1	5.6

L-161-SW-008		
Date		11/14/03
Compound	LOC	Conc
Trichloroethene (ug/l)	1	1.7

L-161-MW-001C			
Date		06/14/04	12/06/07
Compound	LOC	Conc	Conc
Trichloroethene (ug/l)	1	45 D	38.9

L-161-SW-009		
Date		11/14/03
Compound	LOC	Conc
Trichloroethene (ug/l)	1	2.1

LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- MONITORING WELL
- POST-EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

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SCALE IN FEET (0, 80)

PLOT SIZE: 22x34

REV. ISSUED DATE DESCRIPTION

KEYPLAN

SEAL

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PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 161/PICA 172 NITRATION BUILDING

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX

PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	22

Acad Version : R18.0s (LMS tech)
User Name : AFOX

Date\Time : Wed, 28 Jul 2010 - 2:49pm
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\SITE 161\DWG\SITE-161.dwg - Layout Tab : LAYOUT1

L-162-SS-012		
Depth (ft)		0 - 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	22.7

L-162-SS-010A		
Depth (ft)		1 - 2
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.29 J

L-162-SS-008		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.27 J

L-162-SS-001		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.3 J

L-1070-SS-C		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.31 J

L-1070-SS-B		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.52

L-162-SS-006		
Depth (ft)		0 - 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.39

L-162-MW-001				
Date		11/11/03	06/08/04	09/29/08
Compound	LOC	Conc	Conc	Conc
2,4,6-Trinitrotoluene (ug/l)	2	NE	24 D	NA
Iron (ug/l)	300	3300	NA	NA
Trichloroethene (ug/l)	1	3.1	ND	ND

L-162-SB-008			
Depth (ft)		2.3 - 2.8	2.3 - 2.8 (dup)
Compound	LOC	Conc	Conc
RDX (mg/kg)	26	830 D	670 D

L-162-GR-F4		
Depth (ft)		0 - 1
Compound	LOC	Conc
RDX (mg/kg)	26	4800 JD

L-162-GR-E1		
Depth (ft)		0 - 1
Compound	LOC	Conc
RDX (mg/kg)	26	1300 JD

L-162-SB-007		
Depth (ft)		7 - 7.5
Compound	LOC	Conc
RDX (mg/kg)	26	210 D

L-162-SS-016		
Depth (ft)		0 - 1
Compound	LOC	Conc
Chromium (mg/kg)	200	251

LEGEND

- SURFACE SOIL
- POST-EXCAVATION SOIL SAMPLE
- SOIL BORING
- MONITORING WELL
- ROADS
- WATER BODIES
- BUILDING
- FORMER BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

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0 120
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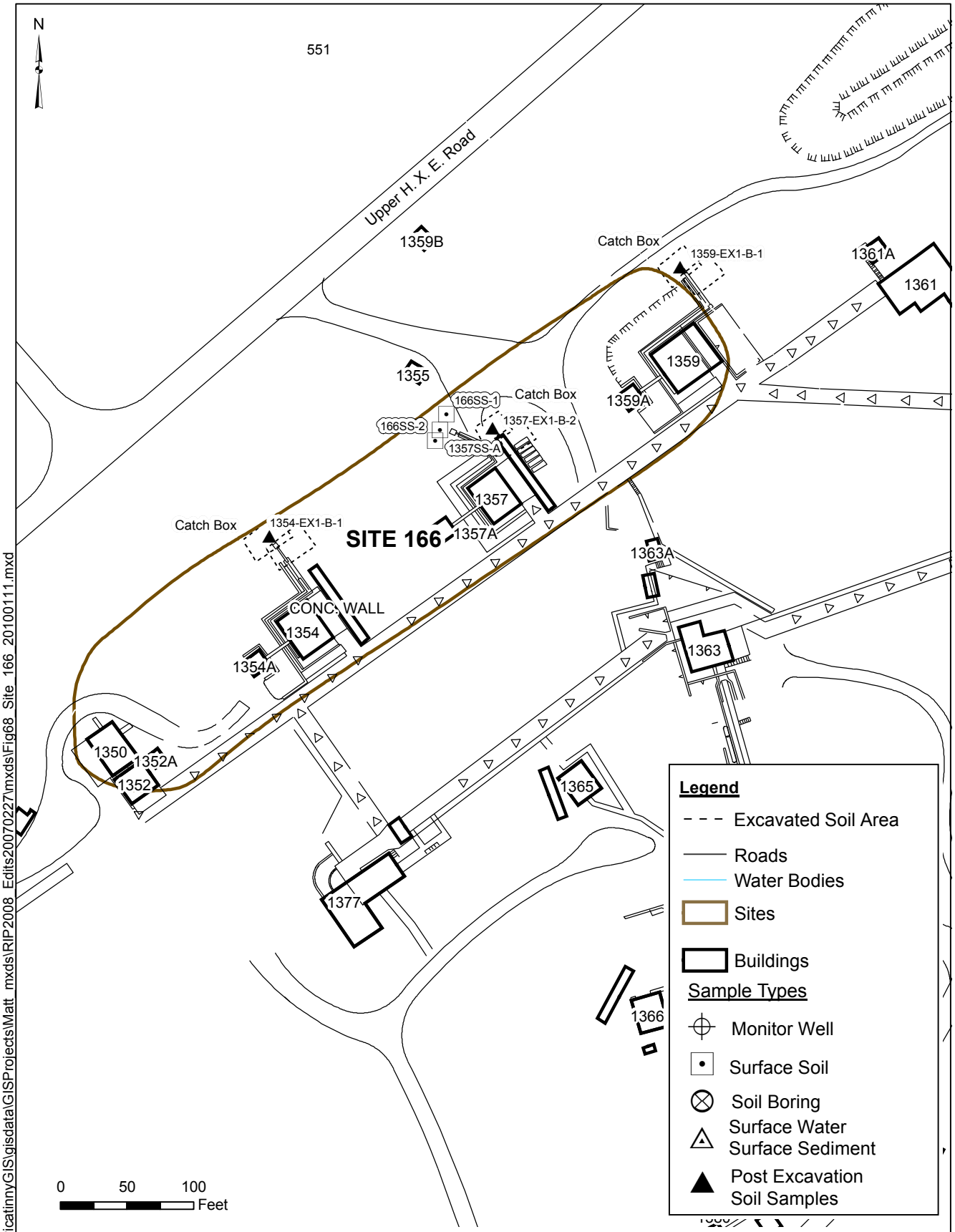
PROJECT TITLE
PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 162/PICA 173 BUILDINGS 1070, 1071, & 1071C

TASK/PHASE NUMBER	DRAWN BY
EA001	A. SANTINI
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	23



G:\GIS\Projects\PicatinnyGIS\gisdata\GISProjectsMatt_mxds\RIP2008_Edits20070227\mxds\Fig68_Site_166_20100111.mxd

ARCADIS
ARCADIS - Edison, NJ
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Edison, NJ 08817
Phone: (732) 225-5061
Fax: (732) 225-5067

HISTORICAL DATA EXCEEDING LOCs AT
RI SITE 166 \ PICA 174
STORAGE MAGAZINES
PICATINNY ARSENAL, NEW JERSEY

PROJECT MANAGER T. LLEWELLYN	DEPARTMENT MANAGER M. MOHIUDDIN
DRAWN M.GRESS	CHECKED K. TIPTON
PROJECT NUMBER GP06PICA.P001.NJ001	DRAWING NUMBER 24

L-1403-EX2-SWN-1		
Depth (ft)		3 – 3
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.29 J

L-168-SD-002		
Depth (ft)		0 – 1
Compound	LOC	Conc
Acenaphthene (mg/kg)	0.00671	1.18 JD
Anthracene (mg/kg)	0.03162	1.99 JD
Benz(a)anthracene (mg/kg)	0.0317	2.8 JD
Benzo(a)pyrene (mg/kg)	0.0319	2.43 JD
Benzo(b)fluoranthene (mg/kg)	0.0272	2.49 JD
Benzo(g,h,i)perylene (mg/kg)	0.29	0.92 JD
Benzo(k)fluoranthene (mg/kg)	0.0272	2.24 JD
Chrysene (mg/kg)	0.0571	2.74 JD
Copper (mg/kg)	28	29.1
Fluoranthene (mg/kg)	0.06423	6.84 JD
Fluorene (mg/kg)	0.0212	1.31 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	0.078	1.06 JD
Lead (mg/kg)	38.8	141 J
Phenanthrene (mg/kg)	0.0419	7.46 JD
Pyrene (mg/kg)	0.0530	4.79 JD

L-168-SW-001		
Date		05/11/99
Compound	LOC	Conc
Aluminum (ug/l)	190	4000
Arsenic (ug/l)	1.38	9.5 J
Chromium (ug/l)	10	16
Copper (ug/l)	9.4	170
Iron (ug/l)	1790	7100
Lead (ug/l)	3.2	65
Manganese (ug/l)	383	590
Mercury (ug/l)	0.05	0.41
Zinc (ug/l)	122	1200

L-168-SD-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
Acenaphthene (mg/kg)	0.00671	0.33 JD
Acenaphthylene (mg/kg)	0.00587	0.2 JD
Anthracene (mg/kg)	0.03162	0.99 JD
Benz(a)anthracene (mg/kg)	0.0317	3.07 JD
Benzo(a)pyrene (mg/kg)	0.0319	3.07 JD
Benzo(b)fluoranthene (mg/kg)	0.0272	2.83 JD
Benzo(g,h,i)perylene (mg/kg)	0.29	1.63 JD
Benzo(k)fluoranthene (mg/kg)	0.0272	2.83 JD
Chrysene (mg/kg)	0.0571	3.07 JD
Dibenz(a,h)anthracene (mg/kg)	0.00622	0.63 JD
Fluoranthene (mg/kg)	0.06423	6.13 JD
Fluorene (mg/kg)	0.0212	0.35 JD
Indeno(1,2,3-c,d)pyrene (mg/kg)	0.078	1.58 JD
Naphthalene (mg/kg)	0.03275	0.09 JD
Phenanthrene (mg/kg)	0.0419	3.54 JD
Pyrene (mg/kg)	0.0530	5.42 JD

L-168-SS-032		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.38 J

L-168-SS-016		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benz(a)anthracene (mg/kg)	2	3.81 D
Benzo(a)pyrene (mg/kg)	0.2	3.81 D
Benzo(b)fluoranthene (mg/kg)	2	5.33 D
Dibenz(a,h)anthracene (mg/kg)	0.2	0.5 D
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	2.08 D

L-168-SS-034		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.25 J

L-168-SS-026		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	26.6

L-168-SS-028		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	20.5

L-168-SS-013		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	253

L-168-SS-030		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	24.5 J

L-168-SS-039		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	3900 JD

L-168-SS-025		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1350 JD

L-168-SS-024		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1210 JD

L-168-SS-005		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	1040 J

L-168-SS-006		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	60.6
Lead (mg/kg)	800	1470 J
Manganese (mg/kg)	5900	24400 D

L-168-SS-004		
Depth (ft)		0 – 1
Compound	LOC	Conc
2,4-Dinitrotoluene (mg/kg)	4.2	21.5

L-1403-EX3-SWN-1		
Depth (ft)		1 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.35 J

L-168-SS-015			
Depth (ft)		0 – 1	0 – 1 (dup)
Compound	LOC	Conc	Conc
Benz(a)anthracene (mg/kg)	2	4.88 JD	NE
Benzo(a)pyrene (mg/kg)	0.2	4.88 JD	1.06 J
Benzo(b)fluoranthene (mg/kg)	2	7.08 JD	NE
Dibenz(a,h)anthracene (mg/kg)	0.2	0.61 JD	NE
Indeno(1,2,3-c,d)pyrene (mg/kg)	2	2.69 JD	NE

L-168-SS-011		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	19	20.4

N. CAST PROPELLANT ROAD

FARLEY AVENUE

ROCKET PRODUCTION

SITE 168

1400 1401 1402 1402A 1403 1409

L-168-SB-001

168MW-3

L-168-SS-046

L-168-SS-045

L-168-SS-044

L-168-SS-043

LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- MONITORING WELL
- POST-EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

0 100 SCALE IN FEET

PLOT SIZE: 17x22

REV. ISSUED DATE DESCRIPTION

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PROJECT TITLE

PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	T. LLEWELLYN

SHEET TITLE

HISTORICAL DATA
EXCEEDING LOCs AT
RI SITE 168/PICA 168
BUILDINGS 1400 AND 1403

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	25

Acad Version : R18.0s (LMS Tech)
User Name : AFOX
Date\Time : Fri, 30 Jul 2010 – 1:13pm
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\site 168\dwg\SITE-168.dwg – Layout Tab : LAYOUT1

L-169-SD-003		
Depth (ft)		0 – 1
Compound	LOC	Conc
Cadmium (mg/kg)	1.70	2.8 J
Copper (mg/kg)	28	31 J
Lead (mg/kg)	38.8	65.4 J
Manganese (mg/kg)	1673	5110 J
Mercury (mg/kg)	0.249	0.69 J
Zinc (mg/kg)	171	269 J

L-169-SS-012		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.27 JD

L-169-MW-001			
Date		1/4/2001	2/10/2005
Compound	LOC	Conc	Conc
Aluminum (ug/l)	200	1900	NA
Iron (ug/l)	300	2400	NA
RDX (ug/l)	2	NE	2.7

L-169-SS-013		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	0.25 JD

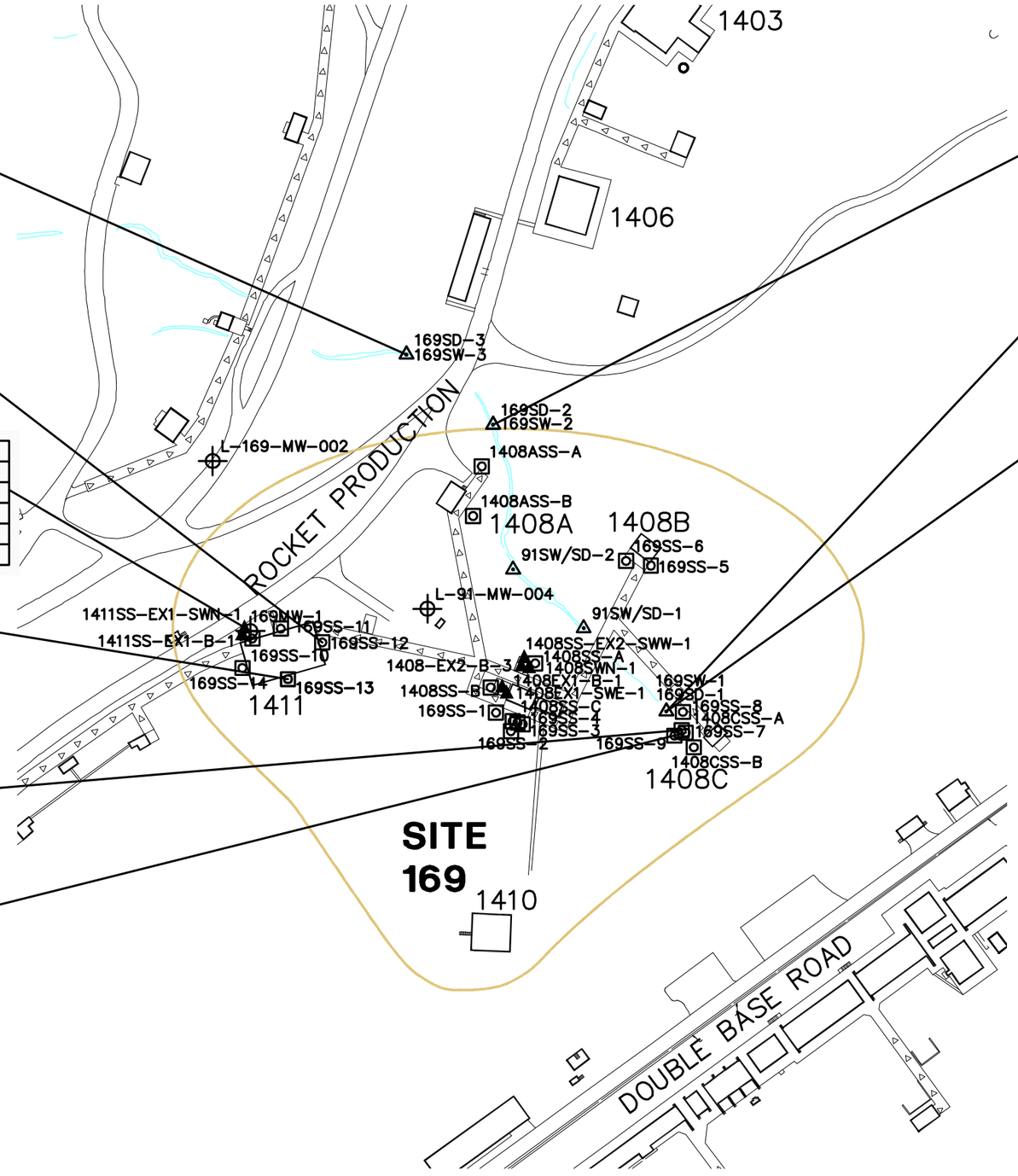
L-1408C-SS-A		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2450

L-169-SS-007		
Depth (ft)		1 – 2
Compound	LOC	Conc
Lead (mg/kg)	800	904

L-169-SW-002		
Date		10/11/2000
Compound	LOC	Conc
Aluminum (ug/l)	190	1800
Cadmium (ug/l)	0.28	0.36 J
Iron (ug/l)	1790	2900
Lead (ug/l)	3.2	8.1
Zinc (ug/l)	122	160

L-169-SD-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
Arsenic (mg/kg)	16.0	27 D
Chromium (mg/kg)	37.3	46.4 D
Copper (mg/kg)	28	387 J
Nickel (mg/kg)	39.6	149

L-169-SW-001		
Date		10/11/2000
Compound	LOC	Conc
Iron (ug/l)	1790	1800
Lead (ug/l)	3.2	10



LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- MONITORING WELL
- POST-EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
- ND — NOT DETECTED
- NE — NO EXCEEDENCE

Date/Time : Mon, 20 Jul 2010 - 3:47pm
Path\Name : G:\ENVCAD\BRIGHTON\ACT\PICATINNY\Pica 001\SITE 169\DWG\SITE-169.dwg - Layout Tab : DWG #
User Name : AFOX
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PLOT SCALE 11x17

REV. ISSUED DATE DESCRIPTION

KEYPLAN

ARCADIS
1114 Benfield Blvd. Suite A
Millersville, MD 21108
Tel: 410-987-4392 Fax: 410-987-0032
www.arcadis-us.com

PROJECT TITLE

PICATINNY ARSENAL
NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	K. TIPTON

SHEET TITLE
HISTORICAL DATA EXCEEDING LOCs AT RI SITE 169/PICA 169 PROPELLANT PLANTS

TASK/PHASE NUMBER	DRAWN BY
EA001	A. FOX
PROJECT NUMBER	DRAWING NUMBER
GP06PICA.P001	26

L-171-MW-001		
Date		01/04/01
Compound	LOC	Conc
Aluminum (ug/l)	200	210
Iron (ug/l)	300	420

L-171-SS-001		
Depth (ft)		0 – 1
Compound	LOC	Conc
Benzo(a)pyrene (mg/kg)	0.2	1.7
Benzo(b)fluoranthene (mg/kg)	2	2.4
Dibenz(a,h)anthracene (mg/kg)	0.2	0.24 J

L-171-SS-004		
Depth (ft)		0 – 1
Compound	LOC	Conc
Lead (mg/kg)	800	2470 D

L-171-SS-006		
Depth (ft)		0 – 1
Compound	LOC	Conc
Cadmium (mg/kg)	78	162 D
Lead (mg/kg)	800	3950 D
Zinc (mg/kg)	110000	134000 D

L-171-MW-002				
Date		01/04/01	11/14/03	09/30/08
Compound	LOC	Conc	Conc	Conc
Aluminum (ug/l)	200	370	NA	NA
Iron (ug/l)	300	730	NA	NA
Manganese (ug/l)	50	59	NA	NA
Trichloroethene (ug/l)	1	12	22	77.4

L-171-SW-002		
Date		05/05/04
Compound	LOC	Conc
Trichloroethene (ug/l)	1	1.7

L-171-SW-003		
Date		05/05/04
Compound	LOC	Conc
Trichloroethene (ug/l)	1	6

L-171-SS-008			
Depth (ft)		0 – 1	0 – 1 (dup)
Compound	LOC	Conc	Conc
Aroclor 1242 (mg/kg)	1	2.5 D /ND	ND

SITE 171

EAST TOWER ROAD

SOUTH WOODS ROAD

FORMER RAILROAD TRACK BED

BELT ROAD

13th STREET

N.G. ROAD

3106 3109 3116 3144 3145 1311

L-171-MW-001 L-171-MW-002 L-171-MW-003 L-171-MW-004

L-171-SS-001 L-171-SS-002 L-171-SS-003 L-171-SS-004 L-171-SS-005 L-171-SS-006 L-171-SS-007 L-171-SS-008 L-171-SS-009 L-171-SS-010A L-171-SS-011 L-171-SS-012 L-171-SS-013 L-171-SS-014 L-171-SS-015 L-171-SS-016 L-171-SS-017 L-171-SS-018 L-171-SS-019 L-171-SS-020 L-171-SS-021

L-171-SB-002 L-171-SB-003 L-171-SB-004 L-171-SB-006

L-171-SW-001 L-171-SW-002 L-171-SW-003

L-171-EX1-B1 L-171-EX1-SWNE-1 L-171-EX1-SWNE-2 L-171-EX1-SWNW-1 L-171-EX1-SWSE-1 L-171-EX1-SWSW-1 L-171-EX1-SWSW-2

L-3106-SS-B L-3109-SS-B L-3109-SS-C L-171-SB-001

N

LEGEND

- SURFACE SOIL
- SURFACE WATER AND/OR SEDIMENT
- SOIL BORING
- MONITORING WELL
- POST–EXCAVATION SOIL SAMPLE
- ROADS
- WATER BODIES
- BUILDING
- APPROXIMATE SITE LOCATION
- REMOVAL AREA OF LEAD–CONTAMINATED SOIL
- D — ALL COMPOUNDS IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR
- J — ESTIMATED VALUE
- NA — NOT ANALYZED
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PLOT SCALE 11x17

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NEW JERSEY

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
T. LLEWELLYN	M. MOHIUDDIN	K. PANHORST	K. TIPTON
SHEET TITLE: HISTORICAL DATA EXCEEDING LOCs AT RI SITE 171/PICA 171 ORDNANCE FACILITIES		TASK/PHASE NUMBER: EA001	DRAWN BY: A. FOX
		PROJECT NUMBER: GP06PICA.P001	DRAWING NUMBER: 27

Date/Time : 11/30/2010 - 1:44pm
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User Name : AFOX

Appendix A

Certificate of Publication for Public Notices

PUBLIC NOTICE

U.S. ARMY INVITES PUBLIC COMMENT ON PROPOSED PLAN FOR NO FURTHER ACTION WITH MONITORING OF LAND USE AT 26 PICATINNY SITES

PROPOSED PLAN FOR 26 SITES AT PICATINNY ARSENAL

The US Army at Picatinny Arsenal invites public comment on a Proposed Plan for 26 Sites consisting of former industrial buildings, offices, or disposal areas. Picatinny's Master Plan designates future use of these areas as military and industrial within a secured area. There are no plans to change this land use in the foreseeable future. Low concentration levels of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), explosives, and metals have been identified in soils and other media at these sites due to historical operations. However, no unacceptable human health or ecological risks have been identified for the current and reasonably anticipated future use of these sites (military/industrial). Therefore, no adverse impacts are expected for site users or other personnel.

Because there are no unacceptable impacts from historical operations for industrial use at these sites, the Army has issued a Proposed Plan for No Further Action with Monitoring of Land Use. The U.S. Environmental Protection Agency has technically approved the draft of the Proposed Plan. The New Jersey Department of Environmental Protection has provided input into its development. Monitoring of land use will be required to ensure the sites continue to be used as military/industrial areas.

Public Meeting

The Army invites the public to attend a meeting on **Thursday, March 7, 2013, 6:30 p.m.**, Hilton Garden Inn (near the Rockaway Townsquare Mall), 375 Mt. Hope Avenue, Rockaway, NJ, 07866. The meeting location is wheelchair accessible.

Written Comments

Copies of the Remedial Investigation (RI) Reports and the Feasibility Study (FS) for these 26 sites are available for public review at the Environmental Affairs Directorate at Picatinny by contacting Mr. Ted Gabel at (973) 724-8748 or ted.b.gabel.civ@mail.mil in advance. A copy of the Proposed Plan and the PDF version of the RI and FS for these sites will be available for review at the Rockaway Township Library (61 Mount Hope Road) and Morris County Library (30 East Hanover Avenue, Whippany). In addition, the PDF of the document can be found on the following webpage: http://picac2w4.pica.army.mil/ead/.

The public may submit written comments during the 30-day comment period (March 7 to April 6, 2013). Comments must be postmarked by April 6, 2013 and sent to Mr. Ted Gabel, U.S. Army Garrison, Picatinny Arsenal, IMPI-PWE, Building 319, Picatinny Arsenal, NJ, 07806-5000 or by email to ted.b.gabel.civ@mail.mil .

STATE OF NEW JERSEY
COUNTY OF ESSEX } SS

DARRELL MORALES

Being duly sworn, according to law, on his/her oath sayeth that he/she is CLERK of the Star-Ledger, in said County of Essex, and that the notice, of which the attached is a copy, was published in said paper on the 22nd day of February and continued therein for ____ successively, at least once in each ____ for One Day

Sworn to and subscribed
before me this 25th
day of February, 20 13

NOTARY PUBLIC of NEW JERSEY

MEDINAH Y. JONES
Notary Public, State of New Jersey
My Commission Expires
January 18, 2018

Affidavit of Publication

Publisher's Fee $50.44 Affidavit $35.00

State of New Jersey } SS.

Morris County

Personally appeared Daryl Wesson

Of the **Daily Record**, a newspaper printed in Secaucus, New Jersey and published in Parsippany, in said County and State, and of general circulation in said county, who being duly sworn, deposeth and saith that the advertisement of which the annexed is a true copy, has been published in the said newspaper 1 times, once in each issue as follows:

2/22/13

Kathleen A. Gibson
Notary Public State of New Jersey
My Commission Expires Dec. 18, 2014

A.D. 2013

Sworn and subscribed before me, this
22 day of **February, 2013**

Kathleen A Gibson
Notary Public of New Jersey

UNITED STATES

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($50.44) 697732