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FINAL ENVIRONMENTAL INVESTIGATION REPORT FOR THE BUILDING 181 AREA NSA  
CRANE IN  
2/1/2013  
TETRA TECH

# **Environmental Investigation Report for the Building 181 Area**

**Naval Support Activity Crane  
Crane, Indiana**



**Naval Facilities Engineering Command  
Midwest**

**Contract Number N62470-08-D-1001**

**Contract Task Order F276**

**February 2013**

REVISION 0  
FEBRUARY 2013

**ENVIRONMENTAL INVESTIGATION REPORT  
FOR  
BUILDING 181 AREA**

**NAVAL SUPPORT ACTIVITY, CRANE  
CRANE, INDIANA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:  
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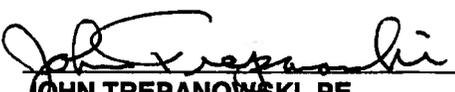
**CONTRACT NUMBER N62470-08-D-1001  
CONTRACT TASK ORDER F276**

**FEBRUARY 2013**

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## ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
CAAA	Crane Ammunition Army Activity
CAS	Chemical Abstract Service
CLEAN	Comprehensive Long-Term Environmental Action Navy
COPC	Contaminants of Potential Concern
CTO	Contract Task Order
DPT	Direct-Push Technology
Eco PSL	Ecological Project Screening Level
Empirical	Empirical Laboratories, LLC
ILCR	Incremental Lifetime Cancer Risk
GPS	Global Positioning System
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MW	Midwest
NA	Not Applicable
NAVFAC	Naval Facilities Engineering Command
Navy	U. S. Department of the Navy
NSA	Naval Support Activity
PEC	Probable Effects Concentration
PPE	Personal Protective Equipment
PQLG	Project Quantitation Limit Goal
PSL	Project Screening Level
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
TEC	Threshold Effects Concentration
TNT	2,4,6-Trinitrotoluene
U.S.	United States
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UTL	Upper Tolerance Limit
WWII	World War II

## **EXECUTIVE SUMMARY**

This Environmental Investigation Report presents the results of the environmental sampling of surface and subsurface soils, drainageway sediment, structure water and structure sediment associated with the Building 181 Area. This environmental investigation of the Building 181 Area at the Naval Support Activity (NSA) Crane facility, located in Crane, Indiana, was performed through the United States Naval Facilities Engineering Command Midwest (NAVFAC MW) under Contract Task Order (CTO) F276, for the Comprehensive Long-Term Environmental Action Navy (CLEAN), Contract Number N62470-08-D-1001.

### **PURPOSE OF REPORT**

The primary purpose of the environmental investigation was to determine the presence or absence of potential contaminants associated with industrial activities and operations performed within the Building 181 Area; and if present, determine the nature and extent of contamination and potential impacts to human health and ecological receptors. The report summarizes field activities conducted in 2012. All work performed for this field investigation was conducted in accordance with the procedures and methodologies described in the Navy-approved SAP (Tetra Tech, 2012).

### **SITE DESCRIPTION**

The Building 181 Area is located slightly more than 1 mile from the southern boundary of NSA Crane (Figure 1-1). The location of former Building 181 (which was demolished in 2005), the surrounding area of approximately 2.3 acres, and the associated structures constitute the Building 181 Area site (see Figure 1-2).

Detailed information regarding the Building 181 history is not available. Building 181 was designed and constructed during World War II (WWII) as a chemical decontamination building. During WWII, NSA Crane was designated a storage facility for Navy chemical weapons. At that time, the chemical weapons in use were aerial bombs containing mustard gas. The Building 181 structure had several small rooms for work with weapon items and also had support rooms for showers, etc. It remained dormant after the end of WWII when the mustard gas bombs were removed from Crane storage.

During the Vietnam conflict, a saw was installed in Building 181 which was operated from a remote control room located in Magazine 1441 down the road. After the bomb-sawing effort, the Building 181 facility again remained dormant; it deteriorated until the early 1980s, when the Navy acquired the facility from the Crane Ammunition Army Activity (CAAA). The Navy completely rebuilt the facility and redesigned

it for abusive testing of lithium batteries. After a Lithium Battery Test Facility was later built in the Industrial Area of the base, and the use of lithium batteries became a well-understood technology, the Building 181 Area was no longer needed. It was demolished as a part of the military footprint reduction effort in 2005. Some of the test facilities (i.e., gun tubs) still remain on the site. In addition, there is an unsubstantiated report of a large cloud (presumably containing uncombusted thionyl chloride) which was released during a battery explosion at Building 181 at an unknown date.

## **FIELD AND ANALYTICAL PROGRAM**

The primary constituents of concern (COPCs) for surface and subsurface soil, drainageway sediment, structure water and structure sediment associated with the Building 181 Area are explosives and metals.

A total of 27 surface soil, 10 subsurface soil, three drainageway sediment, three structure water, and two structure sediment samples were collected.

## **CONCLUSIONS**

The degree and extent of contamination at the Building 181 Area is very limited and reasonably well bounded. The primary COPCs are the metals lithium, nickel, and zinc in the onsite surface soil, and zinc in the drainageway sediments.

Nickel, zinc and lithium exceeded screening criteria in a few surface soil samples. These exceedances are very limited and represent a small percentage of the total number of surface soil samples collected. Therefore, these metal exceedances are considered inconsequential, and no further action (NFA) is recommended for site surface soil.

No concentrations of explosive or metals detected in the subsurface soil samples exceeded the screening criteria; therefore, NFA is recommended for site subsurface soil.

Nickel and zinc concentrations exceeded only the ecological screening criteria, and background surface soil levels, in the drainageway sediment samples. Since the drainageway is primarily dry most of the year, it is unlikely a benthic community exists in the drainageway to be impacted. Therefore, these metal exceedances are considered inconsequential, and NFA is recommended for site sediment.

The water and sediment in the subsurface structures are contained within the structures; therefore, under normal circumstances are not considered a potential source of contamination for human or ecological risk

assessment purposes. It is recommended that analytical toxicity leachability testing be conducted for the structure sediment to determine proper disposal requirements prior to any removal activities.

The three site subsurface structures (i.e., cistern, settling basin and UST) present potential future waste accumulation points; therefore, removal of these structures and backfilling is recommended.

## **1.0 INTRODUCTION**

This environmental investigation of the Building 181 Area at the Naval Support Activity (NSA) Crane facility, located in Crane, Indiana, was performed through the United States Naval Facilities Engineering Command Midwest (NAVFAC MW) under Contract Task Order (CTO) F276, for the Comprehensive Long-Term Environmental Action Navy (CLEAN), Contract Number N62470-08-D-1001.

The Building 181 Area is located slightly more than 1 mile from the southern boundary of NSA Crane (Figure 1-1). The location of former Building 181 (which was demolished in 2005), the surrounding area of approximately 2.3 acres, and the associated structures constitute the Building 181 Area site (see Figure 1-2).

No previous environmental investigations have been conducted for the Building 181 Area.

### **1.1 PURPOSE OF THIS REPORT**

The purpose of this report is to present and interpret the results of the environmental investigation associated with the Building 181 Area. The data have been screened against sitewide background soil data, and human health and ecological risk criteria.

This investigation provides data on select organic and inorganic chemical concentrations in surface and subsurface soils, drainageway sediment, structure water and structure sediment associated with the Building 181 Area. The investigation was conducted in accordance with the Sampling and Analysis Plan (SAP) for the Building 181 Area (Tetra Tech, 2012), which was approved by the Navy.

### **1.2 BACKGROUND**

Very little is known about this site in terms of operational history. The following information was provided in the September 4, 2008 Ordnance Briefing Program for Explosives Safety Personnel Session Memo (NSA Crane, 2008).

Building 181 was designed and constructed during World War II (WWII) as a chemical decontamination building. During WWII, NSA Crane was designated a storage facility for Navy chemical weapons. At that time, the chemical weapons in use were aerial bombs containing mustard gas. The Building 181 structure had many small rooms for work with weapon items and also had support rooms for

showers, etc. It remained dormant after the end of WWII when the mustard gas bombs were removed from Crane storage.

During the Vietnam conflict, a saw was installed in Building 181 which was operated from a remote control room located in Magazine 1441 down the road. In response to two train derailments in which bombs exploded, the saw was used to open completed bombs to determine the extent of cavitation within the explosive. It was theorized by experts, that 2,4,6-trinitrotoluene (TNT) crystals within such cavities were super-sensitive to the shock of transportation, thus generating a hazard that resulted in the explosions. Many bombs were sawed open in Building 181, but none indicated that a special hazard existed in the bomb cavities.

After the bomb-sawing effort, the Building 181 facility again remained dormant; it deteriorated until the early 1980s, when the Navy acquired the facility from the Crane Ammunition Army Activity (CAAA), which had received it as a part of the license for the transfer of buildings from Crane Ordnance. The Navy completely rebuilt the facility and redesigned it for abusive testing of lithium batteries. After a Lithium Battery Test Facility was later built in the Industrial Area of the base, and the use of lithium batteries became a well-understood technology, the Building 181 Area was no longer needed. It was demolished as a part of the military footprint reduction effort in 2005. Some of the test facilities (i.e., gun tubs) still remain on the site.

The text below describes information obtained in May 2011 by Tetra Tech from the NSA Crane Environmental Manager (Mr. Tom Brent) about site features, and from available photographs and diagrams.

It is believed that wash water used to wash explosives from the insides of bombs in the former Building 181 was directed through a drain to an external location. There is no indication that organic solvents or surfactants were used in this process, and the position of the external drain location is unknown. An underground storage tank (UST) currently located near the former Building 181 may have been the receiver of the wash water containing explosives, and possibly other contaminants such as metals (see Figure 1-2). This UST is open to the air via a 6-inch metal stand pipe (Figure 1-2). The volume of the UST was unknown at the time of SAP development, but was later investigated and is discussed in Section 2.3.

On the northern edge of this site is a drop tower. The tower consists of four wooden poles approximately 40 feet high. Three sides of the structure are covered with steel plates roughly 7 feet high. This drop tower was used for abusive testing of lithium batteries and drop testing of explosives. Abusive battery

testing required dropping the batteries from various heights to determine the degree of damage associated with that kind of physical abuse. West of the drop tower is a concrete pad where iron surface warfare ship gun tubs were placed and used for testing lithium batteries. In addition, a gun tub is located south of the concrete pad. The exact type of testing conducted is unknown.



A settling basin is located in the northern portion of the Site (see Figure 1-2). The concrete structure is approximately 5 feet by 4 feet and is 2 feet deep. Approximately 4 inches of water and 1 inch of sediment were observed in the basin during a Site walk conducted by Tetra Tech on November 21, 2011.

A square concrete cistern-like structure with dimensions of approximately 2 feet by 2 feet and 9.4 feet deep is located in the western portion of the Site (see Figure 1-2). Several inches of water and an unknown amount of sediment were observed in the cistern during a Site walk conducted by Tetra Tech on November 21, 2011. The purpose of this structure is unknown.

**View of Lithium Battery Drop Tower Facing Northeast**

Potentially site-related contaminants are contaminants commonly associated with bomb demilitarization and lithium battery drop testing such as metals (including lithium) and explosives.



**View of Cistern**



**View of Setting Basin Facing North**

Once released, most potentially site-related contaminants would be expected to remain near the release point. One exception is potentially site-related lithium salts, which are generally soluble in water. A relatively small mass of contamination could leach deeper into soils; however, most of the mass would remain in the surface soil. Because the site is relatively flat and well vegetated, surface runoff potential appears to be low and soil erosion is not a concern. A normally dry creek bed runs northeast to southwest approximately 40 feet south of the southern tree line of the site (see Figure 1-2). If any surface runoff has occurred, this would be the most likely place to find contamination. Because the creek bed is usually dry, however, contaminant transport in surface water is likely to be limited.

Human exposure to soil contamination could occur via dermal contact, incidental ingestion, and inhalation of resuspended dust. Plausible current receptors representing the various degrees of potential exposure are: the occupational worker who works 8 hours per day at the Building 181 Area and is exposed to surface soil; the maintenance worker who maintains the surrounding grounds and also is exposed to surface soil; a construction worker who may dig into soils and be exposed to



**View of Wooden Barricade Facing Northeast**

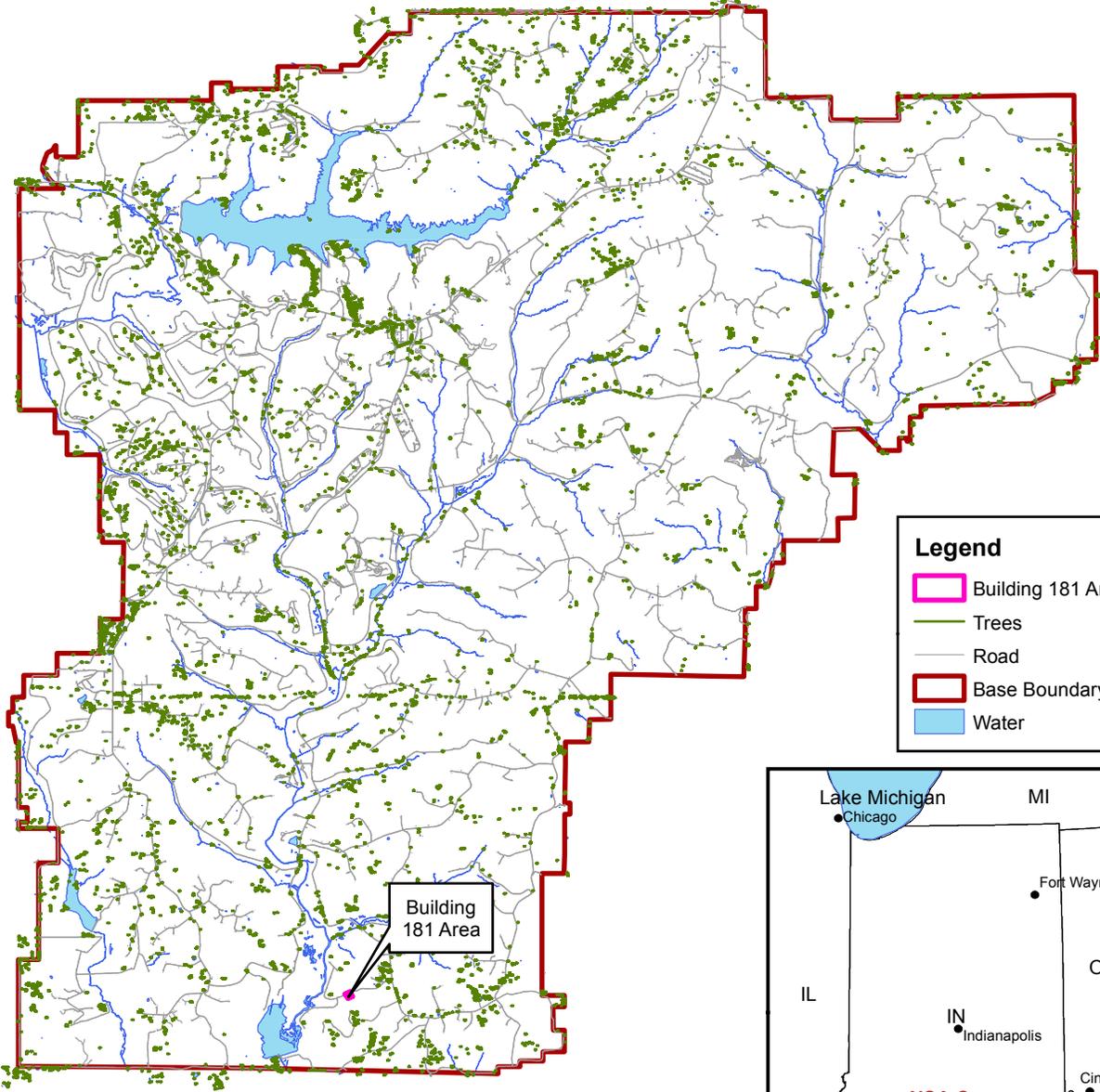
surface and subsurface soil and groundwater; and a trespasser who wanders onto the site and is exposed to surface soil. Plausible future receptors include these receptors as well as a site resident who may be exposed to surface and subsurface soil. The hypothetical future resident may also be exposed to groundwater used as potable water. Humans could be exposed to contaminants (if present in surface water or sediment) in the drainageway located in the woods in the southern portion of the Building 181 Area site.

Exposure to water in the UST near former Building 181 is not likely, but is a possibility. At both the drainageway and the UST, dermal contact and incidental ingestion are the plausible exposure pathways.

In addition, there is an unsubstantiated report of a large cloud (presumably containing uncombusted thionyl chloride) which was released during a battery explosion at Building 181 at an unknown date. This cloud is reported to have traveled off site toward the south and caused damage to a melon patch.

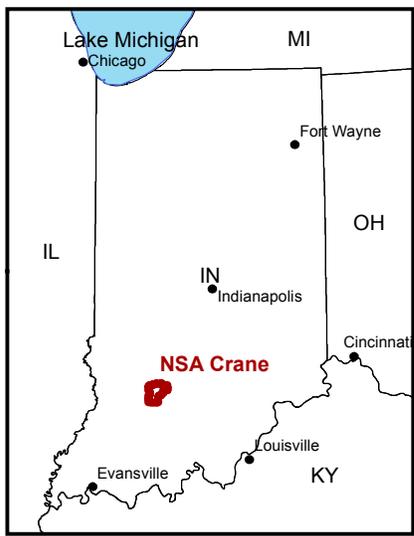


**View of Dry Drainageway Facing East**



**Legend**

- Building 181 Area
- Trees
- Road
- Base Boundary
- Water

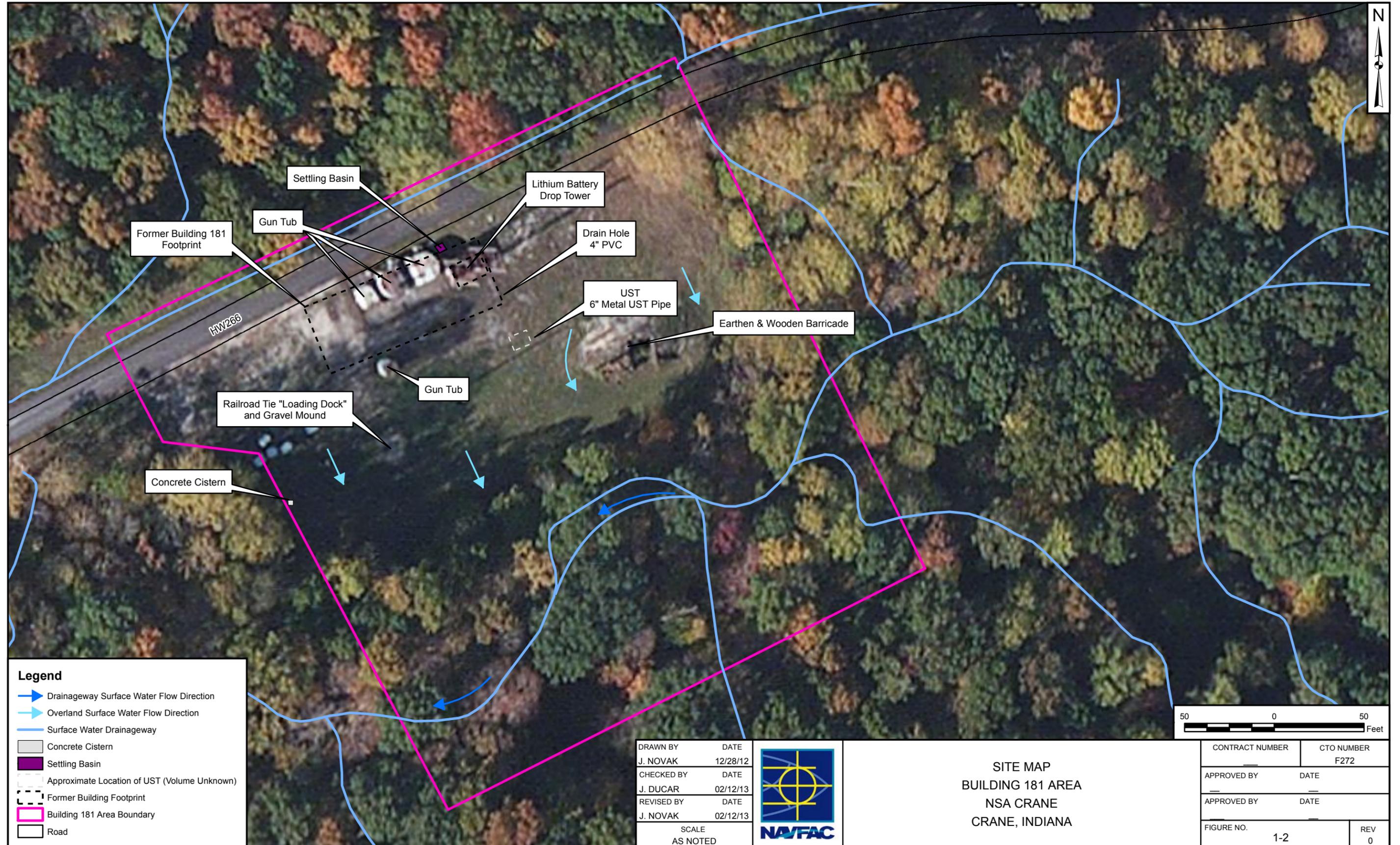


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**BASE AND SITE LOCATION MAP**  
**BUILDING 181 AREA**  
**NSA CRANE**  
**CRANE, INDIANA**

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FIGURE 1-1	0



**Legend**

- Drainageway Surface Water Flow Direction
- Overland Surface Water Flow Direction
- Surface Water Drainageway
- Concrete Cistern
- Settling Basin
- Approximate Location of UST (Volume Unknown)
- Former Building Footprint
- Building 181 Area Boundary
- Road



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SITE MAP  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA

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FIGURE NO.	REV
1-2	0

## 2.0 FIELD INVESTIGATION

Samples were collected from areas of potential contamination within and near the Building 181 Area site September 9 and 10, 2012 and October 4, 2012. The sampling design was a biased design based on the assumption that a contaminant release occurred. Locations within the site boundary which were most likely to have been contaminated were targeted, and onsite soil sample locations were biased toward areas downgradient of potential contaminant sources (e.g., UST, concrete cistern, battery drop tower, gun tubs, etc.). Figure 2-1 shows the locations of the onsite samples, and Figure 2-2 shows the locations of the off-site samples.

The off-site surface soil samples were collected from predetermined locations based on the areas potentially affected by the cloud (presumably containing uncombusted thionyl chloride) generated by a battery explosion at Building 181. This cloud is reported to have traveled off site toward the south and caused damage to a melon patch.

The field sampling events included the collection of surface and subsurface soil, and drainageway sediment samples. Interior subsurface structure sediment/residue and structure water samples were also collected. Samples were collected via hand auger, hand trowel and direct-push technology (DPT). Table 2-1 presents sample identification and a lab analysis summary for each sample. Appendix A presents all of the field forms.

All work performed for this field investigation was conducted in accordance with the procedures and methodologies described in the Navy-approved SAP (Tetra Tech, 2012). Sample log sheets and field documentation associated with this field investigation are provided in Appendix A.

### 2.1 SITE INVESTIGATION METHODOLOGIES AND PROCEDURES

#### **Surface and Subsurface Soil**

A total of 18 surface soil and 10 subsurface soil samples (from 5 borings) were collected within the Building 181 Area (See Figures 2-1 and 2-2) in accordance with the approved SAP (Tetra Tech, 2012). Surface soil only samples [from 0 to 2 feet below ground surface (bgs)] were collected with a hand auger. Subsurface soil samples (greater than 2 feet bgs) were collected using a DPT rig.

In addition, nine surface soil samples were collected in the area south of the site, along the hill ridge. These samples were collected in an attempt to determine if a cloud of suspected uncombusted thionyl

chloride, which was released during a battery explosion at Building 181 at an unknown date, has impacted the area. All soil samples were submitted to Empirical Laboratories, Inc. (Empirical) for explosives and metals analysis.

### **Surface Water Drainageways**

Sediment samples (B181SD001 through B181SD003) were collected from three locations within the surface water drainageway at the Building 181 Area (see Figure 2-1). All samples were collected at a depth of 0 to 0.5 foot bgs. The samples were submitted to Empirical for explosives and metals analysis.

Three surface water samples were proposed to be collected within the surface water drainageway located in the southern area of the site; however, surface water was not present within the drainageway at the time of sampling (see Figure 2-1).

### **Subsurface Structures**

Standing water from within the concrete cistern, settling basin, and UST was sampled. The samples from the concrete cistern and UST were collected using a peristaltic pump and dedicated tubing. The sample from the settling basin was collected with the use of a clean sample bottle since it was only inches below the ground surface. The sampling bottle was used to transfer the water into the bottle submitted to the laboratory for analyses. These samples were collected for waste disposal or potential contaminant characterization purposes. Samples B181SU001 (concrete cistern), B181SU002 (settling basin), and B181SU003 (UST) were submitted to Empirical for analysis of explosives, total and dissolved metals.

Sediment from the base of the settling basin and cistern was sampled (entire sediment column). No sediment was present within the UST; therefore, a sediment/residue sample was unable to be collected as proposed in the SAP. Samples B181SL001 (concrete cistern) and B181SL002 (settling basin) were submitted to Empirical for analysis of explosives and metals.

Soil boring log sheets can be found in Appendix A.1. Sample logs and chain-of-custody forms can be found in Appendix A.2.

## **2.2 GPS/SURVEYING**

Each sample location at the Building 181 Area, prior to sample collection, was marked with a brightly covered pin flag pushed into the ground next to the boring. Northing and easting coordinates for each sample location were then logged by Tetra Tech personnel utilizing a Trimble XH global positioning

system (GPS) unit. After sampling, the locations were surveyed by a professional surveyor licensed in the State of Indiana. This information is retained in the Tetra Tech main database and can be used as a reference if repeat sampling is required at any of the sample locations.

It should be noted that the sample locations for borings B181016, B181018, and B181022 could not be relocated after sampling was conducted; therefore, these locations were not surveyed and the presampling GPS locations were used to identify the locations on the figures.

### **2.3 UST DIMENSION INVESTIGATION**

Tetra Tech conducted an investigation on February 8, 2013 to attempt to determine the dimension of the UST. Based on readings from a Schonstedt metal detector, the tank dimensions are estimated to be approximately 8 feet in diameter and approximately 10.5 feet long, which equates to a volume of approximately 4,000-gallons.

TABLE 2-1

SAMPLE SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 1 OF 2

Sample Location	Sample ID <sup>(1)</sup>	Analyses		
		Explosives	Total Metals	Dissolved Metals
<b>SURFACE SOIL</b>				
B181SB001	B181SS0010002	1	1	-- <sup>(2)</sup>
B181SB002	B181SS0020002	1	1	--
B181SB003	B181SS0030002	1	1	--
B181SB004	B181SS0040002	1	1	--
B181SB005	B181SS0050002	1	1	--
B181SB006	B181SS0060002	1	1	--
B181SB007	B181SS0070002	1	1	--
B181SB008	B181SS0080002	1	1	--
B181SB009	B181SS0090002	1	1	--
B181SB010	B181SS0100002	1	1	--
B181SB011	B181SS0110002	1	1	--
B181SB012	B181SS0120002	1	1	--
B181SB013	B181SS0130002	1	1	--
B181SB014	B181SS0140002	1	1	--
B181SB015	B181SS0150002	1	1	--
B181SB016	B181SS0160002	1	1	--
B181SB017	B181SS0170002	1	1	--
B181SB018	B181SS0180002	1	1	--
B181SB019	B181SS0190002	1	1	--
B181SB020	B181SS0200002	1	1	--
B181SB021	B181SS0210002	1	1	--
B181SB022	B181SS0220002	1	1	--
B181SB023	B181SS0230002	1	1	--
B181SB024	B181SS0240002	1	1	--
B181SB025	B181SS0250002	1	1	--
B181SB026	B181SS0260002	1	1	--
B181SB027	B181SS0270002	1	1	--
<b>SUBSURFACE SOIL</b>				
B181SB023	B181SB0230204	1	1	--
B181SB023	B181SB0230406	1	1	--
B181SB024	B181SB0240810	1	1	--
B181SB024	B181SB0241012	1	1	--

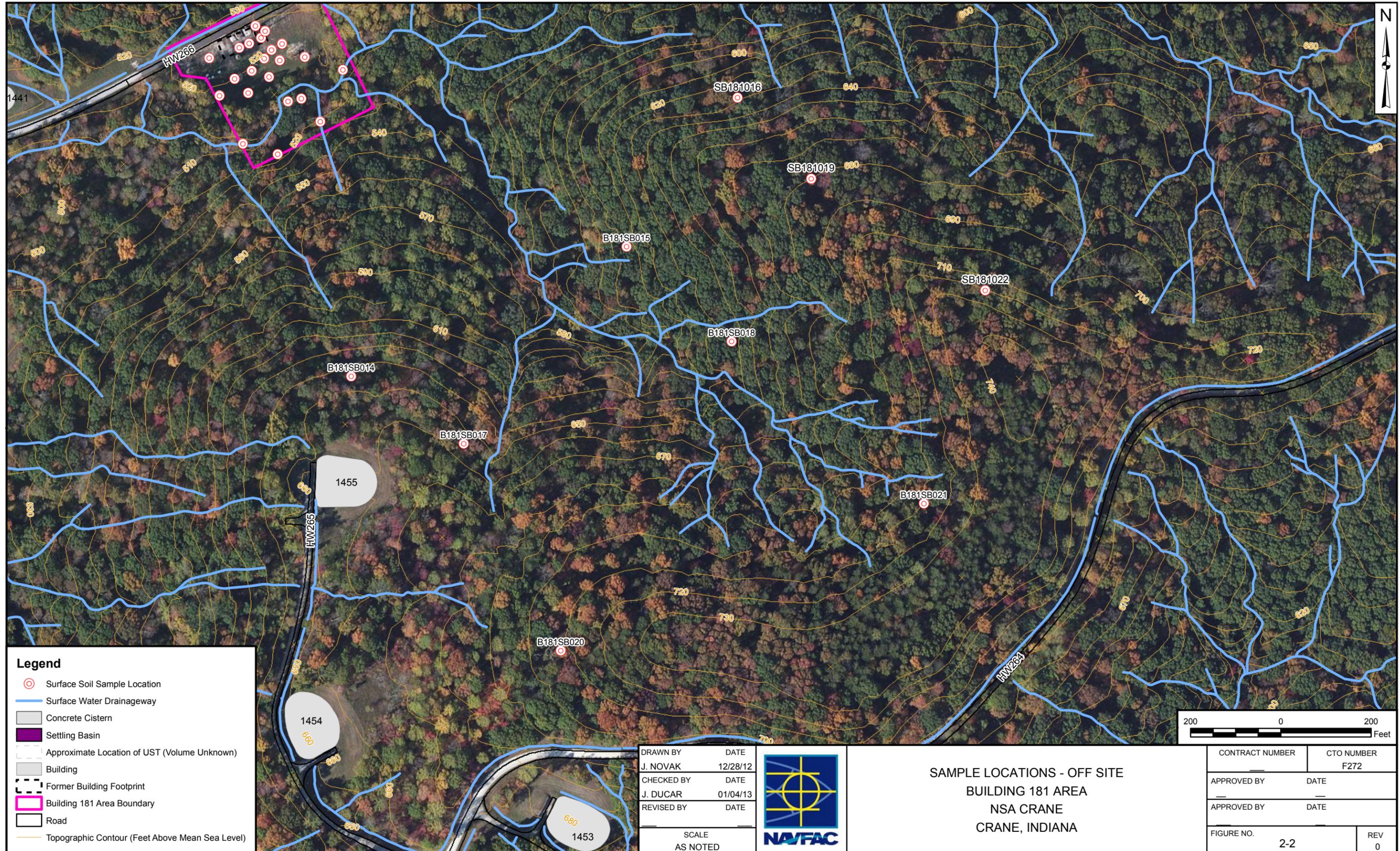
TABLE 2-1

SAMPLE SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 2 OF 2

Sample Location	Sample ID <sup>(1)</sup>	Analyses		
		Explosives	Total Metals	Dissolved Metals
B181SB025	B181SB0250810	1	1	--
B181SB025	B181SB0251012	1	1	--
B181SB026	B181SB0261012	1	1	--
B181SB026	B181SB0261214	1	1	--
B181SB027	B181SB0270810	1	1	--
B181SB027	B181SB0271012	1	1	--
<b>STREAM SEDIMENT</b>				
B181SD001	B181SD001	1	1	--
B181SD002	B181SD002	1	1	--
B181SD003	B181SD003	1	1	--
<b>STRUCTURE WATER</b>				
B181SU001	B181SU001	1	1	1
B181SU002	B181SU002	1	1	1
B181SU003	B181SU003	1	1	1
<b>STRUCTURE SEDIMENT</b>				
B181SL001	B181SL001	1	1	--
B181SL002	B181SL002	1	1	--

1. The interval of the sample from below ground surface. For example, if the sample is collected from 0 to 2 feet bgs, the depth will be recorded as 0002.
2. -- Not analyzed





**Legend**

- Surface Soil Sample Location
- Surface Water Drainageway
- Concrete Cistern
- Settling Basin
- Approximate Location of UST (Volume Unknown)
- Building
- Former Building Footprint
- Building 181 Area Boundary
- Road
- Topographic Contour (Feet Above Mean Sea Level)

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J. DUCAR	01/04/13
REVISED BY	DATE
SCALE AS NOTED	



SAMPLE LOCATIONS - OFF SITE  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
	F272
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FIGURE NO.	REV
2-2	0

### **3.0 DATA PRESENTATION**

This section describes the analytical data, locations, chemical forms, and concentrations of organic and inorganic chemical contaminants detected in soil, sediment, and subsurface structure water and structure sediment/residue material at the NSA Crane Building 181 Area during the field sampling events conducted in September and October 2012.

The analyses conducted during this investigation are documented in Section 2.0, and summarized in Table 2-1. Tables 3-1 through 3-5 present the data summaries for each medium screened against appropriate screening criteria. The tables present only analytes detected in at least one sample. Figure 3-1 presents the onsite sample locations and project screening level (PSL) exceedances. The complete validated analytical data set for the investigation is presented in Appendix B.

Organic chemical contamination is defined as chemicals detected at concentrations that exceed human health or ecological PSLs; therefore, their presence could potentially result in unacceptable human health or ecological risk. Exceedances of PSLs are highlighted in the data tables (Tables 3-1 through 3-5). Because organic chemicals (i.e., explosives) were assumed not to occur naturally, detections of organic compounds at the Building 181 Area were generally considered to be site-related, unless the site history and observed concentrations or concentration patterns indicate that the contaminants are from non-site-related sources.

Metals contamination was defined as an exceedance of PSLs; however, consideration was given to the natural occurrence of metals in environmental media. Concentrations of metals that are within normal Crane background levels were not considered to represent site-related contamination. Background data sets, which are used for these evaluations, are described in Section 3.1.

Multiple chemicals of environmental interest were detected in the Building 181 Area at concentrations greater than PSLs.

#### **3.1 BACKGROUND LOCATIONS**

The soil background data set and how it was established are described in this section.

The soil samples collected from the Building 181 Area were determined to fall within the following soil categories:

- Surface Soil: Soil Group 3 - Alluvial, Mississippian, and Pennsylvanian.
- Subsurface Soil: Soil Group 8 - Pennsylvanian Subsurface Clay and Silt.

The background data for these soil groups were generated during the NSA Crane basewide background soil investigation. Derivation of the Soil Groups is described in detail in the report for that investigation (Tetra Tech, 2001). Soil Groups 3 and 8 represent all soil samples collected at the Building 181 Area.

NSA Crane background soil data (Tetra Tech, 2001) were used to determine whether the concentrations of metals observed in the Building 181 Area soils represented site-related contamination. The background data were also used to determine whether the concentrations of metals in the surface water drainageway sediment represented site-related contamination, because the drainageways are usually dry except during rain events, and are more indicative of soil versus true sediment in the areas where the samples were collected. Upper Tolerance Limits (UTLs) were used as points of comparison to demonstrate that one soil data set was similar to another. These values represent a limit below which 95 percent of the reported concentrations would fall with 95 percent confidence, if the soil data represent background concentrations.

## **3.2 SOIL**

The Building 181 Area consists of two potential areas of contamination: onsite and off-site (surface soil sampling was conducted south of the site property to investigate the potential effect of an air release presumably containing uncombusted thionyl chloride). These areas are evaluated separately below. Contaminants of potential concern (COPCs) were selected for surface and subsurface soil using the screening levels described in the SAP (Tetra Tech, 2012).

### **Onsite Area Soil**

**Surface Soil Metals** - Three metals (lithium, nickel, and zinc) exhibited concentrations which exceeded human health and ecological PSLs, as well as Crane soil background concentrations, in onsite surface soil samples (see Table 3-1 and Figure 3-1). Nickel and zinc concentrations exceeded the respective PSLs in sample B181SS0060002, located downgradient of the railroad tie "loading dock." However, the zinc concentration of 68.6 mg/kg was consistent with the zinc background soil concentration (65.6 mg/kg).

In addition, sample B181SS0230002, located downgradient of the lithium battery drop tower, exhibited a concentration of lithium above the PSL.

The nickel ecological PSL is based on risks to plants. However, the only sample where the PSL was exceeded is bounded by samples with concentrations less than the PSL or by physical structures (i.e., road) within 50 to 75 feet, so any potentially impacted area is small. Also, the area is vegetated so it is not likely that plants are being impacted at the site.

**Surface Soil Explosives** – No explosives concentrations exceeded human health or ecological PSLs in the onsite surface soil samples (see Table 3-1).

**Subsurface Soil Metals** - No metals concentrations exceeded human health PSLs in the onsite subsurface soil samples (see Table 3-2).

**Subsurface Soil Explosives** - No explosives concentrations exceeded human health PSLs in the onsite subsurface soil samples (see Table 3-2).

In summary, the COPCs in onsite surface soil are lithium, nickel, and zinc. This is consistent with site history.

### 3.3 ONSITE AREA DRAINAGEWAY SEDIMENT

COPCs were selected for drainageway sediment using the screening levels described in the SAP (Tetra Tech, 2012).

**Drainageway Sediment Metals** - Two metals (nickel, and zinc) were detected at concentrations which exceeded human health and/or ecological PSLs and Crane Sitewide surface soil background levels in the onsite surface water drainageway sediment samples (see Table 3-3 and Figure 3-1). Nickel concentrations exceeded the ecological PSL and the Crane Sitewide surface soil background level in all three samples (and a duplicate sample). Nickel concentrations ranged from 35.9J mg/kg at the midstream location B181SD002 to 54.2J mg/kg at downstream location B181SD001. In addition, a zinc concentration above the ecological PSL and the Crane Sitewide surface soil background level was detected in the duplicate sample only for midstream location B181SD002.

The ecological PSLs that were exceeded for nickel and zinc are the threshold effects concentrations (TECs) from MacDonald et al., (2000). TECs are the concentrations below which effects on sediment invertebrates are not expected, while PECs are defined as concentrations above which adverse effects to sediment invertebrates are probable. All of the zinc concentration were less than its PEC (459 mg/kg), while only one of the nickel concentrations [54.2J mg/kg (not including the duplicate sample result)],

slightly exceeded its PEC of 48.6 mg/kg. The nickel concentration in the upstream location, which is upgradient of the site, was 37.1 mg/kg, so the 54.2 mg/kg concentration may be indicative of upgradient/off-site levels. This is supported by the fact, with one exception at B181SB006, all of the nickel detections in soil were less than 23 mg/kg, so the source of the higher levels of nickel in the drainageway samples do not appear to be site-related. Also, because the drainageway is primarily dry most of the year, it is not likely to be able to support a viable benthic community to be impacted. For these reasons, site-related impacts to sediment invertebrates from nickel in the sediment are not expected.

**Drainageway Sediment Explosives** - No explosives concentrations exceeded human health or ecological PSLs in the drainageway sediment samples (see Table 3-3).

### 3.4 ONSITE SUBSURFACE STRUCTURES

The subsurface structure water and structure sediment samples are not considered environmental samples; rather, they are more indicative of waste material. Therefore, these samples were screened against the project PSLs for identifying potential human health concerns during disposal activities only.

**Subsurface Structure Water Metals** - Several metals concentrations exceeded human health PSLs in the subsurface structure water samples (see Table 3-4). However, the water in these structures is contained within the structures; therefore, under normal circumstances they would not be a potential source of contamination to human or ecological receptors.

**Subsurface Structure Water Explosives** - Only one explosive (2-Nitrotoluene) was detected at a concentration which exceeded human health PSLs in a subsurface structure water sample (see Table 3-4). It was detected at a concentration exceeding the human health PSL in the sample collected from the concrete cistern. However, as stated above, the water in these structures is contained within the structures; therefore, under normal circumstances they would not be a potential source of contamination to human or ecological receptors.

**Subsurface Structure Sediment Metals** – No metal concentrations exceeded human health PSLs and the Crane Sitewide surface soil background level in the concrete cistern sediment sample (see Table 3-5). Several metals concentrations exceeded human health PSLs and background levels in the settling basin sample (see Table 3-5). However, the sediment in these structures is contained within the concrete structures; therefore, under normal circumstances they would not be a potential source of contamination to human or ecological receptors.

**Subsurface Structure Sediment Explosives** - No explosives concentrations exceeded human health PSLs in the subsurface structure sediment samples (see Table 3-5).

### 3.5 OFFSITE AREA SOIL

**Surface Soil Metals** - No metals concentrations exceeded human health or ecological PSLs in the offsite surface soil samples (see Table 3-1).

**Surface Soil Explosives** - No explosives concentrations exceeded human health or ecological PSLs in the offsite surface soil samples (see Table 3-1).

### 3.6 INVESTIGATION SUMMARY

The degree and extent of contamination at the Building 181 Area is very limited and reasonably well bounded. The primary COPCs are the metals lithium, nickel, and zinc in the onsite surface soil, and zinc in the drainageway sediments.

The lithium and nickel PSLs were derived by using 1/10<sup>th</sup> the human health residential soil regional screening level (RSL). The division by 10 renders the adjusted criterion equal to a hazard quotient of 0.1, and represents an assumption that 10 compounds having the same target organ effect will be present (USEPA, 2012). This is a very conservative approach. However, when using the full residential soil RSL for each compound (i.e., 160 mg/kg for lithium and 1,500 mg/kg for nickel), both compound concentrations are well below the respective RSLs. Therefore, no further action is required.

One concentration each of nickel, zinc (both in B181SB006) and lithium (B181SB023) exceeded the ecological PSL in the surface soil samples. These exceedances are very limited and represent only 7.4 percent of the 27 surface soil samples collected. Also, as discussed above, zinc concentrations are indicative of background levels, and potential impacts to plants from nickel are limited to a small area. Also, because the site is vegetated, it is not likely that plants are being significantly impacted. Therefore, these metal exceedances are considered inconsequential, and no further action is required for site soil.

Nickel concentrations exceeded only the ecological PSLs and background soil levels in all three drainageway sediment samples, and zinc exceeded the ecological PSL and the background soil level in only the duplicate sample for the midstream location. All of the zinc concentrations were much lower than the probable effects concentration (PEC) indicating the risks to sediment invertebrates, if present, are not

expected. Although one nickel detection (not including the duplicate result), slightly exceeded the PEC, the nickel concentrations in the drainageway sediment may be indicative of upgradient/off-site levels. Also, because the drainageway is primarily dry most of the year, it is unlikely a benthic community exists in the drainageway to be impacted. Therefore, these metal exceedances are considered inconsequential, and no further action is required for site sediment.

The water and sediment in the subsurface structures are contained within the structures; therefore, under normal circumstances are not considered a potential source of contamination for human or ecological risk assessment purposes. It is recommended that analytical toxicity leachability testing be conducted for the structure sediment to determine proper disposal requirements prior to any removal activities.

TABLE 3-1

SURFACE SOIL SAMPLE ANALYSES SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 1 OF 5

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	Eco PSL	Crane Background	<b>B181SB001</b> <b>B181SS0010002</b> <b>20120909</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB002</b> <b>B181SS0020002</b> <b>20120909</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB003</b> <b>B181SS0030002</b> <b>20120909</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB004</b> <b>B181SS0040002</b> <b>20120909</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB005</b> <b>B181SS0050002</b> <b>20120909</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB006</b> <b>B181SS0060002</b> <b>20120909</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>
<b>EXPLOSIVES (MG/KG)</b>									
2-NITROTOLUENE	0.61	9.9	NC	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U
4-NITROTOLUENE	0.29	22	NC	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U
TETRYL	24	0.99	NC	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U
<b>METALS (MG/KG)</b>									
COPPER	310	28	17.6	14.5	5.83	18.2	17.8	8.59	14.3
LEAD	400	11	27	17.6	11.4	13.4	13.3	16.2	23.1
LITHIUM	16	2	30	13.4 J	9.16	14.5	16.8	11.9	23.6
MANGANESE	180	220	5700	525 J	1950 J	576 J	1000 J	922 J	1470 J
MERCURY	1	0.1	0.077	0.039	0.0399 J	0.0378 J	0.053	0.0309 U	0.0402
NICKEL	150	38	22.1	22.7	15.5	18.7	20.8	10.3	<b>220</b>
ZINC	2300	46	65.6	60.3	32.9	62.8	62.5	30.9	<b>68.6</b>

TABLE 3-1

SURFACE SOIL SAMPLE ANALYSES SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 2 OF 5

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	Eco PSL	Crane Background	B181SB007		B181SB008	B181SB009	B181SB010	B181SB011
				B181SS0070002 20120909 ORIG SO NORMAL SS 0 2	B181SS0070002-D 20120909 DUP SO NORMAL SS 0 2	B181SS0080002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0090002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0100002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0110002 20120910 NORMAL SO NORMAL SS 0 2
<b>EXPLOSIVES (MG/KG)</b>									
2-NITROTOLUENE	0.61	9.9	NC	0.0392 U	0.0388 U	0.0388 U	0.0385 U	0.0381 U	0.0392 U
4-NITROTOLUENE	0.29	22	NC	0.0392 U	0.0388 U	0.0388 U	0.0385 U	0.0381 U	0.0392 U
TETRYL	24	0.99	NC	0.0392 U	0.0388 U	0.0388 U	0.0385 U	0.0381 U	0.0392 U
<b>METALS (MG/KG)</b>									
COPPER	310	28	17.6	9.44	9.15	8.92	7.89	10.3	11.7
LEAD	400	11	27	11.6	11.2	12.9	12.8	14.1	20.7 J
LITHIUM	16	2	30	21.8	19.4	8.93	9.7	9.28	7.79
MANGANESE	180	220	5700	703	904	1990	1980	1750	1340
MERCURY	1	0.1	0.077	0.0432	0.0517	0.0404	0.0363 J	0.0408 J	0.0615
NICKEL	150	38	22.1	14.8	13	17.6	17	18.9	19 J
ZINC	2300	46	65.6	42	37	41.3	40.6	46.8	54.5

TABLE 3-1

SURFACE SOIL SAMPLE ANALYSES SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 3 OF 5

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	Eco PSL	Crane Background	<b>B181SB012</b> <b>B181SS0120002</b> <b>20120910</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB013</b> <b>B181SS0130002</b> <b>20120910</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB014</b> <b>B181SS0140002</b> <b>20121004</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB015</b> <b>B181SS0150002</b> <b>20121004</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB016</b> <b>B181SS0160002</b> <b>20121004</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>	<b>B181SB017</b> <b>B181SS0170002</b> <b>20121004</b> <b>NORMAL</b> <b>SO</b> <b>NORMAL</b> <b>SS</b> <b>0</b> <b>2</b>
<b>EXPLOSIVES (MG/KG)</b>									
2-NITROTOLUENE	0.61	9.9	NC	0.0385 U	0.0396 U	0.04 U	0.04 U	0.0388 U	0.04 U
4-NITROTOLUENE	0.29	22	NC	0.0385 U	0.031 J	0.04 U	0.0479 J	0.0388 U	0.04 U
TETRYL	24	0.99	NC	0.0385 U	0.0396 U	0.04 U	0.04 U	0.0388 U	0.04 U
<b>METALS (MG/KG)</b>									
COPPER	310	28	17.6	9.84	8.23	9.02	12.7	5.98	9.78
LEAD	400	11	27	23 J	16.1 J	15.7	14.8	12.1	13.5
LITHIUM	16	2	30	9.65	7.55	8.71	14.3	12.1	11.5
MANGANESE	180	220	5700	1240	1420	1110 J	298 J	687 J	647 J
MERCURY	1	0.1	0.077	0.06	0.0522	0.0382 J	0.0508	0.0528	0.049
NICKEL	150	38	22.1	15 J	13 J	13.6	15.1	15.3	12.8
ZINC	2300	46	65.6	34.8	30.9	44.5	54	36	35

TABLE 3-1  
SURFACE SOIL SAMPLE ANALYSES SUMMARY  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 4 OF 5

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	Eco PSL	Crane Background	<b>B181SB018</b> <b>B181SS0180002</b> 20121004 <b>NORMAL</b> SO <b>NORMAL</b> SS <b>0</b> <b>2</b>	<b>B181SB019</b> <b>B181SS0190002</b> 20121004 <b>NORMAL</b> SO <b>NORMAL</b> SS <b>0</b> <b>2</b>	<b>B181SB020</b> <b>B181SS0200002</b> 20121004 <b>NORMAL</b> SO <b>NORMAL</b> SS <b>0</b> <b>2</b>	<b>B181SB021</b> <b>B181SS0210002</b> 20121004 <b>NORMAL</b> SO <b>NORMAL</b> SS <b>0</b> <b>2</b>	<b>B181SB022</b> <b>B181SS0220002</b> 20121004 <b>NORMAL</b> SO <b>NORMAL</b> SS <b>0</b> <b>2</b>
<b>EXPLOSIVES (MG/KG)</b>								
2-NITROTOLUENE	0.61	9.9	NC	0.0343 J	0.0508 J	0.0396 U	0.0396 U	0.0826
4-NITROTOLUENE	0.29	22	NC	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
TETRYL	24	0.99	NC	0.0388 U	0.0388 U	0.0396 U	0.0244 J	0.0392 U
<b>METALS (MG/KG)</b>								
COPPER	310	28	17.6	5.33	6.86	16	7.7	8.83
LEAD	400	11	27	8.25	16.2	16.6	14.7	11.1
LITHIUM	16	2	30	11.9	11.4	13.1	9	9.83
MANGANESE	180	220	5700	166 J	1020 J	683 J	925 J	635 J
MERCURY	1	0.1	0.077	0.04 J	0.0603	0.0457	0.0403 J	0.0295 J
NICKEL	150	38	22.1	9.11	11.7	16.9	11.1	13.8
ZINC	2300	46	65.6	32.1	41	53.4	35	45.5

TABLE 3-1  
SURFACE SOIL SAMPLE ANALYSES SUMMARY  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 5 OF 5

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	Eco PSL	Crane Background	B181SB023		B181SB024	B181SB025	B181SB026	B181SB027
				B181SS0230002 20120909 ORIG SO NORMAL SS 0 2	B181SS0230002-D 20120909 DUP SO NORMAL SS 0 2	B181SS0240002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0250002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0260002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0270002 20120909 NORMAL SO NORMAL SS 0 2
<b>EXPLOSIVES (MG/KG)</b>									
2-NITROTOLUENE	0.61	9.9	NC	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
4-NITROTOLUENE	0.29	22	NC	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
TETRYL	24	0.99	NC	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
<b>METALS (MG/KG)</b>									
COPPER	310	28	17.6	15.4	14.5	9.25	18.4	8.72	9.75 J
LEAD	400	11	27	13.2	14.6	13.1	12.6	11.3	11.1
LITHIUM	16	2	30	<b>40.2</b>	<b>37.5</b>	11.8	12	9.18	10
MANGANESE	180	220	5700	617 J	757 J	588	374	1050	1220
MERCURY	1	0.1	0.077	0.0324 U	0.0329 U	0.0338 J	0.0285 J	0.0368 J	0.0374
NICKEL	150	38	22.1	16.7	16.4	14.5	16.5	13.3	13.5
ZINC	2300	46	65.6	57.9	55.8	38.5	57.7	35.9	39 J

Notes:

HH PSL - Human Health Project Screening Level

Eco - Ecological Project Screening Level

**Exceeds HH and Eco PSLs - [H,E] on Figure 3-1**

**Exceeds Eco PSL only - [E] on Figure 3-1**

J - Estimated Value

U - Concentration is below the laboratory detection limit

NC - No Criteria available.

HH PSL Reference: The residential direct contact screening value (R-RSL) was taken from the USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2012 available online at [http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/index.htm](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). The risk-based screening levels are based on a target hazard quotient of 1 for noncarcinogens (denoted in the EPA tables with an "N" flag) divided by 10 or an incremental lifetime cancer risk (ILCR) of 1E-6 for carcinogens (denoted in the EPA tables with a "C" flag). For non-carcinogens, the division by 10 renders the adjusted criterion equal to a hazard quotient of 0.1 and represents an assumption that 10 compounds having the same target organ effect will be present (USEPA, 2012).

Eco PSL Reference: Of the reference used to select ecological criteria, not all references have a criterion for every chemical. These criteria represent the first available criterion in the following hierarchy of references: Eco SSL - USEPA Ecological Soil Screening Levels (USEPA, 2005a-e, 2006d, 2007a,b, 2008b); Reg 5 - USEPA Region 5 Ecological Screening Levels (USEPA, 2003); NOAA - NOAA's Quick Reference Tables (Buchman, 2008); and, Los Alamos National Laboratory (LANL) Ecological Screening Levels, Ecorisk Database release 3.1, October 2012.

TABLE 3-2

SUBSURFACE SOIL SAMPLE ANALYSES SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 1 OF 2

LOCATION			<b>B181SB0230204</b>	<b>B181SB023</b>	<b>B181SB0230406-D</b>	<b>B181SB0240810</b>	<b>B181SB024</b>
SAMPLE ID			<b>20120909</b>	<b>B181SB0230406</b>	<b>20120909</b>	<b>20120909</b>	<b>B181SB0241012</b>
SAMPLE DATE			<b>NORMAL</b>	<b>ORIG</b>	<b>DUP</b>	<b>NORMAL</b>	<b>20120909</b>
SAMPLE CODE	HH	Crane	<b>SO</b>	<b>SO</b>	<b>SO</b>	<b>SO</b>	<b>NORMAL</b>
MATRIX	PSL	Background	<b>NORMAL</b>	<b>NORMAL</b>	<b>NORMAL</b>	<b>NORMAL</b>	<b>SO</b>
MATRIX			<b>SB</b>	<b>SB</b>	<b>SB</b>	<b>SB</b>	<b>SB</b>
SAMPLE TYPE			<b>2</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>10</b>
SUBMATRIX			<b>4</b>	<b>6</b>	<b>6</b>	<b>10</b>	<b>12</b>
TOP DEPTH							
BOTTOM DEPTH							
<b>METALS (MG/KG)</b>							
COPPER	310	33.3	23.3	25.1	25.1	10.1	8.66
LEAD	400	19.6	17	11.1	13.7	8.32 J	6.77 J
LITHIUM	16	80	19.4	16.1	17.2	11.2	8.54
MANGANESE	180	704	432 J	201 J	317 J	128	75
MERCURY	1	0.18	0.0331 U	0.0325 UJ	0.0334 U	0.0205 J	0.0327 U
NICKEL	150	29.6	17	16.2	17.2	11.7 J	9.2 J
ZINC	2300	83.3	79.5	77	77.8	33.4	22.7

TABLE 3-2

SUBSURFACE SOIL SAMPLE ANALYSES SUMMARY  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 2 OF 2

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	Crane Background	B181SB025		B181SB026		B181SB027	
			B181SB0250810 20120909 NORMAL SO NORMAL SB 8 10	B181SB0251012 20120909 NORMAL SO NORMAL SB 10 12	B181SB0261012 20120909 NORMAL SO NORMAL SB 10 12	B181SB0261214 20120909 NORMAL SO NORMAL SB 12 14	B181SB0270810 20120909 NORMAL SO NORMAL SB 8 10	B181SB0271012 20120909 NORMAL SO NORMAL SB 10 12
<b>METALS (MG/KG)</b>								
COPPER	310	33.3	12.4	10.1	18.2	7.61	13.1	9.69
LEAD	400	19.6	8.3	7.93	16.8	11.4	14.5	9.72
LITHIUM	16	80	9.34	10.6	5.3 J	6.88	7.49	4.64 J
MANGANESE	180	704	426	176	451	575	241	243
MERCURY	1	0.18	0.0311 U	0.0225 J	0.03 J	0.0314 J	0.0215 J	0.0341 U
NICKEL	150	29.6	13.9	10.8	18.1	15.6	15.1	16.3
ZINC	2300	83.3	38.6	36.7	38.5	26.1	44.8	35.8

## Notes:

HH PSL - Human Health Project Screening Level

**Exceeds HH PSL**

J - Estimated Value

U - Concentration is below the laboratory detection limit

NC - No Criteria available.

HH PSL Reference: The residential direct contact screening value (R-RSL) was taken from the USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2012 available online at [http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\\_table/index.htm](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). The risk-based screening levels are based on a target hazard quotient of 1 for noncarcinogens (denoted in the EPA tables with an "N" flag) divided by 10 or an incremental lifetime cancer risk (ILCR) of 1E-6 for carcinogens (denoted in the EPA tables with a "C" flag). For non-carcinogens, the division by 10 renders the adjusted criterion equal to a hazard quotient of 0.1 and represents an assumption that 10 compounds having the same target organ effect will be present (USEPA, 2012).

TABLE 3-3

**DRAINAGEWAY SEDIMENT SAMPLE ANALYSES SUMMARY  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA**

LOCATION				<b>B181SW/SD001</b>	<b>B181SW/SD002</b>		<b>B181SW/SD003</b>
SAMPLE ID				<b>B181SD001</b>	<b>B181SD002</b>	<b>B181SD002-D</b>	<b>B181SD003</b>
SAMPLE DATE	HH	Eco	Crane	<b>20120910</b>	<b>20120910</b>	<b>20120910</b>	<b>20120910</b>
SAMPLE CODE	PSL	PSL	Background	<b>NORMAL</b>	<b>ORIG</b>	<b>DUP</b>	<b>NORMAL</b>
MATRIX				<b>SD</b>	<b>SD</b>	<b>SD</b>	<b>SD</b>
SAMPLE TYPE				<b>NORMAL</b>	<b>NORMAL</b>	<b>NORMAL</b>	<b>NORMAL</b>
SUBMATRIX				<b>SD</b>	<b>SD</b>	<b>SD</b>	<b>SD</b>
TOP DEPTH				<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
BOTTOM DEPTH				<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>
<b>METALS (MG/KG)</b>							
COPPER	310	31.6	17.6	21	13.1	25.3	16.3
LEAD	400	35.8	27	32.4 J	21.3 J	35.4 J	20.6 J
LITHIUM	16	NC	30	9.24	7.14 J	7.74 J	7.62
MANGANESE	180	460	5700	2590	1490 J	2650 J	1250
MERCURY	1	0.174	0.077	0.0508	0.0361 J	0.0457	0.0351 J
NICKEL	150	22.7	22.1	<b>54.2 J</b>	<b>35.9 J</b>	<b>68 J</b>	<b>37.1 J</b>
ZINC	2300	121	65.6	111	81.4 J	<b>148 J</b>	82.6

Notes:

HHRA - Human Health Risk Assessment Screening Value

ERA - Ecological Risk Assessment Screening Value

**Exceeds ERA only - [E] on Figure 3-1**

J - Estimated Value

U - Concentration is below the laboratory detection limit

TABLE 3-4

STRUCTURE WATER SAMPLE ANALYSES SUMMARY  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	HH PSL	B181SU001/SL001A		B181SU002/SL002	B181SU003/SL003
		B181SU001 20121004 NORMAL SW NORMAL NA	B181SU002 20120910 ORIG SW NORMAL NA	B181SU002-D 20120910 DUP SW NORMAL NA	B181SU003 20121004 NORMAL SW NORMAL NA
<b>METALS (UG/L)</b>					
COPPER	62	1.29 J	8.38	7.6	6.63
LEAD	15	0.75 U	6.25 J	4.13 J	1.33
LITHIUM	3.1	<b>4.02 J</b>	<b>9.27</b>	<b>8.9</b>	<b>13.9</b>
MANGANESE	32	<b>469</b>	13.4	7.75	4.48
MERCURY	0.063	0.16 U	0.16 U	<b>0.0838 J</b>	0.16 U
NICKEL	30	2.02 J	9.84	8.83	2.55
ZINC	470	19	62 J	39.6 J	52.3
<b>DISSOLVED METALS (UG/L)</b>					
CADMIUM	0.69	0.5 U	<b>0.758 J</b>	0.5 U	0.5 U
COPPER	62	1.79 J	18 J	11.4 J	8.18
LEAD	15	0.452 J	<b>30.8 J</b>	<b>16 J</b>	0.75 U
LITHIUM	3.1	<b>4.08 J</b>	<b>10.3</b>	<b>9.14</b>	<b>13.6</b>
MANGANESE	32	<b>506</b>	<b>65.1 J</b>	20.9 J	3.3 J
MERCURY	0.063	0.16 U	<b>0.0848 J</b>	0.16 U	0.16 U
NICKEL	30	3.76	26.3 J	13.2 J	4.23
ZINC	470	21.5	187 J	88.2 J	54.7
<b>EXPLOSIVES (UG/L)</b>					
2-AMINO-4,6-DINITROTOLUENE	3	0.13 J	0.16 U	0.16 U	0.168 UJ
2-NITROTOLUENE	0.27	<b>1.41 J</b>	0.16 U	0.16 U	0.102 J

## Notes:

HH PSL - Human Health Project Screening Level

**Exceeds HH PSL criteria**

J - Estimated Value

U - Concentration is below the laboratory detection limit

NC - No Criteria available.

HH PSL References: The tapwater screening levels were taken from the USEPA Regional Screening Levels (Tapwater RSLs) for Chemical Contaminants at Superfund Sites, June 2011 available online at <http://epa-prgs.ornl.gov/chemicals/index.shtml>. The risk-based screening levels are based on a target hazard quotient of 1 for noncarcinogens (denoted with a "N" flag) or an ILCR of 1E-6 for carcinogens (denoted with a "C" flag). The USEPA tapwater screening levels (November, 2011) for noncarcinogens were adjusted by dividing by 10, equivalent to a target hazard quotient of 0.1. USEPA MCLs were taken from the 2011 Edition of the Drinking Water Standards and Health Advisories, January 2011.

TABLE 3-5

**STRUCTURE SEDIMENT SAMPLE ANALYSES SUMMARY**  
**BUILDING 181 AREA**  
**NSA CRANE**  
**CRANE, INDIANA**

LOCATION			<b>B181SU001/SL001A</b>	<b>B181SU002/SL002A</b>	
SAMPLE ID			<b>B181SL001</b>	<b>B181SL002</b>	<b>B181SL002-D</b>
SAMPLE DATE	HH	Crane	<b>20121004</b>	<b>20120910</b>	<b>20120910</b>
SAMPLE CODE	PSL	Background	<b>NORMAL</b>	<b>ORIG</b>	<b>DUP</b>
MATRIX			<b>SD</b>	<b>SD</b>	<b>SD</b>
SAMPLE TYPE			<b>NORMAL</b>	<b>NORMAL</b>	<b>NORMAL</b>
SUBMATRIX			<b>SD</b>	<b>SD</b>	<b>SD</b>
TOP DEPTH			<b>0</b>	<b>0</b>	<b>0</b>
BOTTOM DEPTH			<b>0.5</b>	<b>0.5</b>	<b>0.5</b>
<b>EXPLOSIVES (MG/KG)</b>					
1,3,5-TRINITROBENZENE	220	NC	0.0565 J	0.0392 U	0.0385 U
1,3-DINITROBENZENE	0.61	NC	0.0548 J	0.0486 J	0.0558 J
2,4-DINITROTOLUENE	1.6	NC	0.0388 U	0.0392 U	0.056 J
2-AMINO-4,6-DINITROTOLUENE	15	NC	0.0388 U	0.0392 U	0.0825
2-NITROTOLUENE	2.9	NC	0.23	0.0392 U	0.161 J
3-NITROTOLUENE	0.61	NC	0.0388 U	0.0252 J	0.0385 U
4-AMINO-2,6-DINITROTOLUENE	15	NC	0.0477 J	0.0392 U	0.0385 U
NITROBENZENE	4.8	NC	0.0206 J	0.0613 J	0.129 J
RDX	5.6	NC	0.0388 UJ	0.0392 U	0.0385 U
TETRYL	24	NC	0.11 J	0.0392 U	0.0385 U
<b>METALS (MG/KG)</b>					
CADMIUM	7	6.05	2.36	<b>17.5</b>	<b>28.6</b>
COPPER	310	17.6	37.2	248 J	<b>546 J</b>
LEAD	400	27	51.8	<b>633 J</b>	<b>599 J</b>
LITHIUM	16	30	12	<b>32.6</b>	<b>34.8 J</b>
MANGANESE	180	5700	250 J	799 J	1650 J
MERCURY	1	0.077	0.356	0.0511 J	0.109 J
NICKEL	150	22.1	22.1	<b>584 J</b>	<b>698 J</b>
SILVER	39	0.13	0.245 J	1.7 U	3.31 U
ZINC	2300	65.6	596	<b>4890</b>	<b>3500</b>

## Notes:

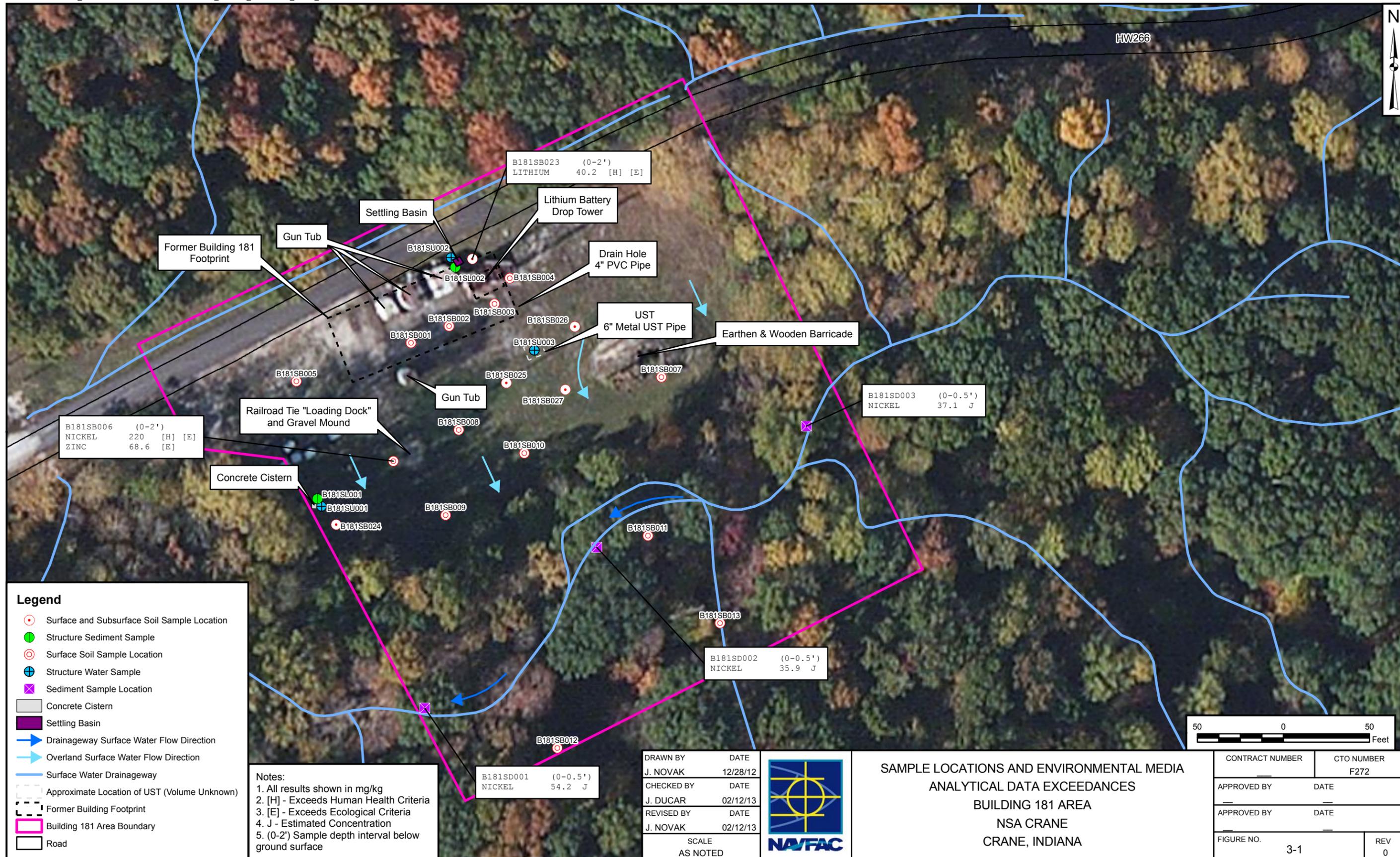
HH PSL - Human Health Project Screening Level

**Exceeds HHRA criteria**

J - Estimated Value

U - Concentration is below the laboratory detection limit

NC - No Criteria available.



**Legend**

- Surface and Subsurface Soil Sample Location
- Structure Sediment Sample
- Surface Soil Sample Location
- + Structure Water Sample
- × Sediment Sample Location
- Concrete Cistern
- Settling Basin
- Drainageway Surface Water Flow Direction
- Overland Surface Water Flow Direction
- Surface Water Drainageway
- Approximate Location of UST (Volume Unknown)
- Former Building Footprint
- Building 181 Area Boundary
- Road

**Notes:**  
 1. All results shown in mg/kg  
 2. [H] - Exceeds Human Health Criteria  
 3. [E] - Exceeds Ecological Criteria  
 4. J - Estimated Concentration  
 5. (0-2') Sample depth interval below ground surface

DRAWN BY	DATE
J. NOVAK	12/28/12
CHECKED BY	DATE
J. DUCAR	02/12/13
REVISED BY	DATE
J. NOVAK	02/12/13
SCALE AS NOTED	



**SAMPLE LOCATIONS AND ENVIRONMENTAL MEDIA  
 ANALYTICAL DATA EXCEEDANCES  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA**

CONTRACT NUMBER	CTO NUMBER
	F272
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
3-1	0



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## **APPENDIX A**

### **SITE INFORMATION**

**A.1 SOIL BORING LOGS**

**A.2 SOIL SAMPLE LOGS, CHAIN-OF-CUSTODIES  
AND FIELD NOTES**

## **A.1 SOIL BORING LOGS**



Tetra Tech

# BORING LOG

Page \_\_\_ of \_\_\_

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B-1815B001  
 DATE: 4/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)						
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**			
					loose	gray	gravel	gr								
	1		5													
	2		5		stiff	brn	silty clay	cl								
	3															
	4															
	5															

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: no refusal

Drilling Area  
 Background (ppm): —

Converted to Well: Yes        No        Well I.D. #:



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B181SB002  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)				
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
			3/4			gray	gravel	gr						
1														
2						Soft gray	Silty Clay	CC	moist					
3														
4														
5														

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: No refusal

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:







# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B18153005  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
			4/4		Stiff	BRN	Silty clay	CC					
	1												
	2												
	3												
	4												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: No refusal

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B18153006  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	1		3/4		Stiff BEM		Silty Clay LL		Some gravel to 6"				
	2												
	3												
				3-5	Hard BEM		Weathered Sandstone						
	4				Stiff BEM		Silty Clay						
				EOD									

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: No refusal

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #:





# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B18153008  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
					Stiff	Ben	Silty Clay	CL					
	1		2										
			2										
	2			EOB									
	3												
	4												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: No refusal

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_





# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B181SB010  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
					loose gray gravel		gn						
			4	6"									
1					stiff brown silty clay		cc						
			4										
2													
3													
4													
				EOB									

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: No refusal

Drilling Area  
 Background (ppm):

Converted to Well: Yes  No  Well I.D. #:



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# BORING LOG

Page \_\_\_ of \_\_\_

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo-Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB011  
 DATE: 9/10/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
					Soft	DK Ben	Topsoil	OH					
				6"									
	1		2		Stiff Ben		Silty Clay	LL					
	2		2										
				BOB									
	3												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger No refusal

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo-Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB012  
 DATE: 09/10/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)				
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
					Soft	BRN	topsoil	OH						
				6"										
1		2			Stiff	BRN	Silty clay	CL						
		2												
2														
				EOS										
3														

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger No Refusal

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:





# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB014  
 DATE: 10/04/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Soft	DK Brown	Topsoil	OH	Organics to 1.5				
				6"									
	1				Stiff	BRN	Silty Clay	CL					
	2								Some Sandstone fragments				
					EOB								
	3												
	4												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB015  
 DATE: 10/04/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Soft	DK Brn	Topsoil	OH	Organics to 1.0				
			2	6"									
	1				Stiff	Brn	Silty Clay	CL					
			2										
	2												
					EOB								
	3												
	4												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: GeoLogic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB016  
 DATE: 10/04/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)									
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**						
	<u>0</u>																		
						<u>Soft</u>	<u>DK Brown</u>	<u>Topsoil</u>	<u>OH</u>	<u>Organics to 1.0</u>									
				<u>6"</u>		<u>Stiff</u>	<u>BRN</u>	<u>Silty Clay</u>	<u>CL</u>										
	<u>1</u>		<u>2</u>																
			<u>2</u>																
	<u>2</u>				<u>EOB</u>														
	<u>3</u>																		
	<u>4</u>																		

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #:





# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB 018  
 DATE: 10/04/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	<u>0</u>				<u>Soft</u>	<u>DK Brn</u>	<u>Topsoil</u>	<u>OH</u>	<u>Organics to 1.5</u>				
				<u>6"</u>									
	<u>1</u>	<u>2</u>			<u>Stiff</u>	<u>Brn</u>	<u>Silty Clay</u>	<u>CL</u>					
		<u>2</u>											
	<u>2</u>			<u>EOB</u>									
	<u>3</u>												
	<u>4</u>												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: GeoLogic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB 019  
 DATE: 10/04/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	<u>0</u>				Soft	<u>DK Brown</u>	<u>Topsoil</u>	<u>OH</u>	<u>Organics to 1.5</u>				
				<u>6"</u>									
	<u>1</u>		<u>2</u>		Stiff	<u>BRN</u>	<u>Silty Clay</u>	<u>CL</u>					
			<u>2</u>										
	<u>2</u>												
				<u>EOB</u>									
	<u>3</u>												
	<u>4</u>												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: GeoLogic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB 020  
 DATE: 10/4/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			USCS*	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Soft DK Brown		Topsoil	OH	Organics to 1.5				
				6"									
	1		2/		Stiff Brown		Silty clay	CL					
			12										
	2												
					EOB								
	3												
	4												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB021  
 DATE: 10/04/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	<u>0</u>				<u>Soft</u>	<u>DK Brn</u>	<u>Topsoil</u>	<u>OH</u>	<u>Organics to 1.5</u>				
			<u>2/ -6"</u>		<u>Stiff</u>	<u>Brn</u>	<u>Silty Clay</u>	<u>CL</u>					
	<u>1</u>												
			<u>2</u>										
	<u>2</u>			<u>EOB</u>									
	<u>3</u>												
	<u>4</u>												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #:



# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Geo Logic  
 DRILLING RIG: 66DT track geoprobe

BORING No.: B181SB022  
 DATE: 10/4/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: Braiden Cockran

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	0				Soft	DK Brown	Topsoil	OH	Organics to 1.5				
			2	6"	Stiff	BRN	Silty Clay	CL					
	1												
			2										
	2												
				EOB									
	3												
	4												

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Hand Auger to 2 feet.

Drilling Area Background (ppm):                     

Converted to Well: Yes                      No                      Well I.D. #:







# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B18193025  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)				
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
					STIFF	BAN	Silty Clay	CC						
			3.5											
	3		4.0											
			3.2											
	6		4.0											
			3.6											
	4		4.0											
			4.0	12.5' / 10.2'		LT BAN	Sand	SC	moist					
						M. STIFF BAN	Sandy Clay	CC						
	12					Hard BAN	well sorted Sandstone							
				EDP 12.0										
	15													

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Refract at 120'

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:





# BORING LOG

PROJECT NAME: B-181  
 PROJECT NUMBER: 112G02126  
 DRILLING COMPANY: Micah Group  
 DRILLING RIG: Truck DPT

BORING No.: B18153027  
 DATE: 9/9/12  
 GEOLOGIST: K. Losekamp  
 DRILLER: M. Stafford

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)							
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**				
				6"	Coarse	gray	gravel										
			3.5		stiff	BRN	Silty Clay		some sand								
	3		4.0														
			3.0														
	6		4.0														
			3.3														
	4		4.0														
			4.0	10'2"	stiff	BRN	Sand		sc water at 10'2"								
	12																
	14																

\* When rock coring, enter rock brokenness.

\*\* Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: Refusal at 12'

Drilling Area Background (ppm):     

Converted to Well: Yes      No      Well I.D. #:

## **A.2 SOIL SAMPLE LOGS, CHAIN-OF-CUSTODIES & FIELD NOTES**



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181  
 Project No.: 112G02126

Sample ID No.: B1815001002  
 Sample Location: B1815B001  
 Sampled By: CR + KL  
 C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Time: <u>1305</u>			
Method: <u>DT</u>			
Monitor Reading (ppm): <u>NA</u>			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
<u>Metals</u>	<u>1 4oz</u>	<input checked="" type="checkbox"/>	
<u>explosives</u>	<u>1 4oz</u>	<input checked="" type="checkbox"/>	

**OBSERVATIONS / NOTES:****MAP:**

*(This area is currently blank for observations and notes.)*

*(This area is currently blank for a map.)*

**Circle if Applicable:**

MS/MSD  Duplicate ID No.:                     

Signature(s): *OK - Jay*



Tetra Tech

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page      of     

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181550020002  
Sample Location: B1815B002  
Sampled By: CR + KL  
C.O.C. No.:                     

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

Type of Sample:  
 Low Concentration  
 High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9/12</u>	<u>0-2</u>	<u>BEN</u>	<u>Silty Clay</u>
Time: <u>1315</u>			
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Explosives</u>	<u>1 4oz</u>	<input checked="" type="checkbox"/>	
<u>Metals</u>	<u>1 4oz</u>	<input checked="" type="checkbox"/>	

### OBSERVATIONS / NOTES:

### MAP:

*(Empty area for observations and notes)*

*(Empty area for map)*

### Circle if Applicable:

MS/MSD  Duplicate ID No.:                     

### Signature(s):

*(Handwritten signature)*



Tetra Tech

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page      of     

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181SS0040002  
Sample Location: B181 SB003  
Sampled By: CR + KL  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>4/9/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Time: <u>1335</u>			
Method: <u>BPI</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Explosives</u>		<input checked="" type="checkbox"/>	
<u>Metals</u>		<input checked="" type="checkbox"/>	

### OBSERVATIONS / NOTES:

### MAP:

*(Empty area for observations and notes)*

*(Empty area for map)*

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:                     

*(Handwritten signatures)*



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181SS0030002  
Sample Location: B181S3003  
Sampled By: CR + KL  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9/12</u>	<u>B-2</u>	<u>BEN</u>	<u>Silty Clay</u>
Time: <u>1330</u>			
Method: <u>DPI</u>			
Monitor Reading (ppm): <u>NA</u>			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
<u>EXPLOSIVES</u>	<u>✓ 1402</u>	<u>✓</u>	
<u>Metals</u>	<u>1402</u>	<u>✓</u>	

**OBSERVATIONS / NOTES:**

**MAP:**

*(Empty area for observations and notes)*

*(Empty area for map)*

**Circle if Applicable:**

MS/MSD            Duplicate ID No.:           

**Signature(s):**

*(Handwritten signature: OK - EJ)*



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# SOIL & SEDIMENT SAMPLE LOG SHEET

Page      of     

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181SS0050002  
Sample Location: B181S3005  
Sampled By: CR + KL  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1410</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Explosives</u>	<u>1 4oz</u>	<u>✓</u>	
<u>Metals</u>	<u>1 4oz</u>	<u>✓</u>	

### OBSERVATIONS / NOTES:

### MAP:

*(Empty area for observations and notes)*

*(Empty area for map)*

### Circle if Applicable:

MS/MSD                      Duplicate ID No.:                     

Signature(s): *CR + KL*



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181550060002  
Sample Location: B18153006  
Sampled By: CR + KL  
C.O.C. No.:                     

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

Type of Sample:  
 Low Concentration  
 High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1415</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:



Tetra Tech

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page      of     

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181550090002  
Sample Location: B18153007  
Sampled By: CR + KL  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1430</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>EX</u>			
<u>Metals</u>			

### OBSERVATIONS / NOTES:

### MAP:

*(Empty area for observations and notes)*

*(Empty area for map)*

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:

B181 FD090912-03

*(Handwritten signature)*



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181      Sample ID No.: B181550080002  
 Project No.: 112G02126      Sample Location: B18153008  
 Sampled By: CR + KL  
 C.O.C. No.: \_\_\_\_\_  
 Surface Soil      Type of Sample:  
 Subsurface Soil       Low Concentration  
 Sediment       High Concentration  
 Other: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_

**GRAB SAMPLE DATA:**

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1426</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Method: <u>PPI</u>			
Monitor Reading (ppm): <u>NA</u>			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other

**OBSERVATIONS / NOTES:**

MAP: \_\_\_\_\_

Circle if Applicable:      Signature(s): *[Signature]*

MS/MSD	Duplicate ID No.:
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# SOIL & SEDIMENT SAMPLE LOG SHEET

Page \_\_\_ of \_\_\_

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181SS0090002  
Sample Location: B181S3009  
Sampled By: CR + KL  
C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1600</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): NA			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181      Sample ID No.: B181SS0100002  
 Project No.: 112G02126      Sample Location: B181SB010  
 Sampled By: CR + KL  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Surface Soil  
 Subsurface Soil  
 Sediment  
 Other: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Low Concentration  
 High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty clay</u>
Time: <u>1555</u>			
Method: <u>DPT</u>			
Monitor Reading (ppm): NA			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other

**OBSERVATIONS / NOTES:**

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): 
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# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSA Crane B181  
 Project No.: 112G02126

Sample ID No.: B181SS 0110002  
 Sample Location: B181SB0 11  
 Sampled By: KL, JF, JG  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
9/10/22	0-2	BRN	Silty Clay
Time: 1045			
Method: Hand Auger			
Monitor Reading (ppm NA)			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

**OBSERVATIONS / NOTES:****MAP:****Circle if Applicable:****Signature(s):**

MS/MSD

Duplicate ID No.:



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSA Crane B181  
 Project No.: 112G02126

Sample ID No.: B181SS0120002  
 Sample Location: B181SB012  
 Sampled By: KL, JF, JG  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/10/12</u>	0-2	BRN	Silty clay
Time: <u>1050</u>			
Method: <u>Hand Auger</u>			
Monitor Reading (ppm NA)			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

**OBSERVATIONS / NOTES:****MAP:****Circle if Applicable:****Signature(s):**

MS/MSD

Duplicate ID No.:





Tetra Tech

# SOIL & SEDIMENT SAMPLE LOG SHEET

Page \_\_\_ of \_\_\_

Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS0140002  
Sample Location: B181SB014  
Sampled By: KL, JF, JG  
C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>10/04/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1300</u>	0-2	BEN	Silty Clay
Method: Hand Auger			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



Tetra Tech

# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NSA Crane B181  
 Project No.: 112G02126

Sample ID No.: B181SS0150002  
 Sample Location: B181SB0015  
 Sampled By: KL, JF, JG  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10/4/12</u>	<u>0-2</u>	<u>BRW</u>	<u>Silty clay</u>
Time: <u>1320</u>			
Method: <u>Hand Auger</u>			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

Observations / Notes area (empty)

MAP area (empty)

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:

*KL-JF*



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS 0160002  
Sample Location: B181SB0 016  
Sampled By: KL, JF, JG  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10/04/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty clay</u>
<u>1340</u>			
Method: <u>Hand Auger</u>			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:

OK - JF



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS 0170002  
Sample Location: B181SB0 017  
Sampled By: KL, JF, JG  
C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>10/04/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1400</u>	0-2	BRN	Silty clay
Method: Hand Auger			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSA Crane B181  
 Project No.: 112G02126

Sample ID No.: B181SS 0180002  
 Sample Location: B181SB0 018  
 Sampled By: KL, JF, JG  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date: <u>10/04/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1420</u>	0-2	BRN	Silty clay
Method: Hand Auger			
Monitor Reading (ppm NA)			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

**OBSERVATIONS / NOTES:****MAP:**

Observations / Notes area (empty).

MAP area (empty).

**Circle if Applicable:****Signature(s):**

MS/MSD  Duplicate ID No.: \_\_\_\_\_

Signature(s): K-SP



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# SOIL & SEDIMENT SAMPLE LOG SHEET

Page      of     

Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS 0190002  
Sample Location: B181SB0 19  
Sampled By: KL, JF, JG  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10/04/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Time: <u>1440</u>			
Method: <u>Hand Auger</u>			
Monitor Reading (ppm NA)			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

**OBSERVATIONS / NOTES:****MAP:**

*(Empty area for observations and notes)*

*(Empty area for map)*

**Circle if Applicable:****Signature(s):**

MS/MSD      Duplicate ID No.:                     

*(Handwritten signature: KL SP)*



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# SOIL & SEDIMENT SAMPLE LOG SHEET

Page \_\_\_ of \_\_\_

Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS 0200002  
Sample Location: B181SB0 20  
Sampled By: KL, JF, JG  
C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>10/04/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1500</u>	0-2	BRN	Silty clay
Method: Hand Auger			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:

*KL JF JG*



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS 0210002  
Sample Location: B181SB0 21  
Sampled By: KL, JF, JG  
C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10/04/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty clay</u>
Time: <u>1520</u>			
Method: <u>Hand Auger</u>			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD      Duplicate ID No.: \_\_\_\_\_

[Signature]



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181S2001  
Sample Location: B181S2001  
Sampled By: KL, JF, JG  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10/4/12</u>	<u>2"</u>	<u>LT BRN</u>	<u>Sandy silt</u>
Time: <u>1130</u>	<u>0-2</u>		
Method: <u>Hand Auger Steel rod/wip</u>			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	<u>2/67 Amber</u>	X	
Metals	<u>24oz 500ml plastic</u>	X	

### OBSERVATIONS / NOTES:

### MAP:

Concrete cistern. only 2" of sediment at bottom. Steel Rod with cup on end to sample.

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: NSA Crane B181  
Project No.: 112G02126

Sample ID No.: B181SS-022-0002  
Sample Location: B181SB0-022  
Sampled By: KL, JF, JG  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>10/4/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1540</u>	0-2	BRN	silty clay
Method: Hand Auger			
Monitor Reading (ppm NA)			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Explosives	1 4 oz	x	
Metals	1 4oz	x	

### OBSERVATIONS / NOTES:

### MAP:

*(Empty area for observations and notes)*

*(Empty area for map)*

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181 Sample ID No.: B181SS0230002  
 Project No.: 112G02126 Sample Location: B181S13023  
 Sampled By: CR + KL  
 C.O.C. No.: \_\_\_\_\_  
 Surface Soil  
 Subsurface Soil  
 Sediment  
 Other: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Time: <u>1340</u>			
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

MAP:

Circle if Applicable: MS/MSD Duplicate ID No.: B181 FD090912-01 Signature(s):







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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181  
 Project No.: 112G02126

Sample ID No.: B18155024002  
 Sample Location: 1318155024  
 Sampled By: CR + KL  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
<u>1615</u>			
<u>DPT</u>			
Monitor Reading (ppm): NA			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

### MAP:

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



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# SOIL & SEDIMENT SAMPLE LOG SHEET

Page      of     

Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B1810240810<sup>SB</sup>  
Sample Location: B18153024  
Sampled By: CR + KL  
C.O.C. No.:                     

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

Type of Sample:  
 Low Concentration  
 High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1620</u>	<u>8-10</u>	<u>BRN</u>	<u>silty sandy claywet.</u>
Method: <u>PPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

Water at 8' - very cold  
possible spring water.

### MAP:

### Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):





# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181  
 Project No.: 112G02126

Sample ID No.: B181550250002  
 Sample Location: B1815B025  
 Sampled By: CR + KL  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1540</u>	<u>0-2</u>	<u>DK BRN</u>	<u>Silty clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): NA			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other

**OBSERVATIONS / NOTES:****MAP:****Circle if Applicable:****Signature(s):**

MS/MSD

Duplicate ID No.:



Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181S30250810  
Sample Location: B181S3025  
Sampled By: CR + KL  
C.O.C. No.:

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

Type of Sample:  
 Low Concentration  
 High Concentration

GRAB SAMPLE DATA:

Date: 4/9/12	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1545	8-10	BRN	Sandy Clay
Method: DPT			
Monitor Reading (ppm): NA			

COMPOSITE SAMPLE DATA:

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

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Refusal at 12.2"

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181  
 Project No.: 112G02126

Sample ID No.: B181SB025102  
 Sample Location: B181SB025  
 Sampled By: CR + KL  
 C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1550</u>	<u>10-12</u>	<u>DK BRN</u>	<u>Sandy clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): NA			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

### MAP:

Refusal at 12' 2"  
Use 10' deep.

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B18155026002  
Sample Location: B18153026  
Sampled By: CR + KL  
C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date: <u>9/9/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1440</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty Clay</u>
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

### MAP:

MS/MSD

Circle if Applicable:

Signature(s):

MS/MSD

Duplicate ID No.:





# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181  
 Project No.: 112G02126

Sample ID No.: B181SB0261214  
 Sample Location: B181SB026  
 Sampled By: CR + KL  
 C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/9/12</u>	<u>12-14</u>	<u>BRN</u>	<u>Sandy Clay</u>
<u>1455</u>			
<u>DPT</u>			
Monitor Reading (ppm): NA			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other

**OBSERVATIONS / NOTES:****MAP:**

*(This area is currently blank for observations and notes.)*

*(This area is currently blank for a map.)*

**Circle if Applicable:****Signature(s):**

**MS/MSD** Duplicate ID No.:                     

*(This area is currently blank for a signature.)*



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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B181550270002  
Sample Location: B1815B027  
Sampled By: CR + KL  
C.O.C. No.:                     

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

Type of Sample:  
 Low Concentration  
 High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>9/19/12</u>	<u>0-2</u>	<u>BRN</u>	<u>Silty clay</u>
Time: <u>1510</u>			
Method: <u>DPT</u>			
Monitor Reading (ppm): <u>NA</u>			

### COMPOSITE SAMPLE DATA:

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

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>Explosives</u>			
<u>Metals</u>			

### OBSERVATIONS / NOTES:

MS/MSD

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):







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# SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B18152001  
Sample Location: B18152001  
Sampled By: CR + KL  
C.O.C. No.: \_\_\_\_\_

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

- Type of Sample:
- Low Concentration
  - High Concentration

### GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>10/4/12</u>	<u>0-.2'</u>	<u>lt grey/ben</u>	<u>very wet silty sandy</u>
Time: <u>1130</u>			
Method: <u>Wagon pole</u>			
Monitor Reading (ppm): NA			

### COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

### SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

### OBSERVATIONS / NOTES:

### MAP:

Location collected from concrete cistern.

### Circle if Applicable:

### Signature(s):

MS/MSD

Duplicate ID No.:



# SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: Building 181  
 Project No.: 112G02126

Sample ID No.: B18156002  
 Sample Location: B18156002  
 Sampled By: CR + KL  
 C.O.C. No.:                     

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

- Type of Sample:
- Low Concentration
  - High Concentration

**GRAB SAMPLE DATA:**

Date: <u>09/10/12</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1200</u>	<u>0-1"</u>	<u>LT BRN</u>	<u>Silt some sand</u>
Method: <u>froncl</u>			
Monitor Reading (ppm): <u>NA</u>			

**COMPOSITE SAMPLE DATA:**

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

**SAMPLE COLLECTION INFORMATION:**

Analysis	Container Requirements	Collected	Other
<u>Metals</u>			
<u>Explosives</u>			

**OBSERVATIONS / NOTES:****MAP:**

*(Empty area for observations and notes)*

*(Empty area for map)*

**Circle if Applicable:****Signature(s):**

MS/MSD

Duplicate ID No.:

B181 PD091012-02

*(Handwritten signature)*







Project Site Name: Building 181  
Project No.: 112G02126

Sample ID No.: B18150003  
Sample Location: B18150003  
Sampled By: CR + KL  
C.O.C. No.:

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

Type of Sample:  
 Low Concentration  
 High Concentration

GRAB SAMPLE DATA:

Date: 09/10/12	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1040	0-6"	LT BRN	Sand
Method: freeze 1			
Monitor Reading (ppm): NA			

COMPOSITE SAMPLE DATA:

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

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Metals	1 402	X	
Explosives	1 402	X	

OBSERVATIONS / NOTES:

MAP:

Observations and notes area (empty).

Map area (empty).

Circle if Applicable:

MS/MSD Duplicate ID No.:

Signature(s):

Handwritten signature









PROJECT NO: 112602126	FACILITY: NSA CRANE	PROJECT MANAGER Ralph Basinski	PHONE NUMBER 912-921-8308	LABORATORY NAME AND CONTACT: Empirical Lab Brian Richards
SAMPLERS (SIGNATURE) 		FIELD OPERATIONS LEADER Kevin Cosetump	PHONE NUMBER 513-333-3680	ADDRESS 621 Mainstream Drive Suite 22
STANDARD TAT <input type="checkbox"/> RUSH TAT <input type="checkbox"/> <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 72 hr. <input type="checkbox"/> 7 day <input type="checkbox"/> 14 day			CARRIER/WAYBILL NUMBER	
			CITY, STATE Nashville, TN 37228	

DATE YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)		PRESERVATIVE USED	TYPE OF ANALYSIS	COMMENTS
9/9	1305	B181SS0010002	SB 001	0	2	SO	G	2	X	X			
	1315	B181SS0020002	SB 002	0	2			4	X	X	X		
	1330	B181SS0030002	SB 003	0	2				X	X			
	1335	B181SS0040002	SB 004	0	2	QC	G		X	X			
	1410	B181SS0050002	SB 005	0	2				X	X			
	1340	B181SS0060002	SB 006	0	2				X	X			
9/9	1345	B181SB0230204		2	4				X	X			
	1350	B181SB0230406		4	6			6	X	X			MS/MSD
	XXXX	B181FD09091201	QC	-	-	SO	G	2	X	X			B181SS0230002
	XXXX	B181FD09091202	QC	-	-	SO	G	2	X	X			B181SB0230406
	1415	B181SS0060002	SB 006	0	2	SO	G	2	X	X			
	1420	B181SS0080002	SB 008	0	2	SO	G	2	X	X			
	1430	B181SS0070002	SB 007	0	2	SO	G	2	X	X			

1. RELINQUISHED BY Kevin Cosetump	DATE 9/11/12	TIME	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS







PROJECT NO: 11261021210	FACILITY: NSA Crane	PROJECT MANAGER: Ralph Basinski	PHONE NUMBER: 412-921-8308	LABORATORY NAME AND CONTACT: Empirical Labs Benia Richards
SAMPLERS (SIGNATURE) 		FIELD OPERATIONS LEADER: Kevin Loskamp	PHONE NUMBER: 513-333-3680	ADDRESS: 621 Mainstream Dr Suite 210
		CARRIER/WAYBILL NUMBER: Fed Ex 8013 8269 1063		CITY, STATE: Nashville TN 37228

STANDARD TAT   
RUSH TAT   
 24 hr.  48 hr.  72 hr.  7 day  14 day

DATE YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)		PRESERVATIVE USED	TYPE OF ANALYSIS	COMMENTS
10/4	1300	B1815S0140002	SB 014	15	2	SO	G	2	X	X			
	1320	B1815S0150002	SB 015										
	1340	B1815S0160002	SB 016										
	1400	B1815S0170002	SB 017										
	1420	B1815S0180002	SB 018										
	1440	B1815S0190002	SB 019										
	1500	B1815S0200002	SB 020										
	1520	B1815S0210002	SB 021										
	1540	B1815S0220002	SB 022	↓	↓	↓	↓	↓	↓	↓			
	1030	B1815U003	SU 003	-	-	SW	G	4			X	X	
	1100	B1815U001	SU 001	-	-	SW	G	4			X	X	
✓	1130	B1815L001	SL 001	-	-	SD	G	2	X	X			

1. RELINQUISHED BY Kevin Loskamp	DATE 10/5/12	TIME 1800	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

**TITLE** B-181 Soil  
Characterization  
Field Event

**PROJECT NO.** 112602126

**BOOK NO.** 2706

Work continued from Page       

8/6/12 - Kevin Losekamp (KL) and  
1530 Chris Rumer (CR) arrive at  
Building 181 (B-181) to check  
utility clearance and to flag  
sampling locations in the vicinity  
of B-181

- Only 1 utility flag was found  
marked for compressed gas

- No surface water is available  
at locations SW 001/002/003

1630 - KL and CR arrive at trailer.  
KL calls Steve Reddit to notify  
of the need for utilities to be  
cleared at B-181. Steve Reddit  
stated that utilities would be  
clear by Tuesday 8/7/12 at  
1200.

- Sampling activities expected to  
begin on Wednesday 8/8/12  
following sampling at SWMU  
17.

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Work continued to Page

SIGNATURE

C. Rumer

DATE

8/6/12

WITNESS

DATE

Work continued from Page 1

Work continued from Page 2

8/6/12 - 1715 - KL and CR leave NSA  
Crane trailer. Site secure.

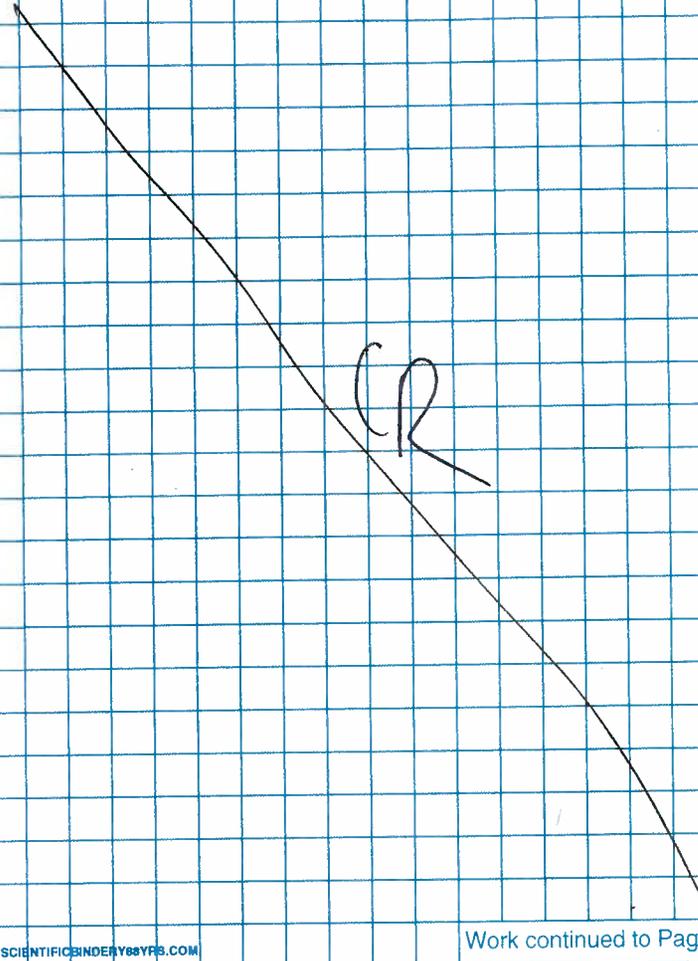
1215 - KL and CR arrive with Geo-Logic  
9/9/12 driller Dennis Samsel (DS) to  
perform DPT drilling at Bldg. 181  
CR/KL perform H3J Site Specific  
Training

1255 - Cistern at location SB023 has a  
2 foot depth. Subsurface samples  
at SB023 will be 2-4 ft. bgs.

At SB001, soil began 4 ft. below  
the surface; therefore, the surface  
soil samples will be collected  
from 0 to 2 feet beneath the  
gravel surface

Depth of underground storage tank (ust)  
is 10 ft. bgs.

1610 Concrete cistern located N of  
SB024 is 8 ft. deep. Subsurface  
samples will be collected from 8-10  
and 10-12 ft. bgs providing  
there is no refusal



SIGNATURE

C. R. or

DATE

8/6/12

WITNESS

DATE

SIGNATURE

C. R. or

DATE

9/9/12

WITNESS

DATE

Work continued from Page 3

1640 KL/CR/DS completed soil sampling for locations SB001-SB010 and SB023-SB027. Subsurface soil sampling is complete. DPT rig has been mounted and will be moved to trailer. Supplies collected: COCs completed for collected samples as well as sample labeling and packaging.

1710 KL/CR/DS arrive at trailer

CR

Work continued to Page 5

SIGNATURE C. R. a

DATE 9/9/12

WITNESS

DATE

Work continued from Page 4

1050 9/10/12 KL/CR/DS arrive at Building 181 to continue sampling effort. Plan is to collect sediment/surface water samples as well as hand auger surface soil sample locations SB011-SB013

1215 KL/CR/DS complete sampling goals at B-181. Peristaltic pump shipped from Pine Environmental does not operate, therefore UST and cistern next to SB024 were not sampled.

1235 KL/CR/DS arrive at trailer

CR

Work continued to Page 6

SIGNATURE C. R. a

DATE 9/10/12

WITNESS

DATE

TITLE

PROJECT NO.

BOOK NO.

TITLE 15181

PROJECT NO. 112602126

BOOK NO.

10/9/12

Work continued from Page

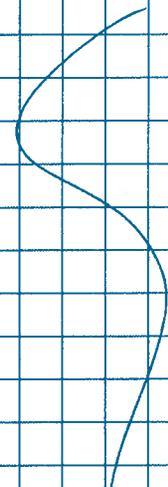
Work continued from Page

0900: JK, KL, + Brandy Lockman (Geologic)  
Set up to collect samples from  
the UST + concrete cistern. There  
is no <sup>Sediment</sup> ~~water~~ in the UST, and about  
4 inches of water. Minor Sediment  
in the concrete cistern and about  
3 inches of water.

1200-1230: Lunch

1230-1645: Collect remaining Hand Auger  
Locations: SR014 + 022.

1700: Offsite



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Work continued to Page

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10/4/12

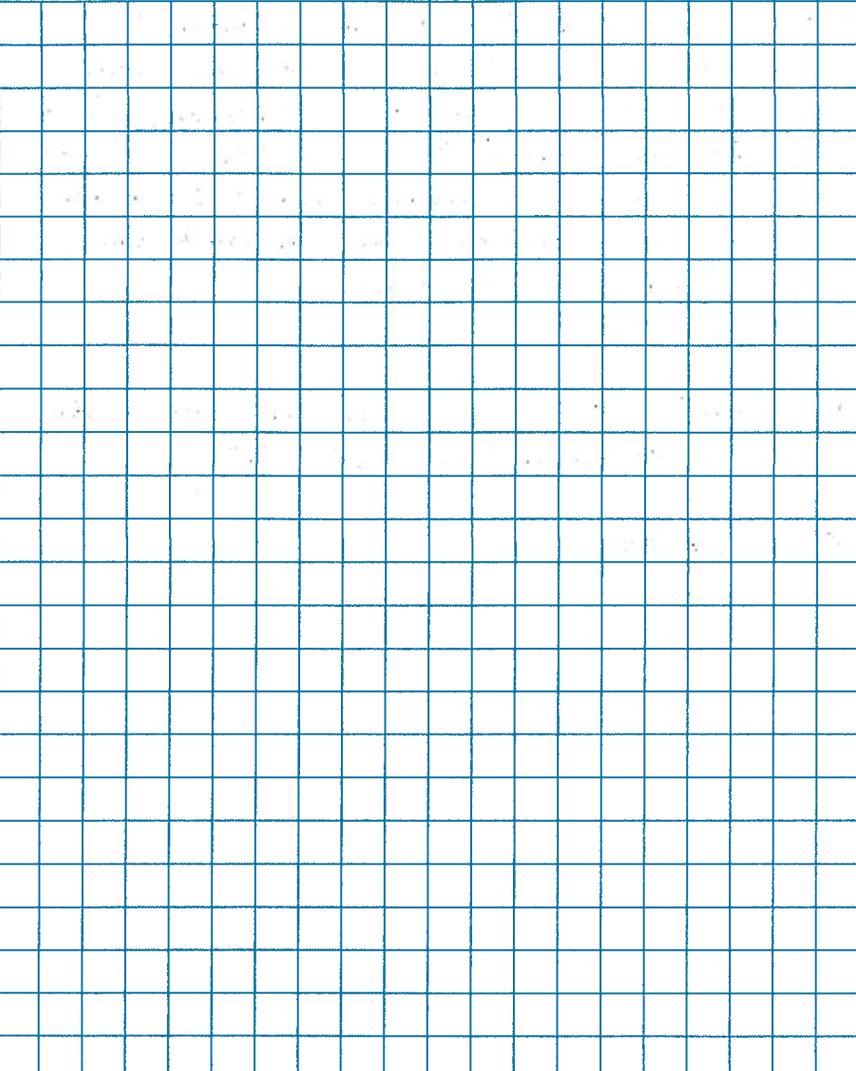
7

TITLE

PROJECT NO.

BOOK NO.

Work continued from Page



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Work continued to Page

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DATE

TITLE

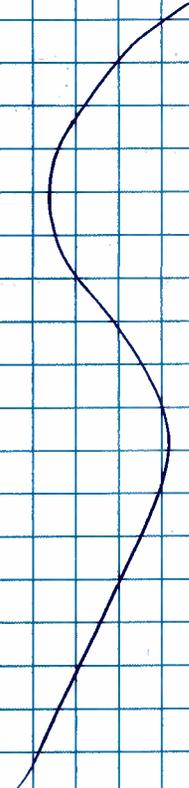
PROJECT NO.

BOOK NO.

10/05/12

Work continued from Page

1300-1530- KL + Surveyors complete  
Survey of All locations in  
Open area of B181 footprint  
and All sediment samples



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Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

*KL Sp*

10/05/12

TITLE B181

PROJECT NO. 112602126

BOOK NO.

TITLE

PROJECT NO.

BOOK NO.

11/6/12

Work continued from Page

Work continued from Page

1300: KC + Survey crew onsite to complete survey of all hand Auger locations.

1500: Locations: 9B22, 019, 016 can not be located. Flagging has been moved.

1600: Survey of all locations at B181 now complete.

*[Large handwritten flourish or signature]*

Work continued to Page

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

SIGNATURE

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WITNESS

DATE

TITLE 13181

Feb 8<sup>th</sup>

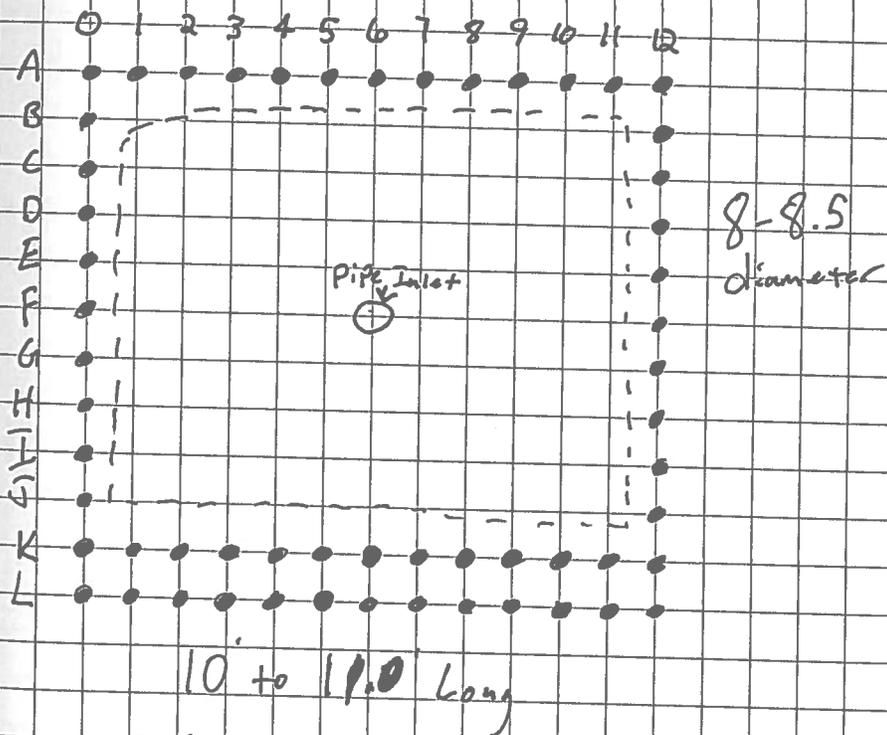
PROJECT NO. 112602126

BOOK NO. 2702

Work continued from Page

-- approx tank size

- 1' x 1' grid - transects run on each line.



- Spray<sup>paint</sup> Used to mark Nodes and a dashed Spray paint line to mark approx tank size.

- Magnetometer zero'd in a metal free zone before work started.

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Work continued to Page

SIGNATURE *[Signature]*

DATE 2/8/13

WITNESS

DATE

## **APPENDIX B**

### **LABORATORY DATA TABLES**

TABLE B-1  
SURFACE SOIL SAMPLE ANALYSES  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 1 OF 4

LOCATION	B181SB001	B181SB002	B181SB003	B181SB004	B181SB005	B181SB006	B181SB007	
SAMPLE ID	B181SS0010002	B181SS0020002	B181SS0030002	B181SS0040002	B181SS0050002	B181SS0060002	B181SS0070002	B181SS0070002-D
SAMPLE DATE	20120909	20120909	20120909	20120909	20120909	20120909	20120909	20120909
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
MATRIX	SO							
SAMPLE TYPE	NORMAL							
SUBMATRIX	SS							
TOP DEPTH	0	0	0	0	0	0	0	0
BOTTOM DEPTH	2	2	2	2	2	2	2	2
<b>EXPLOSIVES (MG/KG)</b>								
1,3,5-TRINITROBENZENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
1,3-DINITROBENZENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
2,4,6-TRINITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
2,4-DINITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
2,6-DINITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
2-AMINO-4,6-DINITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
2-NITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
3-NITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
4-AMINO-2,6-DINITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
4-NITROTOLUENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
HMX	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
NITROBENZENE	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
RDX	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
TETRYL	0.0388 U	0.0392 U	0.0392 U	0.0388 U	0.0396 U	0.0392 U	0.0392 U	0.0388 U
<b>METALS (MG/KG)</b>								
CADMIUM	0.581 U	0.619 U	0.601 U	0.608 U	0.573 U	0.56 U	0.588 U	0.583 U
COPPER	14.5	5.83	18.2	17.8	8.59	14.3	9.44	9.15
LEAD	17.6	11.4	13.4	13.3	16.2	23.1	11.6	11.2
LITHIUM	13.4 J	9.16	14.5	16.8	11.9	23.6	21.8	19.4
MANGANESE	525 J	1950 J	576 J	1000 J	922 J	1470 J	703	904
MERCURY	0.039	0.0399 J	0.0378 J	0.053	0.0309 U	0.0402	0.0432	0.0517
NICKEL	22.7	15.5	18.7	20.8	10.3	220	14.8	13
SILVER	0.581 U	0.619 U	0.601 U	0.608 U	0.573 U	0.56 U	0.588 U	0.583 U
TIN	14.5 U	15.5 U	15 U	15.2 U	14.3 U	14 U	14.7 U	14.6 U
ZINC	60.3	32.9	62.8	62.5	30.9	68.6	42	37

TABLE B-1  
SURFACE SOIL SAMPLE ANALYSES  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 2 OF 4

LOCATION	B181SB008	B181SB009	B181SB010	B181SB011	B181SB012	B181SB013	B181SB014	B181SB015
SAMPLE ID	B181SS0080002	B181SS0090002	B181SS0100002	B181SS0110002	B181SS0120002	B181SS0130002	B181SS0140002	B181SS0150002
SAMPLE DATE	20120909	20120909	20120909	20120910	20120910	20120910	20121004	20121004
SAMPLE CODE	NORMAL							
MATRIX	SO							
SAMPLE TYPE	NORMAL							
SUBMATRIX	SS							
TOP DEPTH	0	0	0	0	0	0	0	0
BOTTOM DEPTH	2	2	2	2	2	2	2	2
<b>EXPLOSIVES (MG/KG)</b>								
1,3,5-TRINITROBENZENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
1,3-DINITROBENZENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
2,4,6-TRINITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
2,4-DINITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
2,6-DINITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
2-NITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
3-NITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
4-AMINO-2,6-DINITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 UJ	0.04 UJ
4-NITROTOLUENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.031 J	0.04 U	0.0479 J
HMX	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
NITROBENZENE	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
RDX	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 UJ	0.04 UJ
TETRYL	0.0388 U	0.0385 U	0.0381 U	0.0392 U	0.0385 U	0.0396 U	0.04 U	0.04 U
<b>METALS (MG/KG)</b>								
CADMIUM	0.597 U	0.602 U	0.624 U	0.601 U	0.615 U	0.597 U	0.632 U	0.619 U
COPPER	8.92	7.89	10.3	11.7	9.84	8.23	9.02	12.7
LEAD	12.9	12.8	14.1	20.7 J	23 J	16.1 J	15.7	14.8
LITHIUM	8.93	9.7	9.28	7.79	9.65	7.55	8.71	14.3
MANGANESE	1990	1980	1750	1340	1240	1420	1110 J	298 J
MERCURY	0.0404	0.0363 J	0.0408 J	0.0615	0.06	0.0522	0.0382 J	0.0508
NICKEL	17.6	17	18.9	19 J	15 J	13 J	13.6	15.1
SILVER	0.597 U	0.602 U	0.624 U	0.601 U	0.615 U	0.597 U	0.632 U	0.619 U
TIN	14.9 U	15 U	15.6 U	15 U	15.4 U	14.9 U	15.8 U	15.5 U
ZINC	41.3	40.6	46.8	54.5	34.8	30.9	44.5	54

TABLE B-1  
SURFACE SOIL SAMPLE ANALYSES  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 3 OF 4

LOCATION	B181SB016	B181SB017	B181SB018	B181SB019	B181SB020	B181SB021A	B181SB022
SAMPLE ID	B181SS0160002	B181SS0170002	B181SS0180002	B181SS0190002	B181SS0200002	B181SS0210002	B181SS0220002
SAMPLE DATE	20121004	20121004	20121004	20121004	20121004	20121004	20121004
SAMPLE CODE	NORMAL						
MATRIX	SO						
SAMPLE TYPE	NORMAL						
SUBMATRIX	SS						
TOP DEPTH	0	0	0	0	0	0	0
BOTTOM DEPTH	2	2	2	2	2	2	2
<b>EXPLOSIVES (MG/KG)</b>							
1,3,5-TRINITROBENZENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
1,3-DINITROBENZENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
2,4,6-TRINITROTOLUENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
2,4-DINITROTOLUENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
2,6-DINITROTOLUENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
2-AMINO-4,6-DINITROTOLUENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
2-NITROTOLUENE	0.0388 U	0.04 U	0.0343 J	0.0508 J	0.0396 U	0.0396 U	0.0826
3-NITROTOLUENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
4-AMINO-2,6-DINITROTOLUENE	0.0388 UJ	0.04 UJ	0.0388 UJ	0.0388 UJ	0.0396 UJ	0.0396 UJ	0.0392 UJ
4-NITROTOLUENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
HMX	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
NITROBENZENE	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0396 U	0.0392 U
RDX	0.0388 UJ	0.04 UJ	0.0388 UJ	0.0388 UJ	0.0396 UJ	0.0396 UJ	0.0392 UJ
TETRYL	0.0388 U	0.04 U	0.0388 U	0.0388 U	0.0396 U	0.0244 J	0.0392 U
<b>METALS (MG/KG)</b>							
CADMIUM	0.621 U	0.61 U	0.593 U	0.629 U	0.636 U	0.619 U	0.621 U
COPPER	5.98	9.78	5.33	6.86	16	7.7	8.83
LEAD	12.1	13.5	8.25	16.2	16.6	14.7	11.1
LITHIUM	12.1	11.5	11.9	11.4	13.1	9	9.83
MANGANESE	687 J	647 J	166 J	1020 J	683 J	925 J	635 J
MERCURY	0.0528	0.049	0.04 J	0.0603	0.0457	0.0403 J	0.0295 J
NICKEL	15.3	12.8	9.11	11.7	16.9	11.1	13.8
SILVER	0.621 U	0.61 U	0.593 U	0.629 U	0.636 U	0.619 U	0.621 U
TIN	15.5 U	15.2 U	14.8 U	15.7 U	15.9 U	15.5 U	15.5 U
ZINC	36	35	32.1	41	53.4	35	45.5

TABLE B-1  
SURFACE SOIL SAMPLE ANALYSES  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 4 OF 4

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	B181SB023		B181SB024	B181SB025	B181SB026	B181SB027
	B181SS0230002 20120909 ORIG SO NORMAL SS 0 2	B181SS0230002-D 20120909 DUP SO NORMAL SS 0 2	B181SS0240002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0250002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0260002 20120909 NORMAL SO NORMAL SS 0 2	B181SS0270002 20120909 NORMAL SO NORMAL SS 0 2
<b>EXPLOSIVES (MG/KG)</b>						
1,3,5-TRINITROBENZENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
1,3-DINITROBENZENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
2,4,6-TRINITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
2,4-DINITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
2,6-DINITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
2-AMINO-4,6-DINITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
2-NITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
3-NITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
4-AMINO-2,6-DINITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
4-NITROTOLUENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
HMX	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 UJ	0.0381 U
NITROBENZENE	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
RDX	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 UJ	0.0381 U
TETRYL	0.0396 U	0.0388 U	0.0388 U	0.0396 U	0.0388 U	0.0381 U
<b>METALS (MG/KG)</b>						
CADMIUM	0.6 U	0.609 U	0.607 U	0.606 U	0.55 U	0.56 U
COPPER	15.4	14.5	9.25	18.4	8.72	9.75 J
LEAD	13.2	14.6	13.1	12.6	11.3	11.1
LITHIUM	40.2	37.5	11.8	12	9.18	10
MANGANESE	617 J	757 J	588	374	1050	1220
MERCURY	0.0324 U	0.0329 U	0.0338 J	0.0285 J	0.0368 J	0.0374
NICKEL	16.7	16.4	14.5	16.5	13.3	13.5
SILVER	0.6 U	0.609 U	0.607 U	0.606 U	0.55 U	0.56 U
TIN	15 U	15.2 U	15.2 U	15.2 U	13.8 U	14 U
ZINC	57.9	55.8	38.5	57.7	35.9	39 J

TABLE B-2  
SUBSURFACE SOIL SAMPLE ANALYSES  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 1 OF 2

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	B181SB023			B181SB024		B181SB025	
	B181SB0230204 20120909 NORMAL SO NORMAL SB 2 4	B181SB0230406 20120909 ORIG SO NORMAL SB 4 6	B181SB0230406-D 20120909 DUP SO NORMAL SB 4 6	B181SB0240810 20120909 NORMAL SO NORMAL SB 8 10	B181SB0241012 20120909 NORMAL SO NORMAL SB 10 12	B181SB0250810 20120909 NORMAL SO NORMAL SB 8 10	B181SB0251012 20120909 NORMAL SO NORMAL SB 10 12
<b>EXPLOSIVES (MG/KG)</b>							
1,3,5-TRINITROBENZENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
1,3-DINITROBENZENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
2,4,6-TRINITROTOLUENE	0.0396 U	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
2,4-DINITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
2,6-DINITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
2-AMINO-4,6-DINITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
2-NITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
3-NITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
4-AMINO-2,6-DINITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
4-NITROTOLUENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
HMX	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
NITROBENZENE	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
RDX	0.0396 U	0.0392 UJ	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
TETRYL	0.0396 U	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0392 U	0.0396 U
<b>METALS (MG/KG)</b>							
CADMIUM	0.611 U	0.621 U	0.636 U	0.597 U	0.589 U	0.601 U	0.592 U
COPPER	23.3	25.1	25.1	10.1	8.66	12.4	10.1
LEAD	17	11.1	13.7	8.32 J	6.77 J	8.3	7.93
LITHIUM	19.4	16.1	17.2	11.2	8.54	9.34	10.6
MANGANESE	432 J	201 J	317 J	128	75	426	176
MERCURY	0.0331 U	0.0325 UJ	0.0334 U	0.0205 J	0.0327 U	0.0311 U	0.0225 J
NICKEL	17	16.2	17.2	11.7 J	9.2 J	13.9	10.8
SILVER	0.611 U	0.621 U	0.636 U	0.597 U	0.589 U	0.601 U	0.592 U
TIN	15.3 U	15.5 U	15.9 U	14.9 U	14.7 U	15 U	14.8 U
ZINC	79.5	77	77.8	33.4	22.7	38.6	36.7

TABLE B-2

SUBSURFACE SOIL SAMPLE ANALYSES  
BUILDING 181 AREA  
NSA CRANE  
CRANE, INDIANA  
PAGE 2 OF 2

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	B181SB026		B181SB027	
	B181SB0261012 20120909 NORMAL SO NORMAL SB 10 12	B181SB0261214 20120909 NORMAL SO NORMAL SB 12 14	B181SB0270810 20120909 NORMAL SO NORMAL SB 8 10	B181SB0271012 20120909 NORMAL SO NORMAL SB 10 12
<b>EXPLOSIVES (MG/KG)</b>				
1,3,5-TRINITROBENZENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
1,3-DINITROBENZENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
2,4,6-TRINITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
2,4-DINITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
2,6-DINITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
2-AMINO-4,6-DINITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
2-NITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
3-NITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
4-AMINO-2,6-DINITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
4-NITROTOLUENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
HMX	0.0396 U	0.04 U	0.0396 U	0.0388 U
NITROBENZENE	0.0396 U	0.04 U	0.0396 U	0.0388 U
RDX	0.0396 U	0.04 U	0.0396 U	0.0388 U
TETRYL	0.0396 U	0.04 U	0.0396 U	0.0388 U
<b>METALS (MG/KG)</b>				
CADMIUM	0.576 U	0.553 U	0.577 U	0.608 U
COPPER	18.2	7.61	13.1	9.69
LEAD	16.8	11.4	14.5	9.72
LITHIUM	5.3 J	6.88	7.49	4.64 J
MANGANESE	451	575	241	243
MERCURY	0.03 J	0.0314 J	0.0215 J	0.0341 U
NICKEL	18.1	15.6	15.1	16.3
SILVER	0.576 U	0.553 U	0.577 U	0.608 U
TIN	14.4 U	13.8 U	14.4 U	15.2 U
ZINC	38.5	26.1	44.8	35.8

TABLE B-3

DRAINAGEWAY SEDIMENT SAMPLE ANALYSES  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 1 OF 1

LOCATION SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SAMPLE TYPE SUBMATRIX TOP DEPTH BOTTOM DEPTH	B181SW/SD001	B181SW/SD002		B181SW/SD003
	B181SD001 20120910 NORMAL SD NORMAL SD 0 0.5	B181SD002 20120910 ORIG SD NORMAL SD 0 0.5	B181SD002-D 20120910 DUP SD NORMAL SD 0 0.5	B181SD003 20120910 NORMAL SD NORMAL SD 0 0.5
<b>EXPLOSIVES (MG/KG)</b>				
1,3,5-TRINITROBENZENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
1,3-DINITROBENZENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
2,4,6-TRINITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
2,4-DINITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
2,6-DINITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
2-NITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
3-NITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
4-AMINO-2,6-DINITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
4-NITROTOLUENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
HMX	0.0381 U	0.0381 U	0.0385 U	0.04 U
NITROBENZENE	0.0381 U	0.0381 U	0.0385 U	0.04 U
RDX	0.0381 U	0.0381 U	0.0385 U	0.04 U
TETRYL	0.0381 U	0.0381 U	0.0385 U	0.04 U
<b>METALS (MG/KG)</b>				
CADMIUM	0.553 U	1.23 U	1.08 U	0.56 U
COPPER	21	13.1	25.3	16.3
LEAD	32.4 J	21.3 J	35.4 J	20.6 J
LITHIUM	9.24	7.14 J	7.74 J	7.62
MANGANESE	2590	1490 J	2650 J	1250
MERCURY	0.0508	0.0361 J	0.0457	0.0351 J
NICKEL	54.2 J	35.9 J	68 J	37.1 J
SILVER	0.553 U	1.23 U	1.08 U	0.56 U
TIN	13.8 U	30.7 U	27.1 U	14 U
ZINC	111	81.4 J	148 J	82.6

TABLE B-4

SUBSURFACE STRUCTURE WATER SAMPLE ANALYSES  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 1 OF 1

LOCATION	B181SU001/SL001A		B181SU002/SL002A	
	B181SL001		B181SL002	B181SL002-D
SAMPLE ID	20121004		20120910	20120910
SAMPLE DATE				
SAMPLE CODE	NORMAL		ORIG	DUP
MATRIX	SD		SD	SD
SAMPLE TYPE	NORMAL		NORMAL	NORMAL
SUBMATRIX	SD		SD	SD
TOP DEPTH	0		0	0
BOTTOM DEPTH	0.5		0.5	0.5
<b>EXPLOSIVES (MG/KG)</b>				
1,3,5-TRINITROBENZENE	0.0565 J		0.0392 U	0.0385 U
1,3-DINITROBENZENE	0.0548 J		0.0486 J	0.0558 J
2,4,6-TRINITROTOLUENE	0.0388 U		0.0392 U	0.0385 U
2,4-DINITROTOLUENE	0.0388 U		0.0392 U	0.056 J
2,6-DINITROTOLUENE	0.0388 U		0.0392 U	0.0385 U
2-AMINO-4,6-DINITROTOLUENE	0.0388 U		0.0392 U	0.0825
2-NITROTOLUENE	0.23		0.0392 U	0.161 J
3-NITROTOLUENE	0.0388 U		0.0252 J	0.0385 U
4-AMINO-2,6-DINITROTOLUENE	0.0477 J		0.0392 U	0.0385 U
4-NITROTOLUENE	0.0388 U		0.0392 U	0.0385 U
HMX	0.0388 U		0.0392 U	0.0385 U
NITROBENZENE	0.0206 J		0.0613 J	0.129 J
RDX	0.0388 UJ		0.0392 U	0.0385 U
TETRYL	0.11 J		0.0392 U	0.0385 U
<b>METALS (MG/KG)</b>				
CADMIUM	2.36		17.5	28.6
COPPER	37.2		248 J	546 J
LEAD	51.8		633 J	599 J
LITHIUM	12		32.6	34.8 J
MANGANESE	250 J		799 J	1650 J
MERCURY	0.356		0.0511 J	0.109 J
NICKEL	22.1		584 J	698 J
SILVER	0.245 J		1.7 U	3.31 U
TIN	14.3 U		42.4 U	82.8 U
ZINC	596		4890	3500

TABLE B-5

SUBSURFACE STRUCTURE SEDIMENT SAMPLE ANALYSES  
 BUILDING 181 AREA  
 NSA CRANE  
 CRANE, INDIANA  
 PAGE 1 OF 1

LOCATION	B181SU001/SL001	B181SU002/SL002A		B181SU003/SL003
SAMPLE ID	B181SU001	B181SU002	B181SU002-D	B181SU003
SAMPLE DATE	20121004	20120910	20120910	20121004
SAMPLE CODE	NORMAL	ORIG	DUP	NORMAL
MATRIX	SW	SW	SW	SW
SAMPLE TYPE	NORMAL	NORMAL	NORMAL	NORMAL
SUBMATRIX	NA	NA	NA	NA
TOP DEPTH	-9999	-9999	-9999	-9999
BOTTOM DEPTH	-9999	-9999	-9999	-9999
<b>DISSOLVED METALS (UG/L)</b>				
CADMIUM	0.5 U	0.758 J	0.5 U	0.5 U
COPPER	1.79 J	18 J	11.4 J	8.18
LEAD	0.452 J	30.8 J	16 J	0.75 U
LITHIUM	4.08 J	10.3	9.14	13.6
MANGANESE	506	65.1 J	20.9 J	3.3 J
MERCURY	0.16 U	0.0848 J	0.16 U	0.16 U
NICKEL	3.76	26.3 J	13.2 J	4.23
SILVER	0.5 U	0.5 U	0.5 U	0.5 U
TIN	5 U	5 U	5 U	5 U
ZINC	21.5	187 J	88.2 J	54.7
<b>EXPLOSIVES (UG/L)</b>				
1,3,5-TRINITROBENZENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
1,3-DINITROBENZENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
2,4,6-TRINITROTOLUENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
2,4-DINITROTOLUENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
2,6-DINITROTOLUENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
2-AMINO-4,6-DINITROTOLUENE	0.13 J	0.16 U	0.16 U	0.168 UJ
2-NITROTOLUENE	1.41 J	0.16 U	0.16 U	0.102 J
3-NITROTOLUENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
4-AMINO-2,6-DINITROTOLUENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
4-NITROTOLUENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
HMX	0.16 UJ	0.16 U	0.16 U	0.168 UJ
NITROBENZENE	0.16 UJ	0.16 U	0.16 U	0.168 UJ
RDX	0.16 UJ	0.16 U	0.16 U	0.168 UJ
TETRYL	0.16 UJ	0.16 U	0.16 U	0.168 UJ
<b>METALS (UG/L)</b>				
CADMIUM	0.5 U	0.5 U	0.5 U	0.5 U
COPPER	1.29 J	8.38	7.6	6.63
LEAD	0.75 U	6.25 J	4.13 J	1.33
LITHIUM	4.02 J	9.27	8.9	13.9
MANGANESE	469	13.4	7.75	4.48
MERCURY	0.16 U	0.16 U	0.0838 J	0.16 U
NICKEL	2.02 J	9.84	8.83	2.55
SILVER	0.5 U	0.5 U	0.5 U	0.5 U
TIN	5 U	5 U	5 U	5 U
ZINC	19	62 J	39.6 J	52.3