FINAL REPORT

TNT C RA-C Construction Completion Report (CCR)

Remediation of Contaminated Soil and Sediment
Plum Brook Ordnance Works, Sandusky, Ohio

Contract Numbers:

W91237-10-C-0002 and W91237-11-C-0016

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Formerly Used Defense Site (FUDS) Project No. G05OH001815

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DEFINITIONS AND ACRONYMS

ADNT	amino-dinitrotoluene
AH	alkaline hydrolysis
AOC	area of concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
cy	cubic yard
D	depth
DD	decision document
DNT	dinitrotoluene
EPA	U.S. Environmental Protection Agency
F	Fahrenheit
ft	feet
FUDS	Formerly Used Defense Sites
gpm	gallons per minute
GSA	General Services Administration
HI	Hazard Index
HQ	hazard quotient
IDW	investigation derived waste
ILCR	Incremental Lifetime Cancer Risk
IQCT	Independent Quality Control Team
L	length
LDR	land disposal restriction
LRD	Great Lakes and Rivers Division
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliters
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
Ohio EPA	Ohio Environmental Protection Agency
PAH	polynuclear aromatic hydrocarbon
PBOW	Plum Brook Ordnance Works
PCB	polychlorinated biphenyl
PPE	personal protective equipment
ppm	parts per million
QC	quality control
QCR	quality control report
RA-C	remedial action - construction
RCRA	Resource Conservation and Recovery Act
RG	remedial goal
RI	remedial investigation
S.U.	standard units
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure

DEFINITIONS AND ACRONYMS cont.

TMG	TMG Services, Inc.
TNT	trinitrotoluene
TNT A	TNT Manufacturing Area A
TNT B	TNT Manufacturing Area B
TNT C	TNT Manufacturing Area C
USACE	United States Army Corps of Engineers
VOC	volatile organic compound
W	width

FINAL REPORT
TNT C RA-C Construction Completion Report
Remediation of Contaminated Soil and Sediment
Plum Brook Ordnance Works – TNT Area C
Sandusky, Ohio

FUDS Project No. G05OH001815

EXECUTIVE SUMMARY

This report presents the results of the remediation of contaminated soil and sediment excavated from TNT Area C (TNT C) located at the former Plum Brook Ordnance Works (PBOW) in Sandusky, Ohio. The U.S. Army Corps of Engineers (USACE) contracted TMG Services, Inc. to conduct this soil and sediment remediation effort under Contract Number W91237-10-C-0002 and the follow-on Contract W91237-11-C-0016. The objective of the remediation efforts was to remediate the contaminated TNT C soil and sediment to below Ohio Environmental Protection Agency residential risk levels.

The 9,009-acre former PBOW site is located approximately 4 miles south of Sandusky, Ohio and 59 miles west of Cleveland, Ohio. It is located primarily in Perkins and Oxford Townships. The eastern edge of the site extends into Huron and Milan Townships. The National Aeronautics and Space Administration (NASA) has occupied the property since 1963.

The former PBOW site was built in early 1941 as a manufacturing plant for 2,4,6-trinitrotoluene (2,4,6-TNT), dinitrotoluene (DNT), and pentolite. Production of explosives continued until 1945. It is estimated that more than one billion pounds of nitroaromatic explosives were manufactured during the 4-year operating period. Twelve process lines were used in the manufacture of 2,4,6-TNT at PBOW, with four lines at TNT A, three lines at TNT B, and five lines at TNT C. Only the areas impacted by the former manufacturing lines at TNT C were part of this soil and sediment remediation effort.

TNT C is located in the southwestern portion of PBOW and occupies approximately 119 acres of land. At the initiation of the excavation activities, TNT C was mostly overgrown with trees and brush. However, some of the roads, building foundations, and remnants of utilities from former 2,4,6-TNT manufacturing operations are still recognizable at TNT C. While the area is still overgrown, the areas of excavation are obvious due to the clearing in the areas targeted for excavation.

Fieldwork for the TNT C Remedial Action – Construction (RA-C) remediation project was conducted from July 2010 through November 2012. The areas of concern (AOCs) were identified in *The TNT Areas A and C Remedial Investigation, Former Plum Brook Ordnance Works, Sandusky, Ohio* (Shaw, 2001) and the *Feasibility Study Addendum, TNT Area C, Former Plum Brook Ordnance Works, Sandusky, Ohio* (Shaw, 2009a). This document provides an

overview and summary of the contamination in TNT C. The contaminants of concern included 2-amino-DNT (2-ADNT), 4-ADNT, 2,4-DNT, 2,6−DNT, 2,4,6-TNT, lead (Pb), Aroclor 1254, Aroclor 1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene that exceeded the remediation goals (RGs). The RG is based upon remedial goal objectives, which are chemical and receptor-specific, risk-based remedial criteria that capture all the exposure assumptions and toxicological data used in risk assessment.

The overall objective of the TNT C RA-C was to minimize threats to, and provide adequate protection to, human health and the environment from exposure to contaminants in soil and sediment. The RGs identified for soil and sediment at PBOW TNT C were based on the reduction of the nitroaromatics, polynuclear aromatic hydrocarbons (PAHs), lead and polychlorinated biphenyl (PCB) contamination to below residential risk levels.

Based on the analysis of remedial alternatives presented in the *Final Decision Document for TNT Area C, Former Plum Brook Ordnance Works* (Shaw Environmental, 2009b) the selected remedy for the 9,205 cubic yards (cy) of soil was excavation, alkaline hydrolysis, windrow composting, *ex situ* chemical stabilization, and/or on-site/off-site disposal.

Under TNT C RA-C, the areas identified in the remedial investigation were excavated to remove the contaminated soil and sediment. The hazardous soil and sediment was transported to the remediation pad for treatment using alkaline hydrolysis and used as backfill following remediation. The non-hazardous soil and sediment was transported to the Erie County Landfill for off-site disposal to be used as daily cover.

Six of the fifteen AOCs under the original effort did not meet the risk criteria for closure, so additional excavation was necessary to get to clean soil. Test pitting was used to define horizontal and vertical extent prior to initiating the continuation effort. The identified extent of the contamination zone was expanded based on the results of test pit evaluations with confirmation sampling to include up to an additional 2,718 cy.

The TNT C RA-C began in July 2010 and the initial excavation of the 15 AOCs and soil and sediment remediation was completed in October 2011. A total of 9,192 cy (surveyed volume) was excavated during the initial excavation effort. Of that approximately 11,000 tons were transported and disposed at the landfill. There were 2,254 cy (surveyed) of soil staged on the remediation pad for alkaline hydrolysis. Subsequently, the remediated soil was used as backfill in the TNT C excavations.

The Follow-on was initiated in late November 2011 and the field work was completed in late November 2012. A total of 2,657 cy (surveyed) was excavated from the six AOCs and remediated using alkaline hydrolysis. Approximately 1,010 cy was used as backfill in the open excavations. The remaining soil was disposed off-site at the landfill due to PAH concentrations remaining above the RG. The tonnage disposed at the landfill was 3,385 tons. The recalcitrant PAHs was attributed to the presence of asphalt material encountered during the test-pitting and excavation.

At the conclusion of the TNT C RA-C the contamination in the hazardous soil and sediment had been reduced using alkaline hydrolysis. Non-hazardous soil and sediment was disposed off-site.

Site restoration activities were completed in November 2012. All project tasks including excavation, stockpiling, and backfilling have been fully implemented and grading, and seeding with native prairie grasses was completed. The remediation pad was left intact and restored to "pre-TNT C" conditions or better for subsequent USACE use. The windrow footprints on the remediation pad were sampled to verify there was no contamination of the underlying soil.

FINAL REPORT

TNT C RA-C Construction Completion Report
Remediation of Contaminated Soil and Sediment
Plum Brook Ordnance Works – TNT Area C
Sandusky, Ohio

Contract No. W91237-10-C-0002

1. INTRODUCTION

1.1. Site History

1.1.1. Land Use

The site of the former Plum Brook Ordnance Works (PBOW) is located approximately 4 miles south of Sandusky, Ohio and 59 miles west of Cleveland, Ohio. Although primarily in Perkins and Oxford Townships, the eastern edge of the site extends into Huron and Milan Townships. PBOW is bounded on the north by Bogart Road, on the south by Mason Road, on the west by County Road 43, and on the east by U.S. Highway 250. The surrounding area is mostly agricultural and residential.

The 9,009-acre PBOW site was built in early 1941 as a manufacturing plant for 2,4,6−trinitrotoluene (2,4,6-TNT), dinitrotoluene (DNT), and pentolite. Production of explosives at PBOW began in December 1941 and continued until 1945. It is estimated that more than 1 billion pounds of nitroaromatic explosives were manufactured during the 4-year operating period. The three explosive manufacturing areas were designated TNT Area A (TNT A), TNT B, and TNT C. Twelve process lines were used in the manufacture of 2,4,6-TNT, four lines at TNT A, three lines at TNT B, and five lines at TNT C. The work performed under this project addressed the contaminated soil and sediment in TNT C.

The TNT C manufacturing site consisted of widely scattered buildings of wood frame construction with asbestos and sheet metal coverings. It also included a series of buried and/or overhead flumes and pipes that were used to transport various liquids associated with the manufacturing process. After plant operations ceased, TNT C manufacturing lines were decontaminated by the War Department in late 1945. During decontamination, all structures, equipment, and manufacturing debris were either removed and salvaged, or removed and burned by the War Department in 1945. After the property was certified decontaminated by the US Army, the property was initially transferred to the Ordnance Department and then to the War Assets Administration. In 1949, PBOW was transferred to the General Services Administration (GSA). In 1955, the GSA completed further decontamination of TNT C. This effort supposedly focused on surface contamination detected by visual inspection.

The National Aeronautics and Space Administration (NASA) acquired the property on March 15, 1963 and currently occupies the site. GSA performed further decontamination efforts during the 1963 transfer. The decontamination process included removing contaminated surface soils above the drain tiles, flumes, etc., destruction of buildings by fire, and the removal of soil, debris, sumps, and concrete foundations. All materials, including the soil in those areas, were flashed. The area was then rough graded. The decontamination process also included the burning of excavated nitroaromatic filled flumes. Although efforts to remove the residuals from the manufacturing process were completed in the 1963 timeframe, today, some wooden flumes and concrete foundations remain in-place and are the subject of current investigations under different projects. Those investigations were not part of this TNT C remediation effort.

NASA currently operates the Plum Brook Station. Most of the aerospace testing facilities built in the 1960s at the site are in standby or inactive status. On April 18, 1978, NASA declared approximately 2,152 acres of PBOW as excess. The Perkins Township Board of Education acquired 46 acres of the excess acreage and uses this area as a bus transportation area. NASA retains ownership of the remaining acreage and currently has a use agreement with the Ohio National Guard for 604 acres of land in the southern part of Plum Brook Station. NASA presently utilizes approximately 6,400 acres mainly as a buffer zone for space research activities as part of the Glenn Research Center located in Cleveland, OH."

TNT C occupies approximately 119 acres of land in the western portion of PBOW. Currently the area is heavily vegetated and overgrown with trees and brush. Several aboveground features indicate former PBOW facilities are still evident at TNT C. These features include roads, fire hydrants, water valves, a water valve control well, railroad beds, and former building driveways and foundations. Below-ground features are also present, including manholes, drains, and underground lines (indicated by aboveground water valves). NASA does not currently use the former manufacturing area, and there are no NASA buildings in TNT C. One building present on the site was constructed and used by the U.S. Environmental Protection Agency (EPA) to perform noise abatement testing in the 1980s. This building is located near a former wash house (Building 606) along former Process Line 10. Based on this use, there is no reason to expect that EPA contributed in any way to contamination at TNT C.

1.1.2. Topography

PBOW is located within the Eastern Lake Region of the Central Lowland Province. Erie County is overlain by lake, glacial outwash, and glacial till sediment. The surface is a plain with a slight slope to the north-northeast toward Lake Erie at approximately 25 ft per mile. Surface features were formed primarily by glacial scouring and deposition.

The elevation of PBOW ranges from 680 ft above mean sea level at the south-central portion of the installation to 625 ft at the northern side of the site. In general, the topography of PBOW is characterized by a flat ground surface with occasional low hummocks. PBOW lies in the eastern region of the Pickeral Creek-Pipe Creek Basin, which is part of the St. Lawrence River drainage basin. Eleven streams exist within the site and flow north-northeast toward Lake Erie, located 3.5 miles north of the site. The eleven streams are part of four drainage areas: (1) Sawmill Creek (southern PBOW); (2) Plum Brook (central PBOW); (3) Pipe Creek (western PBOW); and (4) Storrs-Hemminger Ditch, all of which flow into Sandusky Bay. The drainage pattern is

dendritic where streams are incised into bedrock and poorly developed where they have not yet down cut to the bedrock (D&M, 1997a).

1.1.3. Geology

Bedrock in northern Ohio consists of Devonian and Silurian age carbonates (limestone and dolomite) and clastics (shale, siltstone, and sandstone). These units unconformably overlie older sedimentary sequences of Ordovician and Cambrian age rocks that, in turn, unconformably overlie Pre-Cambrian basement rocks. The local bedrock is situated on the eastern flanks of the Findlay Arch. Beds in the vicinity of PBOW dip to the southeast at an angle of approximately 10 to 30 ft per mile (D&M, 1997a).

At PBOW, the lowermost bedrock unit is the Delaware Limestone. This unit is a hard, dense, finely crystalline, limestone and dolomite. The appearance is often described as buff-colored and fossiliferous. Hydrogen sulfide and benzene, toluene, ethylbenzene, and xylene compounds may naturally occur in the Delaware. Overlying the Delaware Limestone is the Olentangy Shale, which is made up of two members, a lower unit called the Plum Brook Shale and an upper unit called the Prout Limestone. The Plum Brook Shale is a 35-foot-thick unit of bluish gray, soft, fossiliferous shale containing thin layers of dark, hard, fossiliferous limestone. The Prout Limestone is a 15-foot-thick unit with dark gray to blue, very hard, siliceous, fossiliferous limestone or dolomitic mudstone. Overlying the Olentangy Shale is the Ohio Shale, which is made up of one member in the vicinity of PBOW, the Huron Shale. The Huron Shale has been described as black and thinly bedded. Occasional large pyrite/carbonate concretions are also present in the Huron Shale, with some as large as six feet (ft) in diameter (IT, 1999).

Overburden at PBOW is interpreted to be derived predominantly from Pleistocene glacial lacustrine deposits. The overburden ranges from 1 ft at the south-central portion of the site to greater than 25 ft at the northern side of the site. Four soil associations are present across PBOW. These four associations are Kibbie-Elnor-Tuscola-Colwood, Castalia-Millsdale-MiltonRitchey, Hornell-Fries-Colwood, and Pewamo-Bennington (IT, 1999).

1.1.4. Hydrology

Regional groundwater flow is to the north-northeast towards Lake Erie, although local flow may vary due to local topography. The largest producing wells are in the limestone, where water comes from joints and bedding planes or from solutionally enlarged openings. Limestones in the central portion of Erie County provide well yields of up to 500 gallons per minute (gpm) (D&M, 1997a). Wells installed in the shales or glacial overburden yield substantially less groundwater, with production often less than 10 gpm (IT, 2000).

1.2. Overview of Remedy

To provide a basis for taking an action at this site, U.S. Army Corps of Engineers (USACE) conducted a remedial investigation (RI). The findings from the RI are summarized in the report entitled *TNT Areas A and C Remedial Investigation Former Plum Brook Ordnance Works Sandusky, Ohio* (Shaw Environmental, 2003). The RI activities were conducted for TNT C soils and sediments, surface water, and sediment. Groundwater was investigated under Project 1826 and therefore not addressed in the RI. During the RI, TNT C soil was investigated by process

line or process type, and the associated 29 building areas. As part of the RI, human health and ecological risk assessments were conducted for TNT C. Out of the 29 building areas investigated, 14 building areas and 1 drainage ditch area (total of 15 areas) were identified as having contaminants above the identified remedial goals (RGs). Thirteen contaminants of concern (COCs) were identified in surface, subsurface soil, and sediment. Five of those COCs are nitroaromatics (2-amino-4,6−DNT [2-ADNT], 4-amino-2,6-DNT [4-ADNT], 2,4-DNT, 2,6-DNT, and 2,4,6−TNT). The remaining eight COCs are polychlorinated biphenyls (PCBs) (Aroclor 1254 and 1260), polynuclear aromatic hydrocarbons (PAHs) (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(l,2,3-c,d)pyrene) and lead. The sediment had only three COCs: nitroaromatics (2-ADNT, 4-ADNT, and 2,4,6-TNT).

The proposed approach for this remedial action – construction (RA-C) was to excavate the areas in which the concentration of the COCs in soil and sediment exceeded the risk criteria, characterize the soil to determine if it was hazardous or non-hazardous and upon receipt of the analytical results, transport hazardous soil or sediment to the remediation pad. The non-hazardous soil and sediment was disposed off-site and the hazardous soil and sediment was subjected to alkaline hydrolysis (AH) to reduce the nitroaromatics to below hazardous levels and below the RG, and the PAHs to below the RGs.

The *Decision Document (DD) for TNT Area C* (Shaw, 2009b) presented the selected final remedy for contaminated soil and sediment attributable to releases associated with historical operations at TNT C. No action was recommended for TNT C surface water. PBOW is an Army Defense Environmental Restoration Program (DERP) project under the Great Lakes and Rivers Division (LRD) Formerly Used Defense Site (FUDS) program. The remedy selection has been made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the *National Oil and Hazardous Substances Pollution Contingency Plan (NCP) under CERCLA* (EPA, 1990). The investigation, reporting, and project decision process were conducted consistent with *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, 1988) and subsequent guidance materials, including *Guidance on Implementation of the Superfund Accelerated Cleanup Model (SACM) under CERCLA and the NCP* (EPA, 1992).

The remedy presented in the Decision Document addressed the contamination associated with TNT C soil and sediment. The soil and sediment remedy included excavation, AH, windrow composting (if needed), *ex situ* chemical stabilization (if needed), and on-site/off-site disposal. The DD estimated that a total of 9,205 cubic yards (cy) of contaminated soil and sediment was to be excavated, 2,310 cy of which are anticipated to be hazardous. Of the 2,310 cy of hazardous materials, most was classified based solely on 2,4-DNT concentrations that would otherwise exceed alternate land disposal restriction (LDR) treatment standards for underlying hazardous constituents in contaminated soil (40 Code of Federal Regulations [CFR] Parts 261.24 and 268.49). However, it was anticipated that AH, coupled with windrow composting (if necessary), would reduce the 2,4-DNT concentrations to below LDR requirements, soil cleanup criteria, and sediment cleanup criteria.

The selected alternative for remediation was Alternative No. 5. For this alternative, the Decision Document outlined a combination of AH and windrow composting, or alternatively AH alone or windrow composting alone, to reduce the concentrations of COCs to meet the RGs for on-site disposal. During the project, only a patented AH process was used to reduce the hazardous constituents to below the hazardous levels and below the RG concentrations.

Alternative 5 is protective of human health and the environment, complies with federal and State of Ohio requirements that are either applicable or relevant and appropriate to the remedial action, was cost effective, utilized permanent solutions and treatment or resource recovery technologies to the maximum extent practicable, and satisfies the requirement for treatment as a principal element of the remedy. No soil or sediment contaminants were left at levels to which direct exposure would be considered unacceptable by the Ohio EPA. Alternative 5 did not directly address contamination in underlying groundwater, which is addressed under a separate Decision Document and was not part of this TNT C remediation of soil and sediment.

1.3. Project Description

In 2010, USACE Huntington District awarded a contract to TMG Services, Inc. (TMG) to perform soil and sediment remediation in TNT C. Under the original Scope of Work (SOW) there were 15 areas of concern (AOCs) to be excavated, the soil and sediment remediated and the excavations backfilled. The AOCs were excavated and the hazardous soil and sediment was remediated using the AH process. The excavations were backfilled with clean soil and remediated soil was also used as backfill. Confirmation samples from the 15 excavations indicated that 6 of the AOCs did not meet the risk criteria and that additional excavation would be required.

The non-hazardous soil and sediment excavated during the original effort was transported and disposed off-site at the Erie County Landfill and used as daily cover. The hazardous soil from the original excavation was remediated using a patented AH process and subsequently used as backfill in the open excavations in TNT C.

In late September 2011, a separate contract was awarded to TMG to expand the excavations to identify the extent of contamination and achieve clean closure of those six AOCs. The continuation effort was accomplished using test-pitting to identify the clean soil and confirmation samples to confirm that the excavation was below the risk criteria. Following the test-pitting and confirmation samples, the AOC was surveyed, excavated and the soil was transported to the remediation pad and remediated using the AH process. A portion of the remediated, non-hazardous soil from the continuation effort was transported off-site for disposal at the Erie County Landfill. This soil was disposed off-site because the PAH concentration exceed the RG. It is believed that during the excavation, asphalt material was removed and included in the windrowed soil, contributing to the consistent, elevated PAH concentrations during the AH process. The remaining remediated non-hazardous soil was used for backfill in the open excavations.

2. APPLICABLE AND RELEVANT AND APPROPRIATE REQUIREMENTS

2.1. Preliminary Remediation Goal

RI fieldwork was conducted in 2001 in order to provide a basis for taking an action at the site. As part of the RI, a human health risk assessment was conducted for TNT C. Thirteen COCs were identified in the soil and three COCs were identified for sediment. Based on the results of the human health risk assessment, it was determined that remedial actions were to be taken to prevent human exposure via any exposure route (ingestion, inhalation, or dermal contact) to soil and sediment that exceeds the RGs. Tables 2-1 and 2-2 summarize the COCs for this project. Additional information on the applicable and relevant and appropriate requirements are presented in the TNT C RI.

TABLE 2-1. Chemicals of Concern for Soils

Chemicals of Concern for Soils	Remedial Goal (RG) Concentration (mg/kg)
Nitroaromatics	
2-ADNT	1.7
4-ADNT	1.3
2,4-DNT	6.5
2,6-DNT	1.0
2,4,6-TNT	8.0
PCBs	
Aroclor 1254	1.0
Aroclor 1260	1.0
PAHs	
Benzo(a)anthracene	1.0
Benzo(a)pyrene	1.0
Benzo(a)fluoranthene	1.0
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	1.0
Metals	
Lead	400

TABLE 2-2. Chemicals of Concern for Sediment

Chemicals of Concern for Sediment	Remedial Goal (RG) Concentration (mg/kg)
Nitroaromatics	
2-ADNT	5.0
4-ADNT	5.0
2,4,6-TNT	41.0

2.2. Resource Conservation and Recovery Act

Subtitle C of the Federal Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, authorizes EPA to regulate the management of hazardous wastes. The designation of a waste as hazardous subjects all those charged with managing that waste to the stringent "cradle-to-grave" requirements of RCRA Subtitle C. It is crucial, therefore, for all those managing wastes to properly identify them and determine whether or not those wastes are in fact "hazardous." There are four kinds of hazardous wastes as defined by Subtitle C of RCRA:

- Solid wastes, which exhibit hazardous characteristics (i.e., ignitability, corrosivity, reactivity, or toxicity).
- Solid wastes specifically listed by the Agency as being hazardous.
- A waste that is considered a declared waste.
- A waste mixed with a known hazardous waste.

The toxicity characteristic identifies wastes that are likely to leach hazardous concentrations of certain toxic contaminants into groundwater under improper storage conditions. The toxicity of a waste can be determined by applying the toxicity characteristic leaching procedure (TCLP), a test designed to simulate the leaching of toxic constituents. Full TCLP analysis (volatiles, semi-volatiles, metals, herbicides, and pesticides) was performed on all soil and sediment and investigation derived waste (IDW) that was removed from the project site. Analytical data from the TCLP analysis was compared to the RCRA regulatory levels for TCLP constituents.

2.3. Land Disposal Restrictions (LDRs)

The purpose of the LDR program is to ensure that land disposed hazardous waste does not pose a threat to human health and the environment. There are three major components to the LDR program which address hazardous waste disposal, dilution and storage.

The disposal prohibition states that, before a hazardous waste can be land disposed, treatment standards specific to that waste material must be met. This can be accomplished by treating hazardous chemical constituents in the waste to meet required treatment levels or treating hazardous waste using a treatment technology specified by the EPA.

The hazardous soil and sediment identified during the TNT C RA-C efforts exceeded TCLP criteria for 2,4-DNT. The hazardous soil and sediment was subjected to the AH process to reduce the 2,4-DNT component below the TCLP limits as well as to reduce the concentrations of other nitroaromatics and PAHs to below risk levels.

Prior to moving the soil from the remediation pad, one 10-point composite sample was collected from each windrow. Each sample was analyzed for PAHs, total nitroaromatics, total TAL metals, PCB, pH, and full TCLP. Three rounds of disposal samples were collected and analyzed.

Based on the TCLP analytical results, the soil and sediment was determined to be non-hazardous as defined in 40 CFR Parts 261.24 and 268.49. Treated soil which was determined to be non-

hazardous and below other risk-based cleanup criteria was placed back in the open excavations. The non-hazardous soil and sediment which exceeded the risk criteria was disposed at the landfill.

2.4. Hazard Index

In addition to the RGs established in RI report, risk calculations were also performed to evaluate risk based on the Ohio EPA and USACE requirement of a Hazard Index (HI) $\leq$ 1 and an Incremental Lifetime Cancer Risk (ILCR) of $\leq$ 1E-5. Risk calculations were performed on samples collected from the excavation walls and floors. If the samples collected were below the risk criteria, the excavation was considered clean.

The hazards to human health and the environment associated with a contaminated site correspond to the hazards associated with each COC identified at the site. Laboratory analysis determines the concentration of the COC, and the hazard assigned to a COC is a hazard quotient (HQ). HQ's are found by multiplying the COC by a risk-based multiplier. To quantify the hazard of a COC, the mean of the concentrations for each COC was used. The HI for the site is found by adding the HQ of each COC. This resultant HI represents the total degree of hazard to human health and the environment associated with the site.

3. PROJECT ACTIVITIES

Based on the Scope of Work, the estimated amount of soil and sediment to be removed from the TNT C AOCs site was 9,205 cy under the initial contract. Actually, 9,192 cy was excavated from the TNT C excavations. A summary of the soil and sediment excavated from each area is summarized below in Table 3-1.

TABLE 3-1. Summary of Soil and Sediment Volumes

Building No. (AOC)	Actual Volume of Excavation (cy, based on survey data)
602	98
603	113
606*	105
616	474
626*	127
629	1,354
657*	64
682	1,767
683*	714
686*	1,284
689	112
692	962
693	108
696	1,874
Sediment Area (618)*	36
Total Volume, cy	**9,192**
*** Denotes AOCs in which clean closure was not achieved under the original field effort.**	

The estimated excavated volume from the six AOCs under the follow-on contract included the following building areas: 606, 626, 657, 683, 686, and sediment 618. The additional volume scoped to be excavated is summarized below in Table 3-2.

TABLE 3-2. Summary of Soil and Sediment Volumes Scoped for Excavation – Follow on Effort

Building No. (AOC)	Scoped Volume, cy	Actual Volume, cy
606	208	The volumes excavated from the AOCs were transported directly to the remediation pad. The soil was surveyed to determine the total volume.
626	475	
657	208	
683	1,300	
686	453	
Sediment Area (618)	74	
Total Volume, cy	2,718	2,657

The following sections describe the project activities during the original effort and the follow-on effort, including excavation, stockpile characterization, confirmation sampling, AH, and on-site placement of remediated soil and sediment and off-site disposal of non-hazardous soil and sediment. These activities include surveying of excavation coordinates, excavation of AOCs, borrow area sampling, preparation of the stockpile area, confirmation sampling of AOCs, screening of test pit activities, confirmatory sampling of proposed excavation horizontal limits, site restoration, excavated characterization (stockpile characterization), sampling and analysis of the remediated soil and sediment, and disposal of remediated soil and sediment.

Documentation of the project activities, including the Visitor Logs, Daily Quality Control Reports (QCRs), Daily Safety Meetings, Equipment Checklists, Material Quantities and Field Monitoring Logs are provided in Appendix A.

3.1. Site Preparation

TMG received the Notice to Proceed from USACE in late July 2010. The equipment was mobilized to the site and included set up of the office trailer and sanitation facilities. The office trailer was initially set up within TNT C, but due to the poor cellular and internet connection, the trailer was relocated adjacent to the remediation pad. A portion of the office trailer was used for sample recovery, labeling, and packaging. Safety equipment was also stored in the office trailer in supply cabinets. The remainder of the office space was used to maintain all project records and files and to provide work space for individuals assigned to the project.

In preparation of the site, each AOC was surveyed prior to clearing the area. During the clearing and grubbing activities, heavy vegetation was downed using a bulldozer and moved away from the working area of the AOC. Large trees were downed and moved to the side of the work area at the AOC. For each AOC, an area adjacent to the excavation was cleared to make room for the stockpiles of excavated soil. The downed vegetation and trees were configured around the perimeter of the working areas and provided wildlife habitat. In preparation for stockpiling, a layer of 6-mil plastic was placed on the ground to provide a barrier between the excavated soil stockpile and the soil surface below the stockpile.

Silt fence was erected around the stockpile areas at each AOC to prevent the stockpiled, contaminated soil and sediment from spreading to adjacent clean soil resulting in unwanted distribution of contaminants. Photographic record of this process is Appendix B. To prevent

contact of the soil and sediment with precipitation, each stockpile was covered with 6-mil plastic and secured in place with available stones/rocks. The plastic was high-maintenance and required constant rework to make sure the stockpiles remained covered at all times.

3.2. Survey of Excavation Area

The proposed excavation areas for TNT C were based on the horizontal/vertical contamination limits identified during the RI conducted in 2001. Prior to excavation, each AOC was surveyed to mark the coordinates provided in the RI. TMG contracted with John Hancock and Associates to perform the surveying services. Surveying was completed in spring slightly ahead of the spring growing season to facilitate the use of GPS survey equipment. The survey coordinates were staked and upon approval of the project plans, TMG initiated excavation. The survey coordinates are provided in Appendix B.1.

3.3. Summary of Excavation Activities

Prior to any excavation, a dig permit was obtained from NASA. TMG worked with NASA personnel to review site plans and to verify the utilities in the area of the excavations were either abandoned and no longer in use or they had been removed. Upon initiation of the follow-on contract to expand the six excavations, a second dig permit was prepared and approved by NASA in May 2011. The dig permits are provided in Appendix A.1.

Beginning on August 3, 2010, TMG began excavation at Building 657. Under TNT C RA-C, excavation activities continued for all 15 AOCs until early February 2011.

Upon completion of the activities outlined in the Site Preparation section with regard to the silt fence and putting down plastic, excavation of the AOCs was initiated within the surveyed boundaries. The soil and sediment was excavated using a Link-Belt© 160 excavator and placed in a Terex haul truck to move the soil and sediment to the 6-mil plastic lined stockpile area adjacent to the working excavation. Care was taken to stockpile the soil in 300 cy (approximate) stockpiles for characterization. The 300 cy stockpile volume was used in order to meet the Erie County Landfill sampling requirements for disposal. As each pile was completed, it was completely covered with 6-mil plastic to prevent migration of any potential contaminants due to storm water contact. The stockpile volumes are summarized in Table 3-3.

TABLE 3-3. Summary of Stockpile Volumes

AOC	No. of Stockpiles	Volume of Stockpiles (cy)							
		A	B	C	D	E	F	G	H
602	1	98	-	-	-	-	-	-	-
603	1	**113**	-	-	-	-	-	-	-
606	1	105	-	-	-	-	-	-	-
616	2	177	297	-	-	-	-	-	-
626	1	127	-	-	-	-	-	-	-
Sediment (618)	1	36	-	-	-	-	-	-	-
629	5	**279**	**225**	**211**	**299**	**340**	-	-	-
657	1	64	-	-	-	-	-	-	-
682	8	44	310	262	123	221	205	284	318
683	3	**196**	**174**	344	-	-	-	-	-
686	5	69	261	326	341	287	-	-	-
689	2	61	51	-	-	-	-	-	-
692	4	274	233	**199**	256	-	-	-	-
693	1	108	-	-	-	-	-	-	-
696A	6	207	253	257	222	193	230	-	-
696B	2	204	308	-	-	-	-	-	-

– Not Applicable
The cubic yardages presented in bold font were hazardous and required AH remediation. Hazardous soils were transported to the remediation pad for treatment.

Under the follow-on work, test pitting began December 6, 2011. Test pit samples were collected at step-out intervals/locations from the remaining contaminated limits until the preliminary risk calculations showed clean closure for each AOC. The number of test pitting rounds varied from one to five. Then confirmation samples were collected on the final perimeters and floor, every 20 ft. After the risk calculations were finalized for each AOC and all values met the risk criteria, then excavation was begun. The soil and sediment was excavated using a Link-Belt© 160 excavator and placed in a Terex haul truck and the soil was moved directly to the Remediation Pad and staged in windrows for AH treatment. Excavation was completed June 26, 2012. The volume of soil excavated from the six AOCs under the follow-on effort totaled 2,657 cy. The survey coordinates are provided in Appendix B.1.

3.3.1. Confirmation Sampling

Confirmation sampling was conducted on each of the excavations. Samples were collected from each wall and each floor at a frequency of one sample/20-25-foot section. Wall samples were collected by scraping the bucket of the excavator up the height of the face of a wall and a 3-part composite of the soil was placed into a sample bag specific to the sample location. The sample was recovered in the office trailer immediately following sample collection at the excavation. Floor samples were collected from the floor of the excavation by dropping the bucket of the excavator to the floor surface and removing a portion of the soil (approximately 2-3 inches in depth). A 3-part composite of the soil was placed into a sample bag labeled specific to the sample location. The sample was recovered in the office trailer immediately following sample collection at the excavation.

The soil samples were recovered into glass jars with the sample identification on the label. The samples were logged on the laboratory chain-of-custody and also on the daily QCR. The chain-of-custody accompanied the samples to the laboratory and listed the samples included in the shipment and identified the analytical parameters. All of the confirmation samples collected from the TNT C RA-C and the follow-on were analyzed for PAHS, nitroaromatics, PCB, and TAL metals. The samples were placed on ice for shipment to the laboratory using overnight courier service.

Following the excavation of the contaminated soil from a pit, confirmation samples were collected from the walls and floor of the pit. The samples were submitted to the laboratory for analysis to determine if the walls and floor of the excavation are "clean" or if additional excavation will be required. Pursuant to the SOW, TMG collected a minimum of five samples from each individual excavation pit for confirmation analysis using SW-846 Methods for nitroaromatics, lead, PCBs, and PAHs. The specific SW-846 Methods are listed below.

<u>SW-846 Methods for soils</u>
PAHS – 3540C/8270C
PCBs – 3540B/8082A
TAL Metals – 3050B/6010B/7471A
Nitroaromatics - 8330

<u>SW-846 Methods for sediment</u>
PAHS – 8270B
PCBs – 3540B/8082A
TAL Metals – 3050B/6010B/7470A
Nitroaromatics – 8330 (modified)

One confirmation sample was collected from each of the sidewalls near the midpoint of the excavation and at the floor near the midpoint of the excavation. For those areas where the length exceeded 20-25 ft, two samples were collected along the length (whether on a sidewall or floor). If the walls were longer than 50 ft, then a sample was collected within each 25 ft length in order to get representative samples along the wall length. There were a couple of excavations where bedrock or groundwater was encountered therefore, no confirmation sample was collected and the conditions were documented on the daily QCR.

The results from the confirmation sampling indicated that AOCs 602, 603, 616, 629, 682, 689, 692, 693, and 696 were below the risk criteria and were ready for backfilling. AOCs 606, 626, 657, 683, 686, and the sediment area exceeded the risk criteria and remained open for additional excavation under the follow-on contract. During the course of the project, TMG changed from Test America to Microbac Laboratories located in Marietta, Ohio. Microbac continued to provide laboratory services through the completion of the projects. The laboratory results are provided in Appendix C.2 and the risk calculations are presented in Section 3.4, in order of excavation.

3.3.2. Test Pitting – Follow-On Effort

Upon completion of the excavations and the confirmation sampling for each AOC, there were six of the excavations that could not be closed out because the risk calculations exceeded the risk criteria of HI ≤ 1 and ILCR ≤ 1E-5.

Additional excavation was required to get to clean soil on AOCs 606, 626, 657, 683, 686, and the sediment area. However, prior to initiating excavations, test pitting was performed to identify the new boundaries of contamination for the 6 AOCs.

Each test pit was excavated at 20-25 ft intervals (to the depth specified for that AOC), which was the same length and method for doing confirmation sampling of walls. The analysis for the test pit samples was limited to the COC for which the excavation exceeded the risk or RG, i.e., if the concentration of PAHs were the reason for the excavation not being closed out, then the test pit sample was only analyzed for PAHs. If nitroaromatics were the reason for non-closure, then the test pit sample was only analyzed for nitroaromatics.

The results from the test pit samples were used as a screening tool to evaluate if the soil along the new excavation boundary was clean. The test pit samples did not require full Level IV quality control (QC) since the data was used an interim tool to identify clean soil. If the test pit analytical results indicated the soil was clean, and based on the test pit analytical data were below the risk criteria, then confirmation samples were collected and submitted to the laboratory for full confirmation sample analysis which included PAHs, PCB, TAL metals and nitroaromatics with Level IV QC. If the test pit samples indicated the soil was not clean, then the boundary was extended and followed the same process as outlined above.

The laboratory data for the test pit samples and confirmation samples collected from the additional excavations is provided in Appendix C.2. The risk calculations for the confirmation samples are presented in Section 3.4, in order of excavation.

3.4. Excavation Activities

3.4.1. Borrow Areas - Soil Sampling and Analytical

A source for borrow material was identified on Barnes Nursery property (located at the corner of Hull Road and Camp Road in Huron, Ohio) and as required, was sampled for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, TAL metals, and nitroaromatics to ensure the borrow material was “clean.” No issues were found.

The samples were collected from five random locations within the selected borrow site. The soil samples were placed in clean glass containers with Teflon® lined lids provided by the laboratory. The samples were then placed on ice in coolers and transported to Test America located in North Canton, Ohio. The borrow area laboratory analytical data, summary and risk calculations are provided in Tables 3-4 through 3-5.

The AOC 618 (drainage ditch) had specific backfill requirements due to the nature of the ditch and the characteristics of the soil, sediment and wetland-type plant life that had developed over

the course of time. Although this area is currently classified as a wetland, it was below the minimum acreage (1/10th) that would require mitigation. Care was taken to backfill with a custom blend of sandy loam with approximately 15% organic matter from yard waste compost. The borrow soil selected for purchase for this area was sampled on October 13, 2010 and submitted to Test America for analysis. The samples were analyzed for VOCs, SVOCs, pesticides, herbicides, nitroaromatics, metals and TCLP-SVOCs. The laboratory results are provided in Tables 3-6 through 3-7.

TABLE 3-4. Soil Borrow Area Risk Calculations

Sample	COC Analytical Results												
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
0922-B-001	0.125	0.125	0.125	0.125	0.125	0.031	0.031	0.55	0.6	0.9	0.12	0.36	11.3
0922-B-002	0.12	0.12	0.12	0.12	0.12	0.032	0.032	0.022	0.027	0.052	0.004	0.024	12.1
0922-B-003	0.12	0.12	0.12	0.12	0.12	0.031	0.031	0.24	0.28	0.41	0.06	0.19	14.8
0922-B-004	0.12	0.12	0.12	0.12	0.12	0.031	0.031	0.5	0.71	1.1	0.17	0.62	12.8
0922-B-005	0.12	0.12	0.12	0.12	0.12	0.031	0.031	0.015	0.017	0.028	0.004	0.011	13.9
Minimum Detection (mg/kg)	0.12	0.12	0.12	0.12	0.12	0.031	0.031	0.015	0.017	0.028	0.004	0.011	11.3
Mean (mg/kg)	0.121	0.121	0.121	0.121	0.121	0.031	0.031	0.265	0.327	0.498	0.072	0.241	12.98
Maximum Detection (mg/kg)	0.125	0.125	0.125	0.125	0.125	0.032	0.032	0.55	0.71	1.1	0.17	0.62	14.8
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
Remedial HQ	0.4	0.3	0.04	0.01	0.2	0.6	NA	NA	NA	NA	NA	NA	NA
Remedial ILCR	NA	NA	9.E-06	1.E-06	6.E-07	3.E-06	3.E-06	NA	NA	NA	NA	NA	NA
Excavation COC HQ	0.028	0.028	7E-04	0.001	0.003	0.018	NA	NA	NA	NA	NA	NA	NA
Excavation COC ILCR	NA	NA	2.E-07	1E-07	9E-09	9E-08	9E-08	NA	NA	NA	NA	NA	NA
Total HI	0.08												
Total ILCR	5E-07												
Maximum [COC] > RG	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO
HI <= 1 (Mean Detection)	YES												
ILCR <= 1x10-5 (Mean Detection)	YES												

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result marginally exceeds RG

NA - Not Applicable

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-5. Soil Borrow Area Laboratory Results Summary

Sample ID	0922-B-001 (mg/kg)	0922-B-002 (mg/kg)	0922-B-003 (mg/kg)	0922-B-004 (mg/kg)	0922-B-005 (mg/kg)	RSL EPA Region III (May 2010)	
						Residential (mg/kg)	Industrial (mg/kg)
Nitroaromatics							
1,3,5-Trinitrobenzene	ND	ND	ND	ND	ND	2,200	27,000
1,3-Dinitrobenzene	ND	ND	ND	ND	ND	6.1	62
2,4,6-Trinitrotoluene	ND	ND	ND	ND	ND	19	79
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	1.6	5.5
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	61	620
2-Amino-4,6-dinitrotoluene	ND	ND	ND	ND	ND	150	2000
2-Nitrotoluene	ND	ND	ND	ND	ND	2.9	13
3-Nitrotoluene	ND	ND	ND	ND	ND	6.1	62
4-Amino-2,6-dinitrotoluene	ND	ND	ND	ND	ND	150	1900
4-Nitrotoluene	ND	ND	ND	ND	ND	30	110
HMX	ND	ND	ND	ND	ND	3800	49000
Nitrobenzene	ND	ND	ND	ND	ND	4.8	24
RDX	ND	ND	ND	ND	ND	5.5	24
Tetryl	ND	ND	ND	ND	ND	240	2500
Semi-Volatiles Organics							
Acenaphthene	0.024	ND	ND	0.0094	ND	3400	33000
Acenaphthylene	0.022	ND	0.035	0.017	ND	NA	NA
Acetophenone	ND	ND	ND	ND	ND	7800	100000
Anthracene	0.089	ND	0.039	0.064	ND	1,700	170,000
Atrazine	ND	ND	ND	ND	ND	2.1	7.5
Benzaldehyde	ND	ND	ND	ND	ND	7800	100000
Benzo(a)anthracene	0.55	0.022	0.24	0.5	0.015	0.15	2.1
Benzo(a)pyrene	0.6	0.027	0.28	0.71	0.017	0.015	0.21
Benzo(b)fluoranthene	0.9	0.052	0.41	1.1	0.028	0.15	2.1
Benzo(g,h,i)perylene	0.41	0.039	0.22	0.72	0.019	NA	NA
Benzo(k)fluoranthene	0.31	0.014	0.16	0.33	0.01	1.5	21
Bis(2-chloroethoxy)methane	ND	ND	ND	ND	ND	180	1800
Bis(2-chloroethyl)ether	ND	ND	ND	ND	ND	0.21	1
Bis(2-ethylhexyl)phthalate	ND	ND	ND	ND	ND	3.5	120
4-Bromophenyl phenyl ether	ND	ND	ND	ND	ND	NA	NA
Butyl benzyl phthalate	ND	ND	ND	ND	ND	260	910
Caprolactam	ND	ND	ND	ND	ND	31000	310000
Carbazole	ND	ND	ND	ND	ND	NA	NA
4-Chloroaniline	ND	ND	ND	ND	ND	NA	NA
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	NA	NA
2-Chloronaphthalene	ND	ND	ND	ND	ND	6300	82000
2-Chlorophenol	ND	ND	ND	ND	ND	390	5100
4-Chlorophenyl phenyl ether	ND	ND	ND	ND	ND	NA	NA
2,2-oxybis(1-chloropropane)	ND	ND	ND	ND	ND	NA	NA
Chrysene	0.67	0.045	0.27	0.54	0.027	15	210
Dibenzo(a,h)anthracene	0.12	ND	0.06	0.17	ND	0.015	0.21

TABLE 3-5. Soil Borrow Area Laboratory Results Summary cont.

Sample ID	0922-B-001 (mg/kg)	0922-B-002 (mg/kg)	0922-B-003 (mg/kg)	0922-B-004 (mg/kg)	0922-B-005 (mg/kg)	RSL EPA Region III (May 2010)	
						Residential (mg/kg)	Industrial (mg/kg)
Dibenzofuran	ND	ND	ND	ND	ND	NA	NA
Di-n-butyl phthalate	ND	ND	ND	ND	0.056	6100	62000
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	1900	9800
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	NA	NA
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	2.4	12
3,3-Dichlorobenzidine	ND	ND	ND	ND	ND	1.1	3.8
2,4-Dichlorophenol	ND	ND	ND	ND	ND	180	1800
Diethyl phthalate	ND	ND	ND	ND	ND	49000	490000
Dimethyl phthalate	ND	ND	ND	ND	ND	NA	NA
2,4-Dimethylphenol	ND	ND	ND	ND	ND	1200	12000
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	NA	NA
2,4-Dinitrophenol	ND	ND	ND	ND	ND	120	1200
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	1.6	6
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	61	620
1,1-Biphenyl	ND	ND	ND	ND	ND	3900	51000
Fluoranthene	1.7	0.041	0.48	0.98	0.03	2300	22,000
Flourene	0.044	ND	ND	0.017	ND	2300	22,000
Hexachlorobenzene	ND	ND	ND	ND	ND	0.3	1.1
Hexachlorobutadiene	ND	ND	ND	ND	ND	6.2	22
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	370	3,700
Hexachloroethane	ND	ND	ND	ND	ND	35	120
Indeno(1,2,3-cd)pyrene	0.36	0.024	0.19	0.62	0.011	0.15	2.1
Isophorone	ND	ND	ND	ND	ND	510	1,800
2-Methylnaphthalene	ND	ND	0.0093	ND	ND	310	4,100
2-Methylphenol	ND	ND	ND	ND	ND	NA	NA
4-Methylphenol	ND	ND	ND	ND	ND	NA	NA
Naphthalene							
2-Nitroaniline	ND	ND	ND	ND	ND	610	6000
3-Nitroaniline	ND	ND	ND	ND	ND	NA	NA
4-Nitroaniline	ND	ND	ND	ND	ND	24	86
Nitrobenzene	ND	ND	ND	ND	ND	4.8	24
2-Nitrophenol	ND	ND	ND	ND	ND	NA	NA
4-Nitrophenol	ND	ND	ND	ND	ND	NA	NA
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	9.9	350
N-Nitrosodi-n-propylamine	ND	ND	ND	ND	ND	0.069	0.25
Pentachlorophenol	ND	ND	ND	ND	ND	3	9
Phenanthrene	0.88	0.026	0.18	0.27	0.012	NA	NA
Phenol	ND	ND	ND	ND	ND	18000	180000
Pyrene	1.3	0.039	0.38	0.72	0.026	1700	17000
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	6100	62000
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	44	160

TABLE 3-5. Soil Borrow Area Laboratory Results Summary cont.

Sample ID	0922-B-001 (mg/kg)	0922-B-002 (mg/kg)	0922-B-003 (mg/kg)	0922-B-004 (mg/kg)	0922-B-005 (mg/kg)	RSL EPA Region III (May 2010)	
						Residential (mg/kg)	Industrial (mg/kg)
Volatiles Organics							
2-Butanone	ND	ND	ND	ND	ND	28000	20000
2-Hexanone	ND	ND	ND	ND	ND	210	1400
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	5300	53000
Acetone	ND	ND	ND	ND	ND	61000	630000
Carbon disulfide	ND	ND	ND	ND	ND	820	3700
Benzene	ND	ND	ND	ND	ND	1.1	5.4
Bromodichloromethane	ND	ND	ND	ND	ND	0.27	1.4
Bromoform	ND	ND	ND	ND	ND	61	220
Bromomethane	ND	ND	ND	ND	ND	7.3	320
Carbon tetrachloride	ND	ND	ND	ND	ND	0.61	3
Chlorobenzene	ND	ND	ND	ND	ND	290	1400
Chloroform	ND	ND	ND	ND	ND	0.29	1.5
Chloromethane	ND	ND	ND	ND	ND	120	500
Cyclohexane	ND	ND	ND	ND	ND	7000	29000
Dibromochloromethane	ND	ND	ND	ND	ND	0.68	3.3
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	0.0054	0.069
1,2-Dibromoethane	ND	ND	ND	ND	ND	0.034	0.17
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	1900	9800
1,1-Dichloroethane	ND	ND	ND	ND	ND	3.3	170
1,1-Dichloroethene	ND	ND	ND	ND	ND	240	1100
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	780	10000
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	NA	NA
1,2-Dichloropropane	ND	ND	ND	ND	ND	0.89	4.5
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	1.7	8.1
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	1.7	8.1
Ethylbenzene	ND	ND	ND	ND	ND	5.4	270
Isopropylbenzene	ND	ND	ND	ND	ND	NA	NA
Methyl acetate	ND	ND	ND	ND	ND	78000	1000000
Methylene chloride	ND	ND	ND	ND	ND	11	53
Methylcyclohexane	ND	ND	ND	ND	ND	NA	NA
Methly tert-butyl ether	ND	ND	ND	ND	ND	43	220
Naphthalene	ND	ND	ND	ND	ND	3.6	18
Styrene	ND	ND	ND	ND	ND	6,300	36,000
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	0.56	2.8
Tetrachloroethene	ND	ND	ND	ND	ND	0.55	2.6
Toluene	ND	ND	ND	ND	ND	5000	45000
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	22	99
1,2-Dichloroethane	ND	ND	ND	ND	ND	0.43	2.2
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	8700	38000
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	1.1	5.3
Trichloroethene	ND	ND	ND	ND	ND	2.8	14
Trichlorofluoromethane	ND	ND	ND	ND	ND	790	3400

TABLE 3-5. Soil Borrow Area Laboratory Results Summary cont.

Sample ID	0922-B-001 (mg/kg)	0922-B-002 (mg/kg)	0922-B-003 (mg/kg)	0922-B-004 (mg/kg)	0922-B-005 (mg/kg)	RSL EPA Region III (May 2010)	
						Residential (mg/kg)	Industrial (mg/kg)
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND	ND	ND	43000	180000
Vinyl Chloride	ND	ND	ND	ND	ND	0.006	1.7
Xylene (total)	ND	ND	ND	ND	ND	630	2700
PBC's							
Aroclor 1016	ND	ND	ND	ND	ND	3.9	21
Aroclor 1221	ND	ND	ND	ND	ND	0.14	0.54
Aroclor 1232	ND	ND	ND	ND	ND	0.14	0.54
Aroclor 1242	ND	ND	ND	ND	ND	0.22	0.74
Aroclor 1248	ND	ND	ND	ND	ND	0.22	0.74
Aroclor 1254	ND	ND	ND	ND	ND	0.22	0.74
Aroclor 1260	ND	ND	ND	ND	ND	0.22	0.74
Total Metals							
Aluminum	9870	10000	10200	8580	11300	77000	990000
Antimony	ND	ND	ND	ND	ND	31	410
Arsenic	8.0	8.6	9.6	7.1	10.7	0.39	1.6
Barium	97.4	78.7	71.7	55.1	83.5	15000	190000
Beryllium	ND	ND	ND	ND	ND	160	2000
Cadmium	ND	ND	ND	ND	ND	70	800
Calcium	57200	62900	36900	30600	29500	NA	NA
Chromium	15.8	15.6	15.9	13.2	18.2	120000	1500000
Cobalt	11.6	9.7	10.6	6.8	11.7	23	300
Copper	19.9	20	20.5	17.4	22.4	3100	41000
Iron	20900	20600	21300	16400	24600	55000	720000
Lead	11.3	12.1	14.8	12.8	13.9	400	800
Magnesium	10100	9350	11500	9630	9690	NA	NA
Manganese	885	435	464	334	552	1800	23000
Nickel	27.9	25.9	25.9	18.1	29.8	1500	20000
Potassium	1640	1790	1660	987	1680	NA	NA
Selenium	ND	ND	ND	ND	ND	390	5100
Silver	ND	ND	ND	ND	ND	390	5100
Sodium	ND	ND	ND	ND	ND	NA	NA
Thallium	4.0	ND	ND	ND	ND	NA	NA
Vanadium	21.9	22.1	23.1	19.6	26.2	390	5,200
Zinc	54.1	61.3	56.1	44.9	63.3	23000	310,000
Mercury	ND	ND	ND	ND	ND	5.6	34

ND - Detected Below LOQ

- Exceeds residential RSL

TABLE 3-6. Sediment Borrow Area Hazard Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-BSD-001	0.25	0.25	0.25	0.25	0.25		0.070	0.070		0.073	0.097	0.180	0.021	0.082		15.1
Minimum Detection (mg/kg)	ND	ND	ND	ND	ND		ND	ND		0.073	0.097	0.180	0.021	0.082		15
Mean (mg/kg)	ND	ND	ND	ND	ND		ND	ND		0.073	0.097	0.180	0.021	0.082		15
Maximum Detection (mg/kg)	ND	ND	ND	ND	ND		ND	ND		0.073	0.097	0.180	0.021	0.082		15
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	NA	NA	NA	NA	NA		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	NA	NA	NA		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.0				Sum mean		0.000	Sum mean		0.45				lead mean		15
Nitroaromatic ILCR	0.E+00				less than RG?		Yes	less than RG?		Yes				less than RG?		Yes
					total 1 mg/kg			total 1 mg/kg						total 400 mg/kg		

- Not detected above LOQ, 0.5x the LOQ used in calculation.

NA - Not Applicable

ND - Not detected above LOQ

NR - Analysis not requested

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-7. Sediment Borrow Area TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-BSD-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Category:	**Non-Hazardous**
			Recommended For:	**Use As Backfill**

ND -Not detected above LOQ.

3.4.2. Building 657 – Wastewater Disposal Settling Tank

3.4.2.1. *TNT C RA-C*

Based on the RI, excavation in this AOC consists of excavating approximately 104 cy of material from within the surveyed boundaries. The dimensions of the excavation were 20 × 20 × 7 ft and the primary contaminants were PAHs. Groundwater was not encountered during the investigation; however, bedrock was noted at 7 ft. An adjacent well measured groundwater at 13.3 ft.

Preparations at this site began on August 2, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. During the excavation, there were large quantities of debris uncovered during the excavation. Large concrete walls, foundations and large rocks were removed and set aside. The excavation was completed within the scoped dimensions.

Confirmation sampling along four walls and one floor were collected on August 5, 2010 (Figure 3-1). Stockpile sampling was also conducted on the same day (Figure 3-2). The confirmation and samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. The nitroaromatic HI was <1 and the ILCR was <1E-5. The sum mean for the PAHs was <1 mg/kg and the mean for lead was <400 mg/kg. However, the Building 657 sum mean for PAHs was >1 mg/kg (Table 3-8). This AOC required additional excavation and was not closed out.

The stockpile characterization parameter was TCLP. Based on the laboratory data, the stockpile at this AOC was non-hazardous and was approved for disposal at the landfill (Table 3-9).

Figures 3-3 through 3-5 document the equipment staging, preparation for stockpile construction and the staked survey coordinates. The laboratory data for Building 657 is included in electronic format in Appendix C.2.

3.4.2.2. *Follow-on*

The additional excavation was conducted under Follow-on. The source of the contamination was along the east wall of the original excavation (Sample 0922-657-C-002). Test pitting at the AOC was initiated on December 7, 2011 and moved in an easterly direction from the east wall of the original excavation. See Figure 3-6 for the diagram of the test pit locations. A series of test pits were dug along each wall of a 40 (length, L) × 20 ft (width, W) extension of the original wall. Based on the test pit results and preliminary calculation of the risk the soil was below the RG of 1.0 mg/kg. In an attempt to reduce the volume of soil or sediment to be excavated from the AOC, a test pit was relocated to a 30 ft (L) distance from the original wall. Correspondingly, a second test pit floor sample was collected from the 6 ft (depth, D). Results of the test pit floor sample were below RG, but the PAH concentration were high enough that the sum mean exceeded 1.0 mg/kg. The decision was made to collect a deeper test pit sample at 7 ft, just below the concrete floor. The results from this test pit sample and a preliminary calculation of risk using all of the test pit data from the 30 (W) × 20 ft (L) hole indicated that the soil was clean and ready for confirmation sampling.

Confirmation samples were collected on March 21, 2012 (Figure 3-7). The results from those samples were below the RG but exceeded the PAH sum mean of 1.0 mg/kg. The floor sample collected from the 7 ft depth contributed to the exceedance. Consequently, the decision was made to collect a confirmation sample from the 8 ft depth. Based on the results of the confirmation samples and the risk calculations, this AOC was ready for excavation and subsequent backfill.

Confirmation sample data from the original excavation and the expanded excavation were used in calculating the risk for this AOC. Based on the confirmation samples, Building 657 had a nitroaromatic HI of <1 and an ILCR <1E-5. The sum means of the PCBs and the PAHs were <1 mg/kg and the mean of the lead was <400 mg/kg (Table 3-10).

Following the verification that the soil in the excavation's walls and floor was no longer a risk to human health or the environment, the expanded area was surveyed, a new diagram drawn for the AOC (Figure 3-8), and the coordinates documented on a spreadsheet. The coordinates for the expanded area are presented in Appendix B.1. Once the coordinates were staked and surveyed, excavation began.

The soil or soil and sediment (AOC 618) excavated from the expanded area was transported directly to the remediation pad and configured into windrows. The soil was not segregated by AOC, but combined in the windrows for subsequent AH remediation.

Figures 3-9 and 3-10 show debris removal from the AOC and hammering through a concrete floor during the follow-on effort.

Following excavation and transport of the contaminated soil to the remediation pad for treatment, and the confirmation results indicated the AOC was below risk criteria, the AOC was backfilled with clean soil.

Remedial Investigation Notes:

- Scoped volume 104 cy
- Dimensions are 20’ x 20’ x 7’
- Primary contaminants are PAHs
- Groundwater was not encountered during investigation
- Bedrock noted at 7’
- Adjacent well measured groundwater at 13.3’

RA-C Notes:

No Sample was collected from the floor of the excavation
Hit concrete floor at the bottom of the excavation
Sampled for all COCs
Groundwater was not encountered during the excavation
Sampled for all COCs
Surveyed stockpile volume 64 cy

Sample Locations:

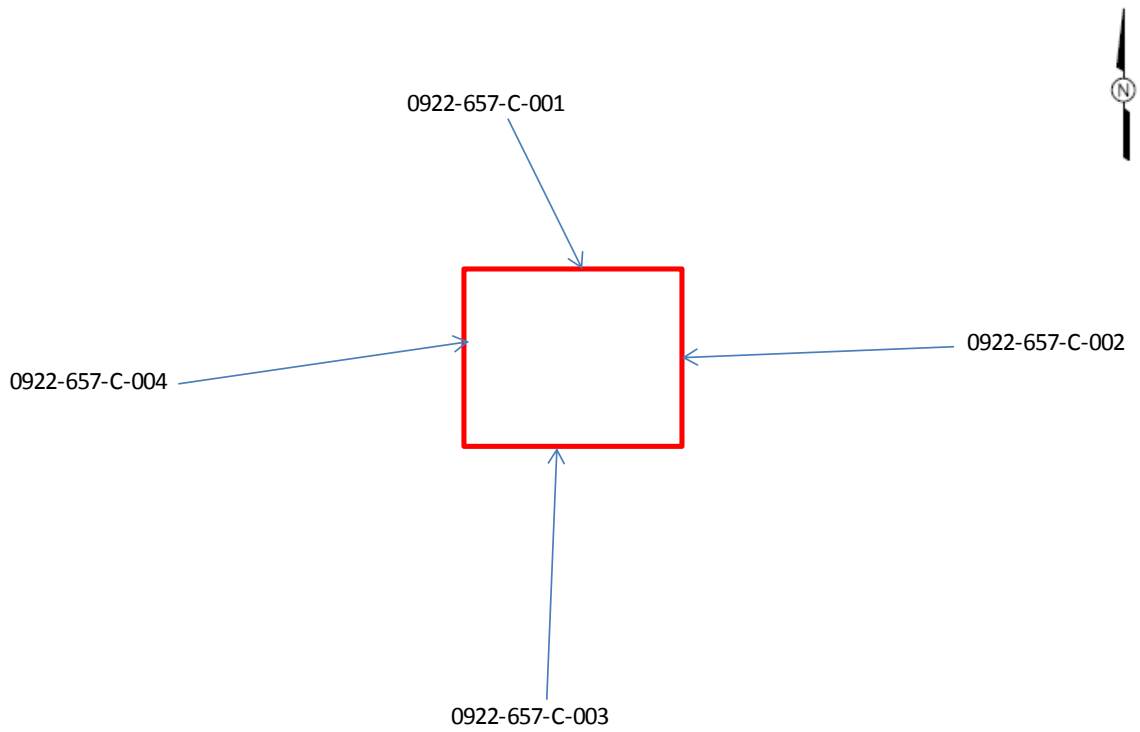


FIGURE 3-1. Building Area 657 Wastewater Disposal Settling Tank Confirmation Diagram

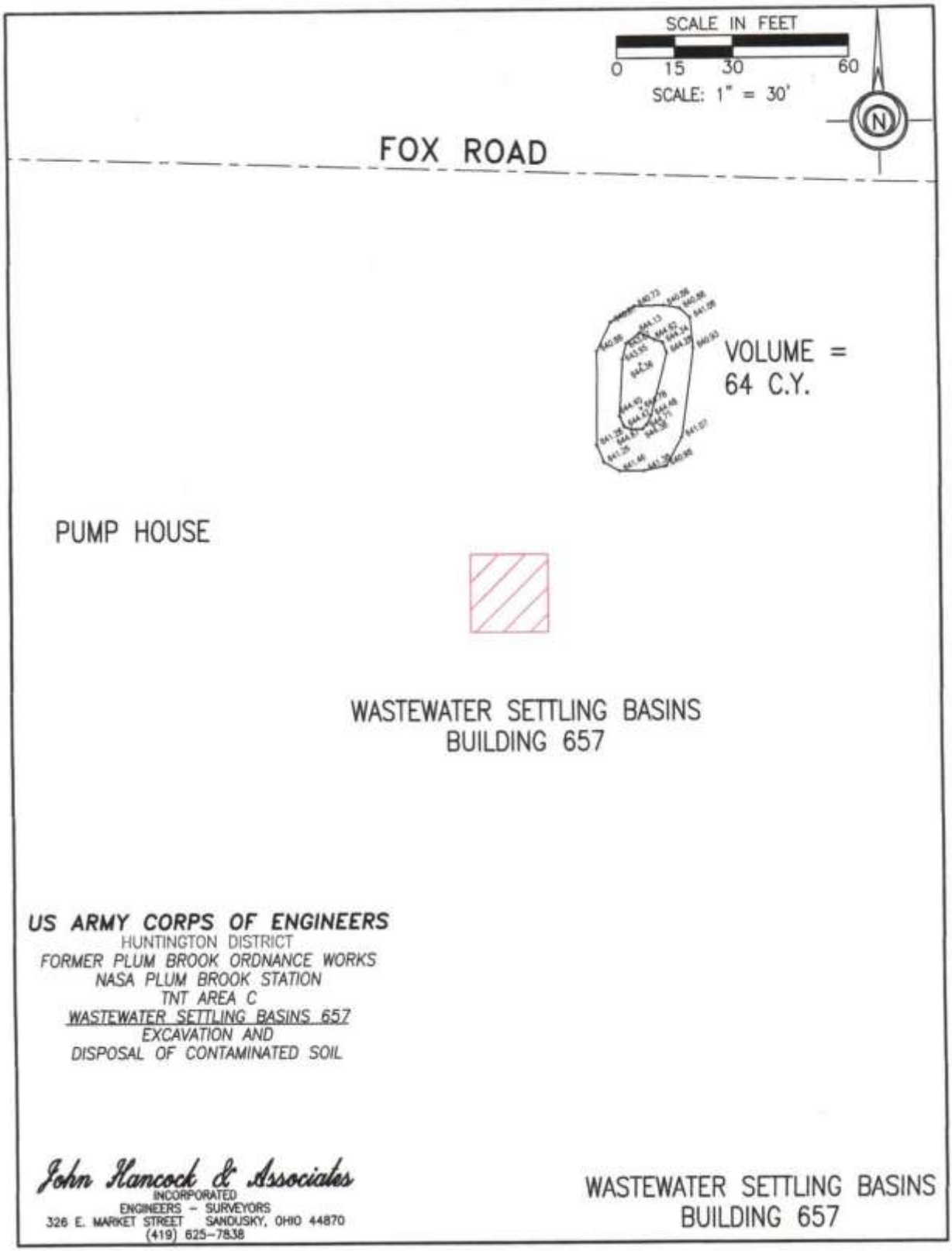


FIGURE 3-2. Building Area 657 Stockpile Diagram

TABLE 3-8. Building Area 657 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-657-C-001	0.47	0.69	0.24	0.24	2.1		0.062	0.28		0.15	0.18	0.25	0.058	0.11		78.7
0922-657-C-002	0.24	0.24	0.24	0.24	0.24		0.061	0.15		0.9	0.86	1.2	0.2	0.49		122
0922-657-C-003	0.25	0.25	0.25	0.25	0.25		0.068	0.068		0.44	0.55	0.84	0.12	0.35		95
0922-657-C-004	0.22	0.22	0.22	0.22	0.22		0.061	0.061		0.078	0.079	0.12	0.024	0.049		26.3
Minimum Detection (mg/kg)	0.47	0.69	ND	ND	2.1		ND	0.15		0.078	0.079	0.12	0.024	0.049		26.3
Mean (mg/kg)	0.21	0.26	ND	ND	0.61		ND	0.12		0.39	0.42	0.60	0.10	0.25		81
Maximum Detection (mg/kg)	0.47	0.69	ND	ND	2.1		ND	0.28		0.44	0.86	1.2	0.2	0.49		122
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.049	0.060	ND	ND	0.015		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	5E-08		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.1					Sum mean	0.12		Sum mean	1.8					lead mean	81
Nitroaromatic ILCR	5.E-08					less than RG?	Yes		less than RG?	No					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-9. Building Area 657 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-657-S-0005	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-3. Staging Equipment at AOC 657

FIGURE 3-4. Putting Down Plastic for the Soil Stockpile at AOC 657

FIGURE 3-5. Surveyed Coordinates at AOC 657

TNTC Excavation Notes:

- Excavate approximately 104 cy of material
- Dimensions are 20’ x 20’ x 7’
- Primary contaminants – SVOCs
- Groundwater was not encountered during investigation
- Adjacent well measured groundwater at 13.3’
- Bedrock encountered at 7’
- No sample collected from floor; hit concrete floor

Follow-on Test Pit Notes:

- Excavate approximately 104 cy of material
- Dimensions are 20’ x 20’ x 7’
- TP1 and TP2 collected at 6 feet due to concrete pad at bottom
- TP3 and TP4 collected at 4.5 feet. Encountered large concrete debris >5 feet in
- There is a visible wall around this area approximately 1 acre in size with a floor at 6 feet. Could not punch through concrete floor with the Linkbelt 210. TP5 and TP6 collected at 6 feet
- TP3 was a floor sample based on original area of excavation (40x20). TP5 is a wall sample since it will become the outer wall with the new area of excavation (20x20)
- TP7 collected at 7 feet, just below broken concrete floor which ranged from 6-12” thick
- Greyed out sample numbers will not be included in calculations

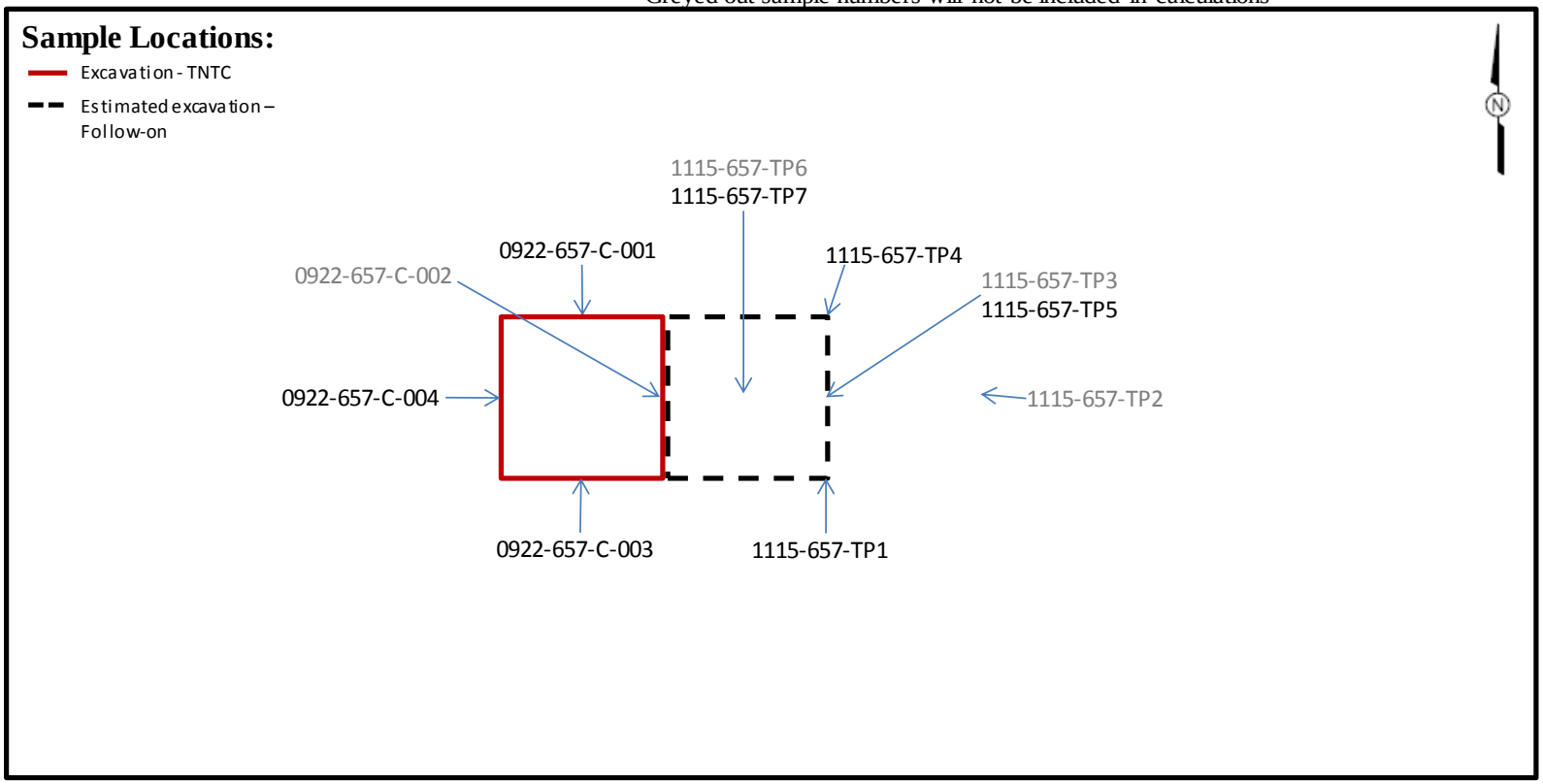


FIGURE 3-6. Building Area 657 Follow-on Test Pitting Diagram

TNTC Excavation Notes:

- Scoped volume 104 cy of material
- Dimensions are 20’ x 20’ x 7’
- Primary contaminants – SVOCs
- Groundwater was not encountered during investigation
- Adjacent well measured groundwater at 13.3’
- Bedrock encountered at 7’
- No sample collected from floor; hit concrete floor

Follow-on Confirmation and Excavation Notes:

- Excavate approximately 178 cy using surveyed dimensions and estimated depth
- Dimensions are 30’ x 20’ x 8’
- Sample results for the greyed-out sample numbers will not be included in calculations
- Confirmation complete, excavation complete 6/5/12
- The volume excavated was transported directly to the remediation pad. The soil was surveyed to determine the total volume of 2,657 cy

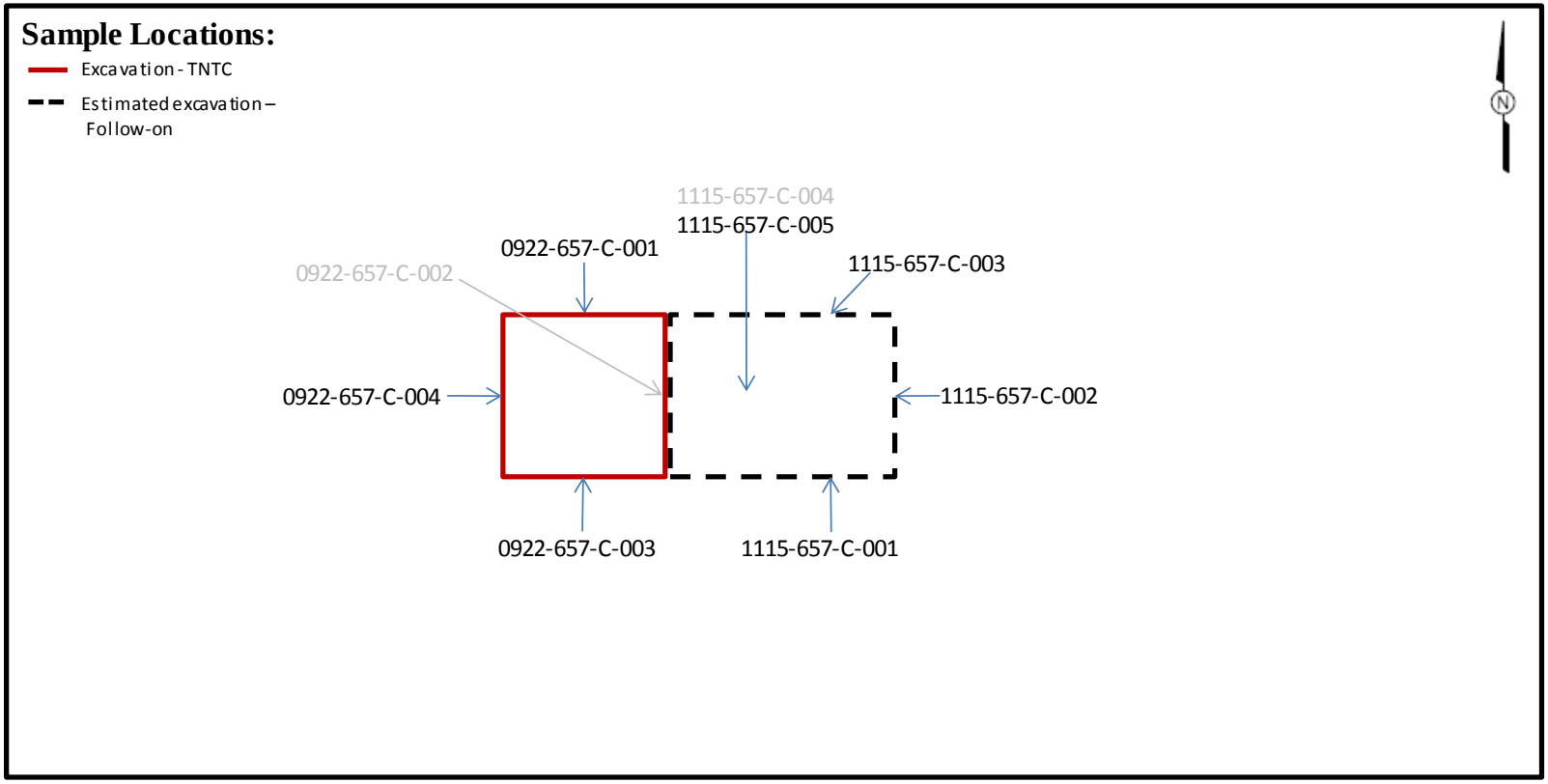


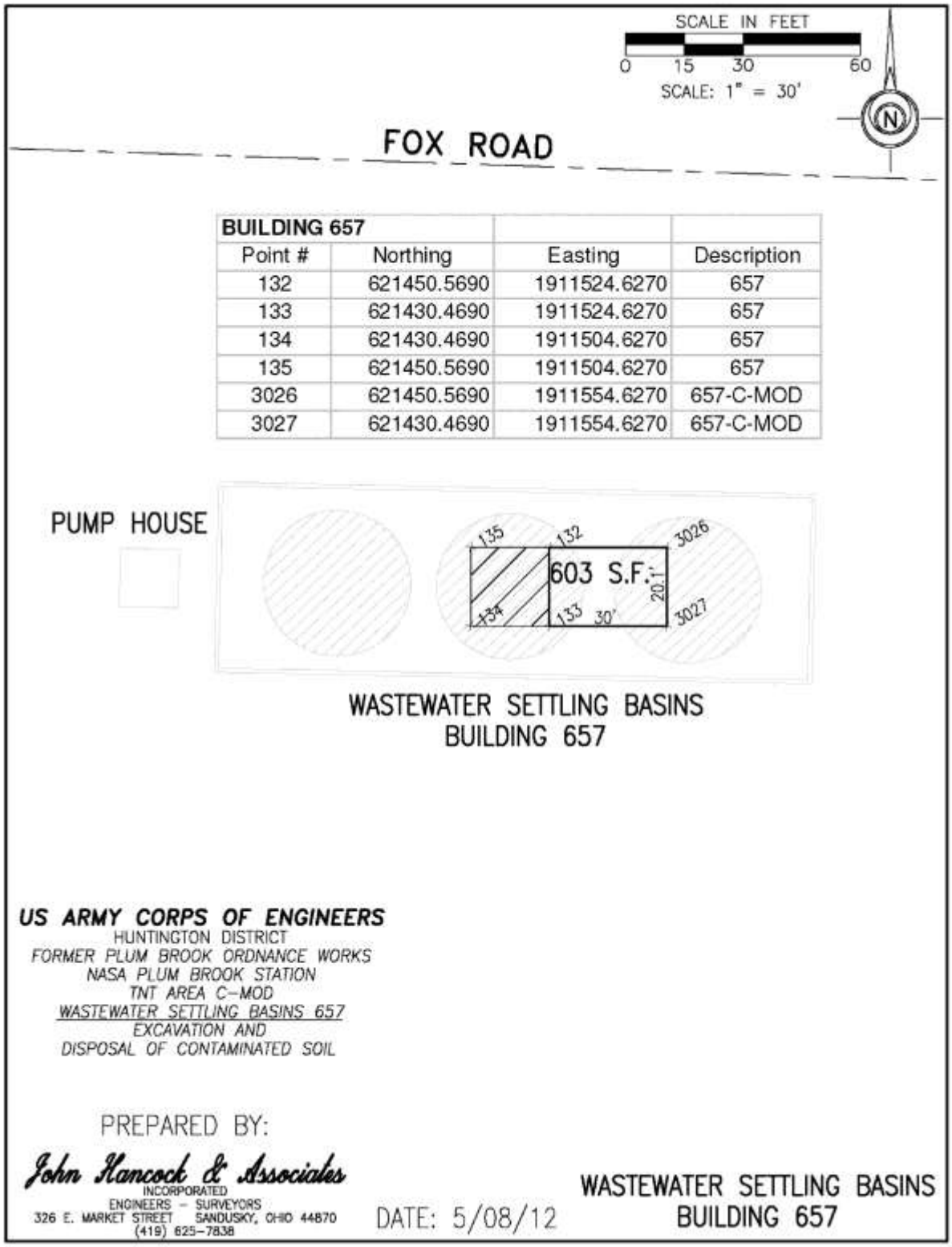
FIGURE 3-7. Building Area 657 Follow-on Confirmation Diagram

TABLE 3-10. Building Area 657 Follow-on Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-657-C-001	0.47	0.69	0.24	0.24	2.1		0.062	0.28		0.15	0.18	0.25	0.058	0.11		78.7
0922-657-C-002	0.24	0.24	0.24	0.24	0.24		0.061	0.15		0.90	0.86	1.2	0.20	0.49		120
0922-657-C-003	0.25	0.25	0.25	0.25	0.25		0.068	0.068		0.44	0.55	0.84	0.12	0.35		95
0922-657-C-004	0.22	0.22	0.22	0.22	0.22		0.061	0.061		0.078	0.079	0.12	0.024	0.049		26.3
1115-657-C-001	0.25	0.25	0.616	1.45	0.144		0.0228	0.0318		0.147	0.163	0.143	0.139	0.139		80.4
1115-657-C-002	0.537	0.830	1.14	1.42	1.34		0.0199	0.567		0.112	0.165	0.163	0.139	0.139		329
1115-657-C-003	0.00250	0.00250	0.00313	0.00656	0.00358		0.0200	0.122		0.697	0.697	0.697	0.697	0.697		87.3
1115-657-C-004	0.296	0.307	0.519	1.57	3.90		0.0216	0.0216		0.774	0.774	0.774	0.774	0.774		11.7
1115-657-C-005	0.249	0.249	0.249	0.249	0.249		0.0190	0.0190		0.134	0.134	0.134	0.134	0.134		16.1
Minimum Detection (mg/kg)	0.47	0.69	0.0031	0.0066	0.0036		ND	0.28		0.078	0.079	0.12	0.024	0.049		16.1
Mean (mg/kg)	0.21	0.29	0.32	0.48	0.56		ND	0.15		0.19	0.22	0.28	0.11	0.15		94
Maximum Detection (mg/kg)	0.54	0.83	1.1	1.5	2.1		ND	0.57		0.44	0.55	0.84	0.12	0.35		329
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.050	0.066	0.0020	0.0048	0.014		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	4.E-07	5E-07	4.2E-08		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.1					Sum mean	0.15		Sum mean	0.95					lead mean	94
Nitroaromatic ILCR	1.E-06					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Sample results not included in risk calculations.
- Not detected above LOQ, 0.5x the LOQ used in calculation.
-Result exceeds RG

NA - Not Applicable
ND - Not detected above LOQ
NR - Analysis not requested
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.



BUILDING 657			
Point #	Northing	Easting	Description
132	621450.5690	1911524.6270	657
133	621430.4690	1911524.6270	657
134	621430.4690	1911504.6270	657
135	621450.5690	1911504.6270	657
3026	621450.5690	1911554.6270	657-C-MOD
3027	621430.4690	1911554.6270	657-C-MOD

FIGURE 3-8. Diagram of AOC 657 Follow-on with Coordinates

FIGURE 3-9. Removing Debris from AOC 657

FIGURE 3-10. Hammering Through Concrete Floor at AOC 657

3.4.3. Building 683 – Fortifier House, Process Line 8

3.4.3.1. *TNT C RA-C*

Based on the RI, excavation in this AOC consisted of excavating approximately 1,200 cy of material from within the surveyed boundaries. The dimensions of the excavation were 60 × 60 × 9 ft and the primary contaminants were nitroaromatics. Groundwater was noted at 9 ft and bedrock was encountered at 15 ft.

Excavation on Building 683 was initiated on August 6, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpiles. As with previous excavation, there were large quantities of debris uncovered during the excavation. Large concrete walls, footers, foundations and large rocks were removed from the excavation and set to the side. A groundwater monitoring well (TNTC-BED-GW001) was inside the surveyed boundaries. To protect the integrity of the bedrock well, the walls of the northeast corner of the excavation were relocated so that the well was outside the excavation area. The north wall and the east wall were shortened 15 ft on the NE corner, and the walls were joined to former two additional walls (see Appendix C.1.1 for decision documentation).

Fourteen confirmation samples were collected along the walls (10 samples) and floor (4) on August 18, 2010 (Figure 3-11). There were three stockpiles and each was sampled the same day (Figure 3-12). The confirmation samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Building 683 had a nitroaromatic HI >1 and the sum mean of the PAHs >1 (Table 3-11). This AOC required additional excavation and was not closed out.

The stockpile characterization parameter was TCLP (Table 3-12). Based on the laboratory data, two of the three stockpiles were hazardous and the soil was transported to the remediation pad. The third stockpile was non-hazardous and was approved for disposal at the landfill.

The laboratory data for Building 683 is included in electronic format in Appendix C.2.

3.4.3.2. *Follow-on*

Based on the confirmation samples collected from the original TNT C RA-C effort, the area at Building 683 was still contaminated and additional excavation was required. Hence, the additional excavation was conducted under Follow-on.

Under the original effort, there were three confirmation samples (0922-683-C-009, 0922-683-C-010, 0922-683-C-013) that had high concentration of nitroaromatics which influenced the risk calculations. These samples were along the west wall and the floor sample (013) was at the southwest corner. A series of test pits samples were collected along a 40 (L) × 30 (W) × 3 ft (D) extension from the west wall. The test pit samples indicated the soil was clean so the extension of the westerly direction was reduced to 30 ft (L) to reduce the volume of soil. Test pits samples were collected along the west wall and test pit floor samples were collected from the floor. In the southwest corner of the original excavation, a test pit was dug at a depth of 3 ft below the floor of the original excavation (Figure 3-13). The test pit samples were submitted

to Microbac Laboratories for nitroaromatics analysis. Preliminary risk calculations indicated the soil was below the risk criteria and confirmation samples were collected from the test pit locations.

Confirmation samples were collected on February 23, 2012 (Figure 3-14) and submitted to Microbac Laboratories for nitroaromatics, PCB, PAHs and TAL metals. The nitroaromatic HI was <1 and the ILCR was <1E-5. The sum mean for the PAHs was <1 mg/kg and the mean for lead was <400 mg/kg (Table 3-13).

Following the verification that the soil in the excavation's walls and floor was no longer a risk to human health or the environment, the expanded areas were surveyed, a new diagram drawn for the AOC (Figure 3-15), and the coordinates documented on a spreadsheet. The coordinates for the expanded areas are presented in Appendix B.1. Once the coordinates were staked and surveyed, excavation began. The soil excavated from the expanded areas was transported directly to the remediation pad and configured into windrows. The soil was not segregated by AOC, but combined in the windrow for subsequent AH remediation. Following excavation and transport of the contaminated soil to the remediation pad for treatment, the AOC was backfilled with clean soil.

Figures 3-16 through 3-20 are photos of the activities at AOC 683.

Remedial Investigation Notes:

- Scoped volume 1,200 cy
- Dimensions are 60’ X 60’ X 9’
- Groundwater noted at 9’
- Bedrock encountered at 15’
- Primary contaminants are nitroaromatics

RA-C Notes:

Began excavating on 8/6/2010
Pulled off excavation on 6/6/2010 to determine plan for well
Sampled for all COCs on 8/18/2010
Surveyed stockpile volume 714 cy

Sample Locations:

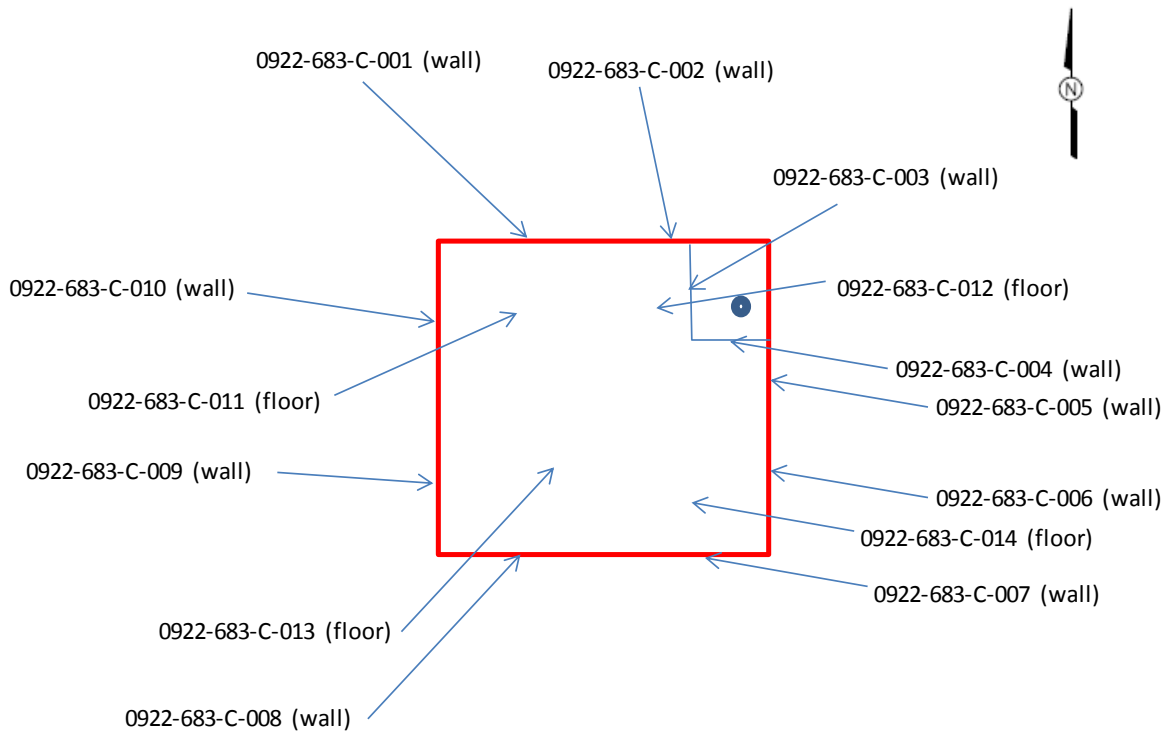


FIGURE 3-11. Building Area 683 Fortifier House – Process Line 8 Confirmation Diagram

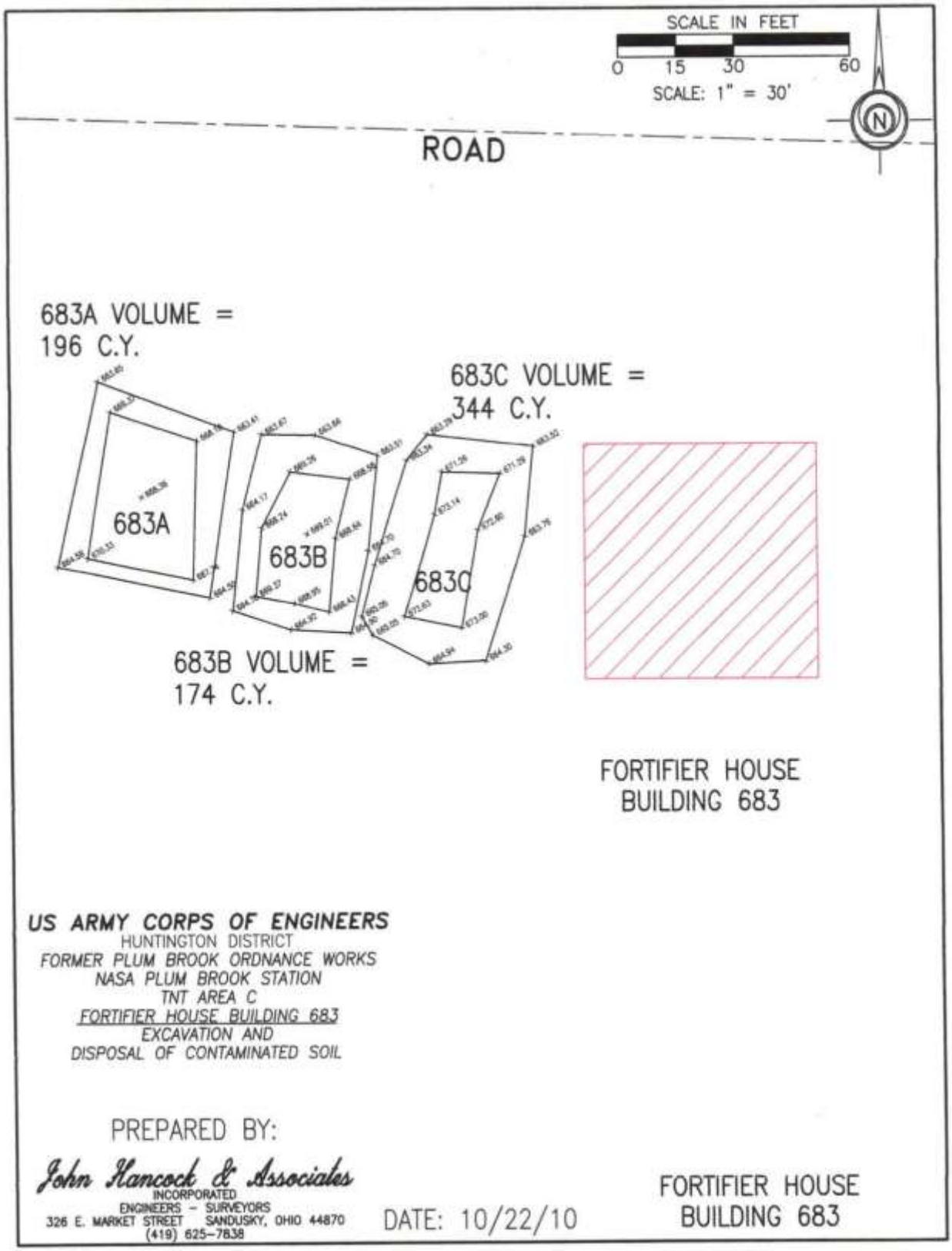


FIGURE 3-12. Building Area 683 Stockpile Diagram

TABLE 3-11. Building Area 683 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-683-C-001	0.25	0.25	0.25	0.25	0.25		0.061	0.061		0.007	0.007	0.007	0.007	0.007		5.3
0922-683-C-002	0.24	0.24	0.24	0.24	0.24		0.061	0.061		0.007	0.007	0.007	0.007	0.007		17.3
0922-683-C-003	0.86	1.6	0.25	0.24	1.4		0.064	0.064		0.008	0.008	0.008	0.008	0.008		7.1
0922-683-C-004	0.24	0.24	0.24	0.24	0.24		0.062	0.062		0.008	0.008	0.008	0.008	0.008		3.1
0922-683-C-005	0.25	0.25	0.25	0.25	0.25		0.059	0.059		0.007	0.007	0.007	0.007	0.007		1.4
0922-683-C-006	0.24	0.24	0.24	0.24	0.24		0.059	0.059		0.007	0.007	0.007	0.007	0.007		2.6
0922-683-C-007	0.25	0.25	0.25	0.25	0.25		0.059	0.059		0.007	0.007	0.007	0.007	0.007		3.0
0922-683-C-008	0.49	0.35	0.33	0.24	0.24		0.059	0.066		0.007	0.007	0.007	0.007	0.007		15.1
0922-683-C-009	0.75	0.25	3.5	1.2	5.1		0.61	2.4		5.1	3.3	4.8	0.49	1.7		42.2
0922-683-C-010	0.7	0.24	3.9	1.2	6.3		0.6	1.8		1.9	1.4	2.5	0.29	0.84		130
0922-683-C-011	0.56	2	0.25	0.25	2.7		0.068	0.068		0.073	0.049	0.075	0.008	0.029		10.1
0922-683-C-012	1.9	2.4	0.24	0.24	4.2		0.069	0.069		0.008	0.008	0.008	0.008	0.008		10.6
0922-683-C-013	24	24	24	24	640		0.068	0.068		0.083	0.083	0.083	0.083	0.083		2.0
0922-683-C-014	0.42	0.69	0.25	0.25	1.3		0.068	0.068		0.008	0.008	0.008	0.008	0.008		2.5
Minimum Detection (mg/kg)	0.42	0.35	0.25	1.2	1.3		ND	0.066		0.073	0.049	0.075	0.29	0.029		2
Mean (mg/kg)	1.3	1.4	1.5	1.1	47		ND	0.33		0.51	0.34	0.53	0.06	0.19		18
Maximum Detection (mg/kg)	1.9	2.4	3.9	1.2	640		ND	2.4		5.1	3.3	4.8	0.49	1.7		130
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.31	0.33	0.009	0.011	1.182		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	2E-06	1E-06	4E-06		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	2					Sum mean	0.33		Sum mean	1.6					lead mean	18
Nitroaromatic ILCR	7.E-06					less than RG?	Yes		less than RG?	No					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-12. Building Area 683 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-683-S-015	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	1.9	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

TABLE 3-12. Building Area 683 Stockpile Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-683-S-016	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.13	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

TABLE 3-12. Building Area 683 Stockpile Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-683-S-017	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.029	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TNTC Excavation Notes:

- Excavate approximately 1,200 cy of material
- Dimensions are 60' x 60' x 9'
- Primary contaminants – nitroaromatics
- Groundwater was noted at 9'
- Bedrock encountered at 15'

Follow-on Test Pit Notes:

- Excavate approximately 1,300 cy of material, in 2 areas
- Dimensions are 30' x 30' x 3' and 60' x 60' x 9'
- TP1 area underwater, estimated 3 feet excavated and sample collected from bottom of hole
- TP4 and TP7 collected at 7 feet due to sand walls collapsing into test pit.
- TP5 collected at 8 feet due to sand walls collapsing.
- TP2, TP3, TP6, TP8, TP9, TP10, TP11 collected at 9 feet
- TP2-TP6 and TP10 backfilled 1/25/12. Clean holes, reducing margins of excavation
- TP12 and TP13 collected at 9 feet
- Greyed out sample numbers will not be included in calculations

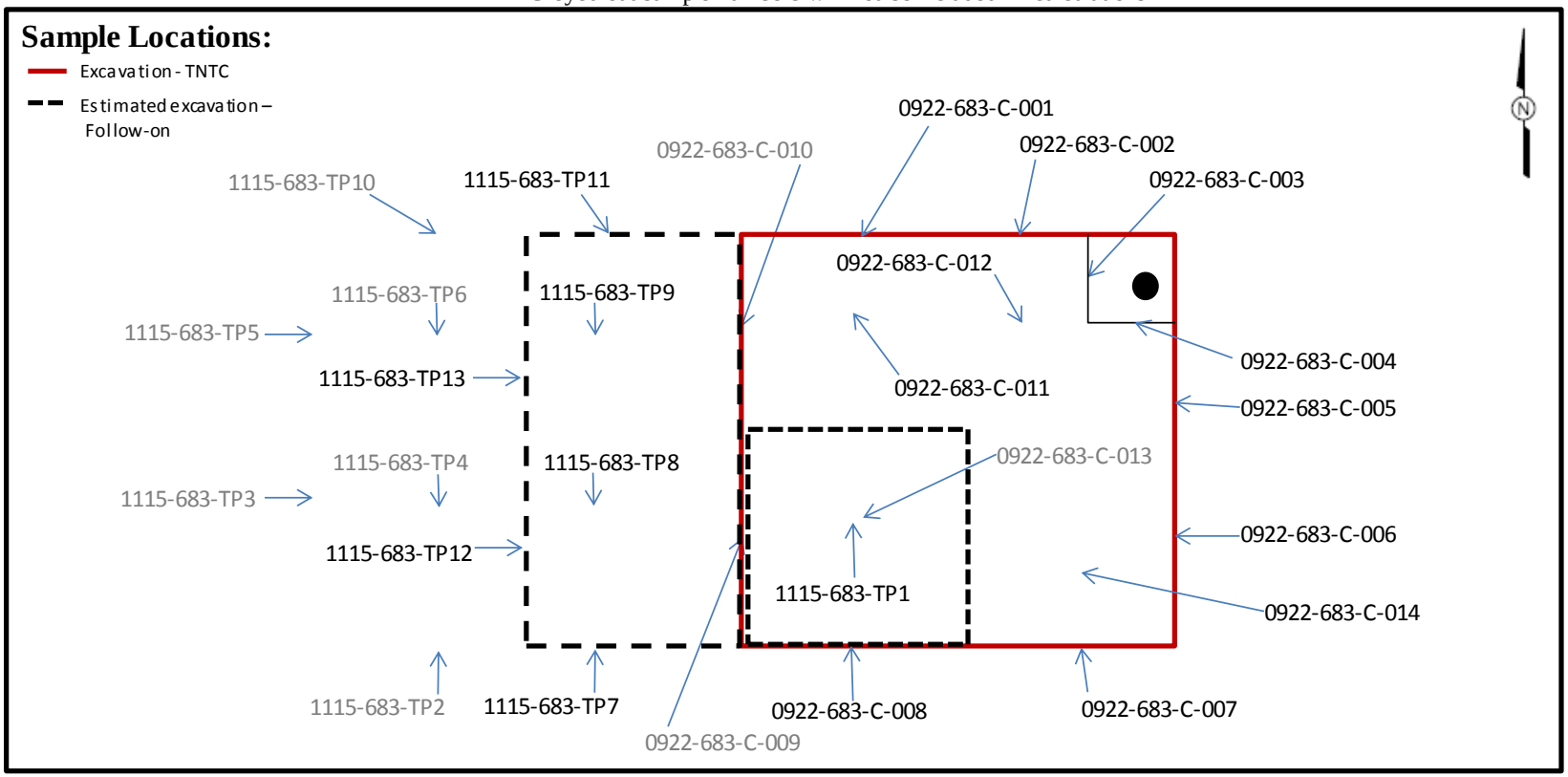


FIGURE 3-13. Building Area 683 Follow-on Test Pitting Diagram

TNTC Excavation Notes:

- Scoped volume 1,200 cy of material
- Dimensions are 60’ x 60’ x 9’
- Primary contaminants – nitroaromatics
- Groundwater was noted at 9’
- Bedrock encountered at 15’

Follow-on Confirmation and Excavation Notes:

- Excavate approximately 911 cy of material in 2 areas using surveyed dimensions and estimated depth
- Dimensions are 30’ x 30’ x 3’ and 64’ x 38’ x 9’ (irregular shape)
- C-004 sample moved out to collect sample off of wall which had collapsed after test pitting
- Sample results for the greyed-out sample numbers will not be included in calculations
- Confirmation complete, excavation completed 5/8/12
- The volume excavated was transported directly to the remediation pad. The soil was surveyed to determine the total volume of 2,657 cy

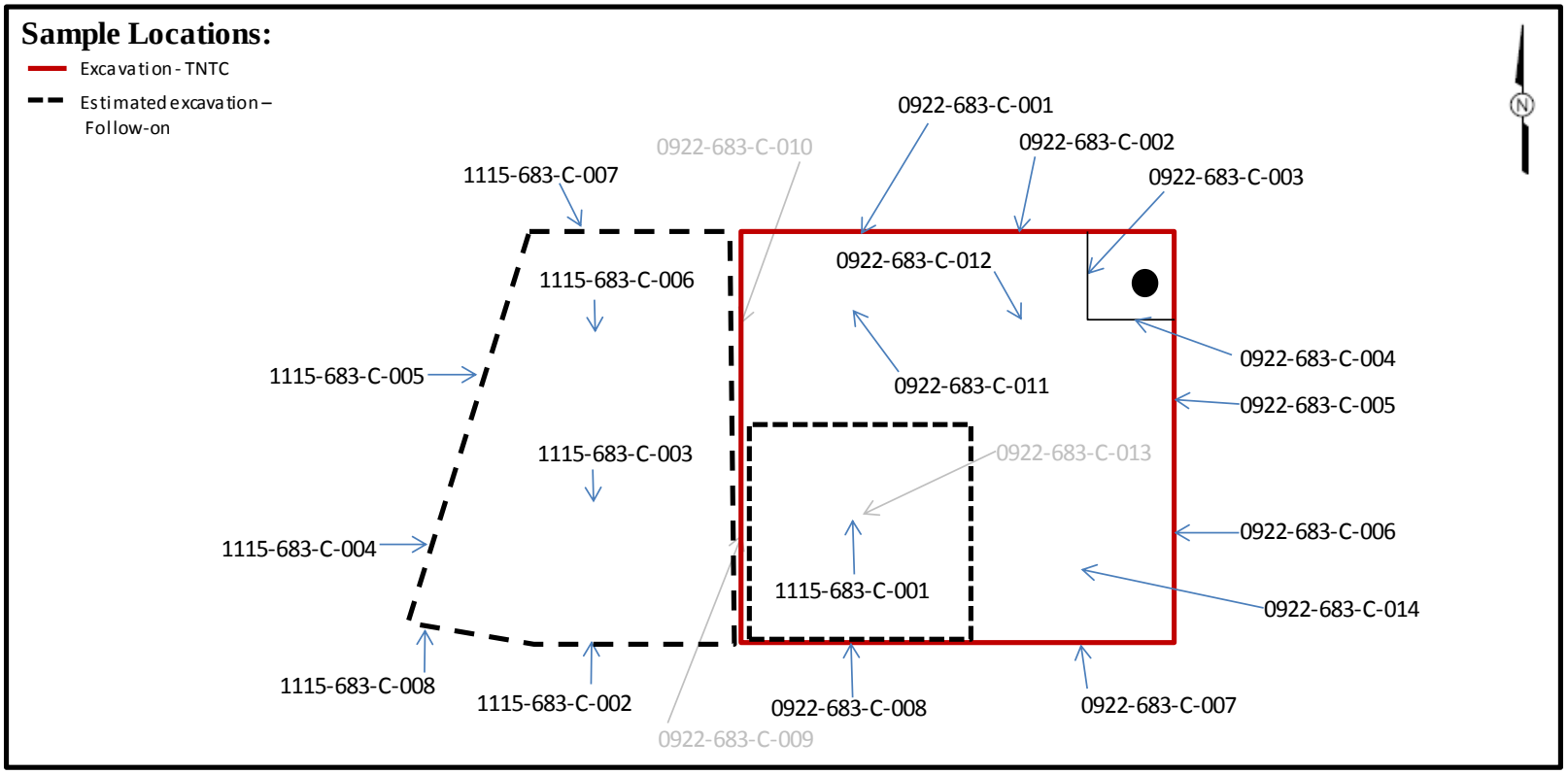


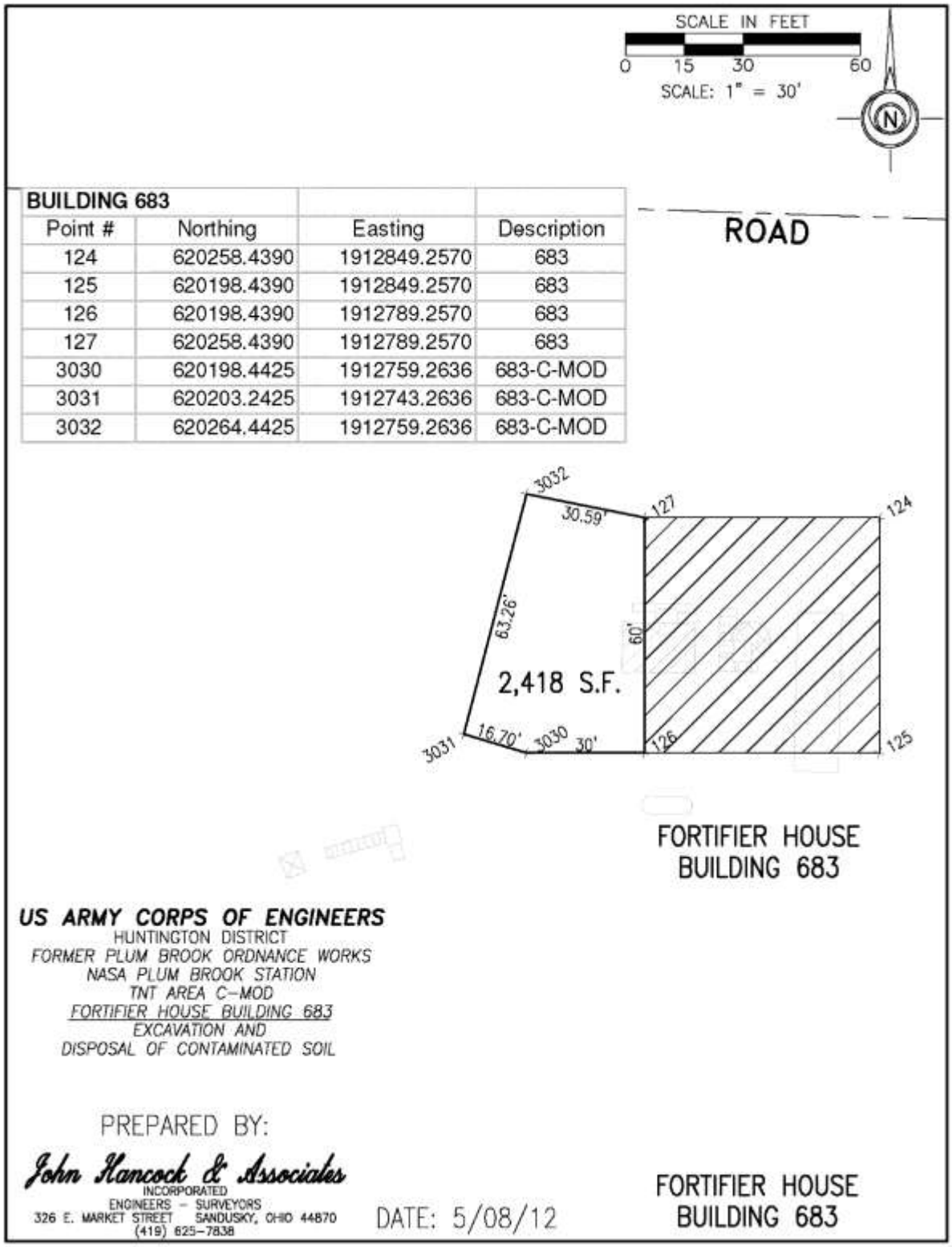
FIGURE 3-14. Building Area 683 Follow-on Confirmation Diagram

TABLE 3-13. Building Area 683 Follow-on Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-683-C-001	0.25	0.25	0.25	0.25	0.25		0.061	0.061		0.0074	0.0074	0.0074	0.0074	0.0074		5.3
0922-683-C-002	0.24	0.24	0.24	0.24	0.24		0.061	0.061		0.0074	0.0074	0.0074	0.0074	0.0074		17.3
0922-683-C-003	0.86	1.6	0.25	0.24	1.4		0.064	0.064		0.0078	0.0078	0.0078	0.0078	0.0078		7.1
0922-683-C-004	0.24	0.24	0.24	0.24	0.24		0.062	0.062		0.0075	0.0075	0.0075	0.0075	0.0075		3.1
0922-683-C-005	0.25	0.25	0.25	0.25	0.25		0.059	0.059		0.0072	0.0072	0.0072	0.0072	0.0072		1.4
0922-683-C-006	0.24	0.24	0.24	0.24	0.24		0.059	0.059		0.0072	0.0072	0.0072	0.0072	0.0072		2.6
0922-683-C-007	0.25	0.25	0.25	0.25	0.25		0.059	0.059		0.0071	0.0071	0.0071	0.0071	0.0071		3.0
0922-683-C-008	0.49	0.35	0.33	0.24	0.24		0.059	0.066		0.0072	0.0072	0.0072	0.0072	0.0072		15.1
0922-683-C-009	0.75	0.25	3.5	1.2	5.1		0.61	2.4		5.1	3.3	4.8	0.49	1.7		42
0922-683-C-010	0.7	0.24	3.9	1.2	6.3		0.6	1.8		1.9	1.4	2.5	0.29	0.84		130
0922-683-C-011	0.56	2	0.25	0.25	2.7		0.068	0.068		0.073	0.049	0.075	0.0082	0.029		10.1
0922-683-C-012	1.9	2.4	0.24	0.24	4.2		0.069	0.069		0.0083	0.008	0.0083	0.0083	0.0083		10.6
0922-683-C-013	24	24	24	24	640		0.068	0.068		0.083	0.083	0.083	0.083	0.083		2.0
0922-683-C-014	0.42	0.69	0.25	0.25	1.3		0.068	0.068		0.0082	0.008	0.0082	0.0082	0.0082		2.5
1115-683-C-001	0.250	0.250	0.250	0.250	0.250		0.0227	0.0227		0.146	0.146	0.146	0.146	0.146		10.2
1115-683-C-002	0.250	0.250	0.250	0.250	0.250		0.0189	0.0189		0.139	0.139	0.139	0.139	0.139		3.33
1115-683-C-003	0.249	0.249	0.340	0.249	0.279		0.0198	0.0198		0.147	0.147	0.147	0.147	0.147		3.78
1115-683-C-004	0.249	0.249	0.249	0.249	0.249		0.0216	0.0216		0.151	0.151	0.151	0.151	0.151		4.27
1115-683-C-005	0.248	0.502	0.248	0.539	6.53		0.0218	0.0361		0.134	0.134	0.134	0.134	0.134		7.67
1115-683-C-006	0.454	0.787	0.246	0.246	0.248		0.0208	0.0208		0.124	0.124	0.124	0.124	0.124		3.09
1115-683-C-007	1.29	2.92	0.246	0.246	1.46		0.0202	0.0202		0.149	0.149	0.149	0.149	0.149		2.28
1115-683-C-008	0.247	0.247	0.247	0.247	0.247		0.0172	0.0172		0.167	0.167	0.167	0.167	0.167		7.97
Minimum Detection (mg/kg)	0.42	0.35	0.25	0.54	0.25		ND	0.036		0.073	0.049	0.075	ND	0.029		1.4
Mean (mg/kg)	0.39	0.66	0.15	0.15	1.02		ND	0.026		0.036	0.035	0.036	ND	0.034		6.4
Maximum Detection (mg/kg)	1.9	2.4	0.34	0.54	6.5		ND	0.066		0.073	0.049	0.075	ND	0.029		17
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.1	0.2	0.001	0.002	0.03		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	2E-07	2E-07	8E-08		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.3					Sum mean	0.026		Sum mean	0.14					lead mean	6.4
Nitroaromatic ILCR	4.E-07					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

NA - Not Applicable
ND - Not detected above LOQ
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.

- Sample results not included in risk calculations.
- Not detected above LOQ, 0.5x the LOQ used in calculati
-Result exceeds RG



BUILDING 683			
Point #	Northing	Easting	Description
124	620258.4390	1912849.2570	683
125	620198.4390	1912849.2570	683
126	620198.4390	1912789.2570	683
127	620258.4390	1912789.2570	683
3030	620198.4425	1912759.2636	683-C-MOD
3031	620203.2425	1912743.2636	683-C-MOD
3032	620264.4425	1912759.2636	683-C-MOD

FIGURE 3-15. Diagram of AOC 683 Follow-on with Coordinates

FIGURE 3-16. Open Excavation at AOC 683

FIGURE 3-17. Stockpile at AOC 683

FIGURE 3-18. Using a Mini-Excavator During Test Pitting

FIGURE 3-19. Excavation Completed at AOC 683

FIGURE 3-20. AOC 683 Backfill Completed

3.4.4. Building 602 – Bi-Tri House, Process Line 10

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 89 cy of material from within the surveyed boundaries. The dimensions of the excavation were 20 × 20 × 6 ft and the primary contaminants were nitroaromatics. Groundwater was noted at 6 ft and bedrock was not encountered.

Excavation on Building 602 was initiated on August 23, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The stockpile for this location was prepared at the corner of the access road into TNT C and the access road to Building 602. This corner location would serve as a stockpile area for 2 smaller excavations within close proximity. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Four confirmation samples were collected along the walls and one from the floor on August 25, 2010 (Figure 3-21). There was one stockpile which was sampled the same day (Figure 3-22). The confirmation samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 602 had a nitroaromatic HI <1, the ILCR was <1E-5, and the sum mean of the PCBs and PAHs was <1 for both. The lead mean was <400 mg/kg (Table 3-14). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-15). The stockpile was non-hazardous and was approved for disposal at the landfill.

The laboratory data for Building 602 is included in electronic format in Appendix C.2.

Figures 3-23 and 3-24 are photos of the activities at AOC 602.

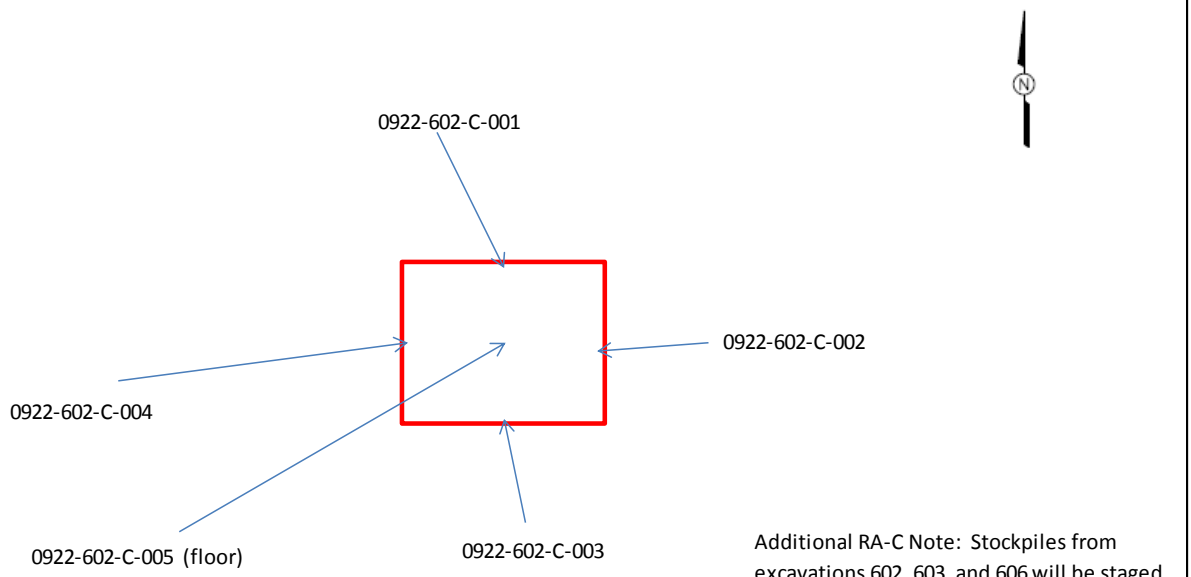
Remedial Investigation Notes:

- Scoped volume 89 cy
- Dimensions are 20'x 20'x 6'
- Primary contaminants – nitroaromatics, possibility of lead and low-levels of PCBs
- Groundwater noted at 6' depth
- Bedrock was not encountered

RA-C Notes:

8/23/10 - Began setup on 602
8/24/10 - Began excavation on 602
8/25/10 - Completed excavation and sampling
Soil was very sandy with some clay
Surveyed stockpile volume 98 cy

Sample Locations:



Additional RA-C Note: Stockpiles from excavations 602, 603, and 606 will be staged at a "common" area along the access road. The stockpiles will be segregated and designated as 602, 603, and 606.

Debris in hole (concrete) and old piping. Each was removed and piled adjacent to hole.

FIGURE 3-21. Building Area 602 Bi-Tri House, Process Line 10 Confirmation Diagram

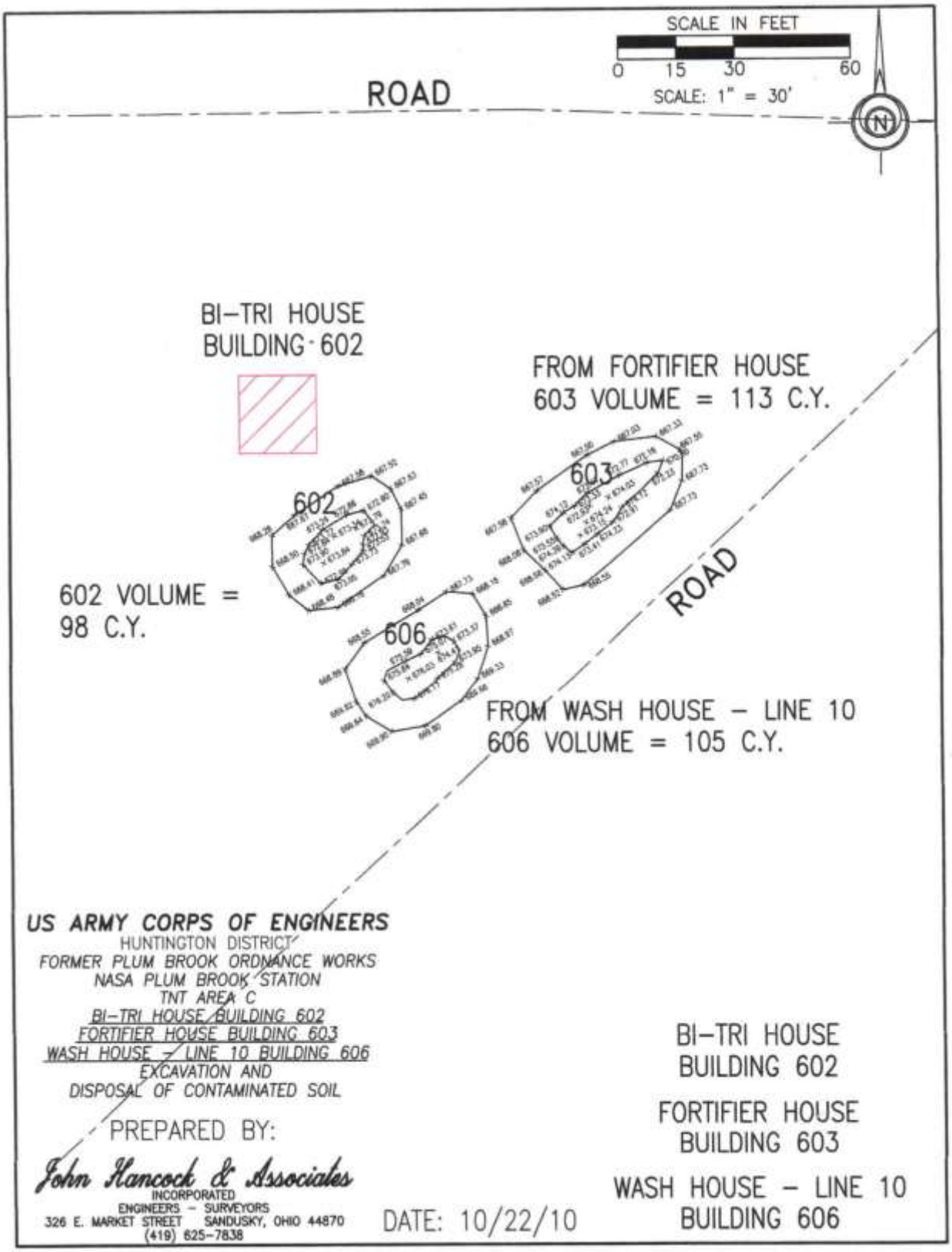


FIGURE 3-22. Building Area 602 Stockpile Diagram

TABLE 3-14. Building Area 602 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-602-C-001	0.24	0.24	0.24	0.24	0.24		0.058	0.058		0.007	0.007	0.01	0.007	0.007		11.0
0922-602-C-002	0.24	0.24	0.24	0.24	0.24		0.34	0.32		0.008	0.008	0.015	0.008	0.008		52.3
0922-602-C-003	0.26	0.26	0.25	0.25	0.32		0.059	0.13		0.029	0.029	0.029	0.029	0.029		60.3
0922-602-C-004	0.24	0.24	0.24	0.24	0.24		0.087	0.059		0.018	0.016	0.029	0.015	0.015		18.1
0922-602-C-005	0.25	0.25	0.25	0.25	0.25		0.068	0.071		0.029	0.031	0.051	0.019	0.022		294.0
Minimum Detection (mg/kg)	0.26	0.26	ND	ND	0.32		0.087	0.071		0.008	0.008	0.015	0.015	0.015		11
Mean (mg/kg)	0.15	0.15	ND	ND	0.16		0.10	0.08		0.015	0.015	0.023	0.011	0.012		87
Maximum Detection (mg/kg)	0.26	0.26	ND	ND	0.32		0.34	0.13		0.029	0.031	0.051	0.019	0.022		294
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.04	0.03	ND	ND	0.004		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	1E-08		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.07					Sum mean	0.19		Sum mean	0.075					lead mean	87
Nitroaromatic ILCR	1.E-08					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-15. Building Area 602 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-602-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-23. Excavating at AOC 602

FIGURE 3-24. Completed Excavation at AOC 602

3.4.5. Building 693 – Fortifier House, Process Line 9

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 147 cy of material from within the surveyed boundaries. The dimensions of the excavation were 26 × 21 × 7 ft and the primary contaminants were nitroaromatics. Groundwater was noted at 7 ft and bedrock was below 10 ft.

Excavation on Building 693 was initiated on August 19, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. As with previous excavation, there were large quantities of debris uncovered during the excavation. Large concrete walls, footers, foundations and large rocks were removed from the excavation and set to the side.

Four confirmation samples were collected along the walls and one from the floor on August 23, 2010 (Figure 3-25). There was one stockpile which was sampled the same day (Figure 3-26). The confirmation samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 693 had a nitroaromatic HI <1 and the sum mean of the PCBs and PAHs was <1. The mean of the lead was the RG of 400 mg/kg (Table 3-16). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-17). The stockpile was non-hazardous and was approved for disposal at the landfill.

The laboratory data for Building 693 is included in electronic format in Appendix C.2

Figures 3-27 and 3-28 show the excavation and backfilling at Building 693.

Remedial Investigation Notes:

- Scoped volume 147 cy
- Dimensions are approximately 26’ x 21’ x 7’
- Primary contaminants are nitroaromatics
- Groundwater was noted at 7’
- Bedrock was below 10’

RA-C Notes:

Started excavation on 8/19/2010
Finished excavation on 8/23/2010
Soil-Sandy
Surveyed stockpile volume 108 cy

Sample Locations:

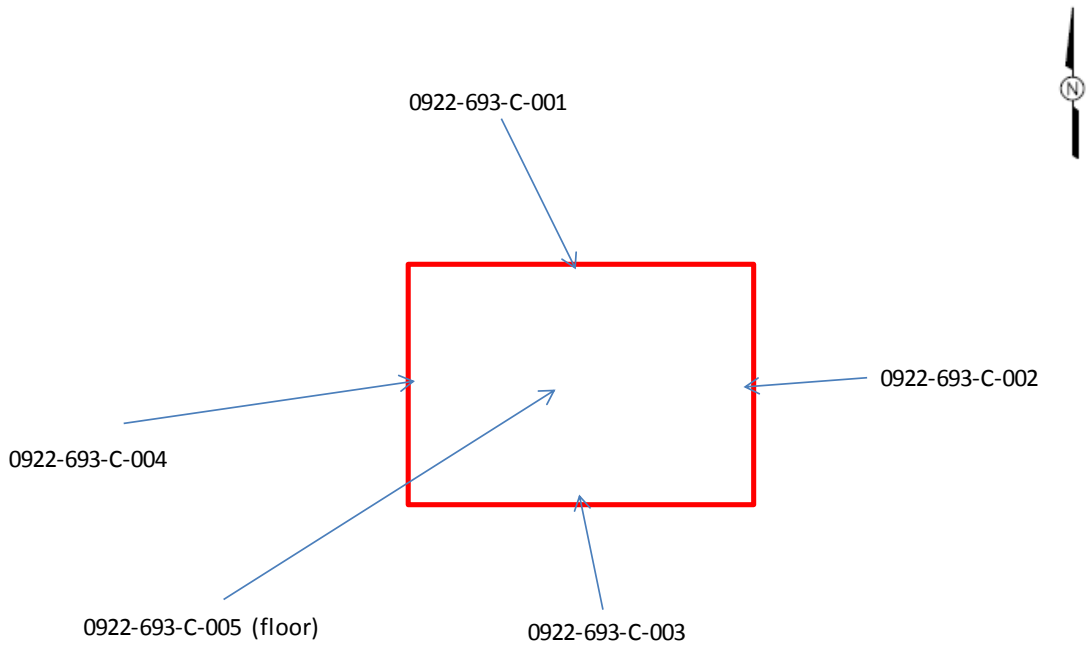


FIGURE 3-25. Building Area 693 Fortifier House – Process Line 9 Confirmation Diagram

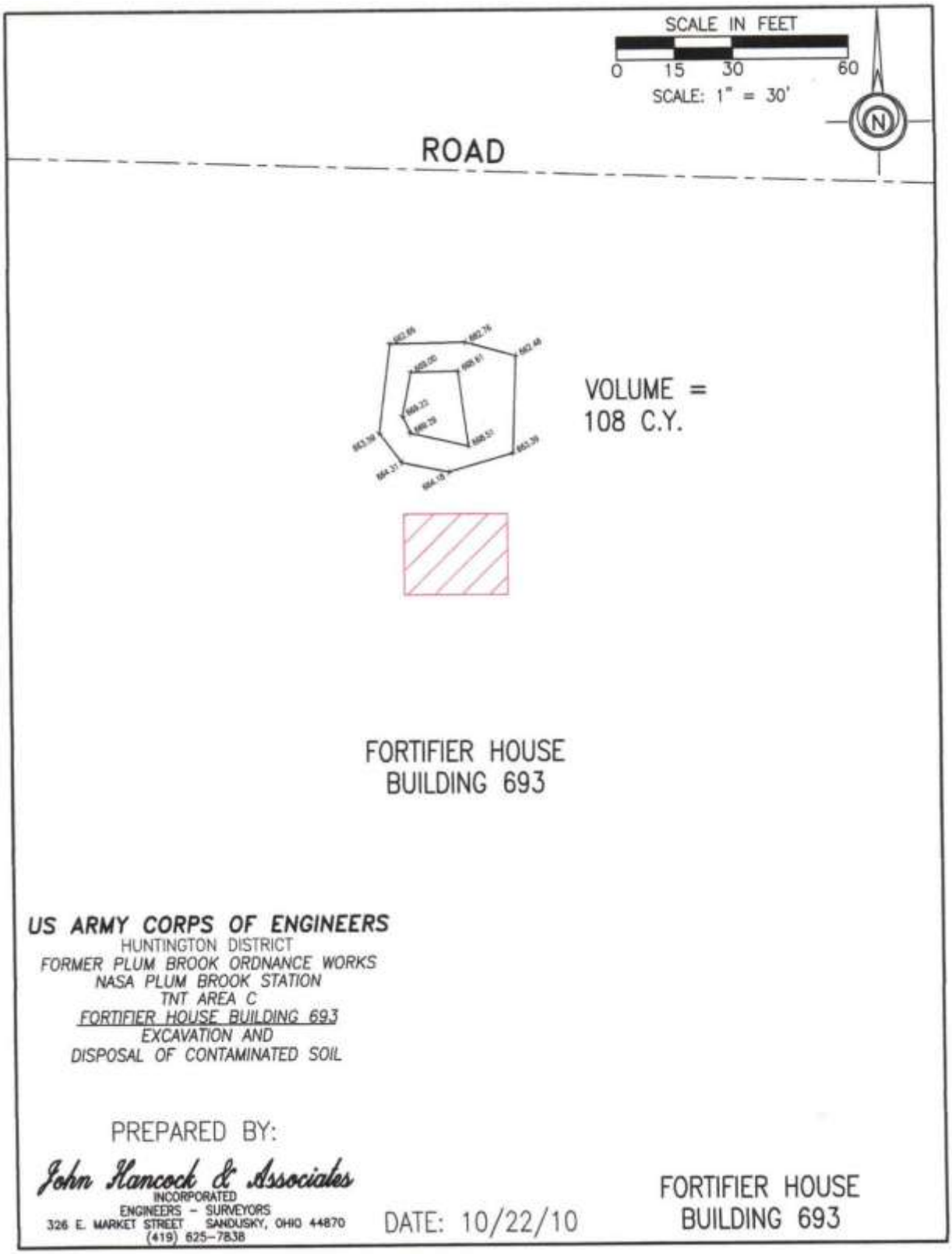


FIGURE 3-26. Building Area 693 Stockpile Diagram

TABLE 3-16. Building Area 693 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-693-C-001	0.25	0.25	0.25	0.25	0.25		0.067	0.067		0.008	0.008	0.009	0.008	0.008		8.0
0922-693-C-002	0.25	0.25	0.25	0.25	0.39		0.29	0.43		0.007	0.038	0.053	0.021	0.038		6.9
0922-693-C-003	0.41	0.38	0.24	0.24	0.38		0.061	0.061		0.18	0.18	0.18	0.18	0.18		6.0
0922-693-C-004	0.24	0.24	0.24	0.24	0.24		0.06	0.089		0.007	0.007	0.007	0.007	0.007		9.9
0922-693-C-005	0.24	0.24	0.24	0.24	0.24		0.06	0.06		0.007	0.007	0.007	0.007	0.007		6.0
Minimum Detection (mg/kg)	0.41	0.38	ND	ND	0.39		ND	0.089		ND	0.038	0.009	0.021	0.038		6.0
Mean (mg/kg)	0.18	0.17	ND	ND	0.23		ND	0.12		ND	0.028	0.032	0.024	0.028		7.4
Maximum Detection (mg/kg)	0.41	0.38	ND	ND	0.38		ND	0.43		ND	0.038	0.053	0.021	0.038		9.9
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.04	0.04	ND	ND	0.006		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	2E-08		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.09					Sum mean	0.1		Sum mean	0.1					lead mean	7.4
Nitroaromatic ILCR	2.E-08					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-17. Building Area 693 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-693-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.093	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-27. Excavation at AOC 693

FIGURE 3-28. Backfilling at AOC 693

3.4.6. Building 606 – Wash House, Process Line 10

3.4.6.1. *TNT C RA-C*

Based on the RI, excavation in this AOC consisted of excavating approximately 104 cy of material from within the surveyed boundaries. The dimensions of the excavation were 20 × 20 × 7 ft and the primary contaminants were nitroaromatics. Groundwater was noted at 6 ft and bedrock was encountered at 8 ft.

Excavation on Building 606 was initiated on August 26, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The stockpile for this AOC was located at the corner of the access road into TNT C and the access road to the AOC. This corner location would serve as a common stockpile area for 2 smaller excavations within close proximity. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Four confirmation samples were collected from a central location along the walls of the excavation and one from the floor on August 30, 2010 (Figure 3-29). There was one stockpile which was sampled the same day (Figure 3-30). The confirmation samples and stockpile characterization samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Building 606 had a nitroaromatic HI >1 and an ILCR >1E-5. The sum mean for the PCBs and the PAHs were both <1 mg/kg and the mean of the lead was <400 mg/kg (Table 3-18). This AOC required additional excavation and was not closed out.

The stockpile characterization parameter was TCLP (Table 3-19). Based on the laboratory data, the stockpile for this AOC was non-hazardous and was approved for disposal at the landfill.

The laboratory data for Building 606 is included in electronic format in Appendix C.2

3.4.6.2. *Follow-on*

Based on the confirmation samples collected from the original TNT C RA-C effort, the area at Building 606 was still contaminated and additional excavation was required. The additional excavation was conducted under Follow-on.

Under the original effort, there was one confirmation sample (0922-606-C-003) that had high concentration of nitroaromatics which influenced the risk calculations. Under the continuation, one series of test pit samples were collected for every 20-foot interval along both walls, to the newly established wall located 40 ft south of the original excavation (Figure 3-31). The results of the test pit samples indicated the soil was clean and that confirmation samples could be collected (Figure 3-32). Conformation samples were collected at the test pit location and submitted to Microbac for analysis of PAHs, TAL metals, PCBs, and nitroaromatics.

The results of the confirmation analysis indicated the AOC had a nitroaromatic HI of <1 and a nitroaromatic ILCR of <1E-5. The sum means of the PCBs and PAHs were <1 mg/kg and the mean of the lead was <400 mg/kg (Table 3-20). The risk calculations indicated that the excavation was “clean” and excavation for closure was initiated.

Following the verification that the soil in the excavation's walls and floor was no longer a risk to human health or the environment, the expanded areas were surveyed, a new diagram drawn for the AOC (Figure 3-33), and the coordinates documented on a spreadsheet. The coordinates for the expanded areas are presented in Appendix B.1. Once the coordinates were staked and surveyed, excavation began. The soil excavated from the expanded areas was transported directly to the remediation pad and configured into windrows. The soil was not segregated by AOC, but combined in the windrow for subsequent AH remediation. Following excavation and transport of the contaminated soil to the remediation pad for treatment, the AOC was backfilled with clean soil.

Figures 3-34 and 3-35 show the vegetation that had to be cleared prior to excavation and the debris that encountered at most of the excavations.

Remedial Investigation Notes:

- Scoped volume 104 cy
- Dimensions are 20'x 20' x 7'
- Primary contaminants – nitroaromatics
- Groundwater was noted at 6'
- Bedrock encountered at 8'

RA-C Notes:

Cleared path to site on 8/23/2010
Sampled on 8/30/2010
Stockpile is in area #602
Surveyed stockpile volume 105 cy

Sample Locations:

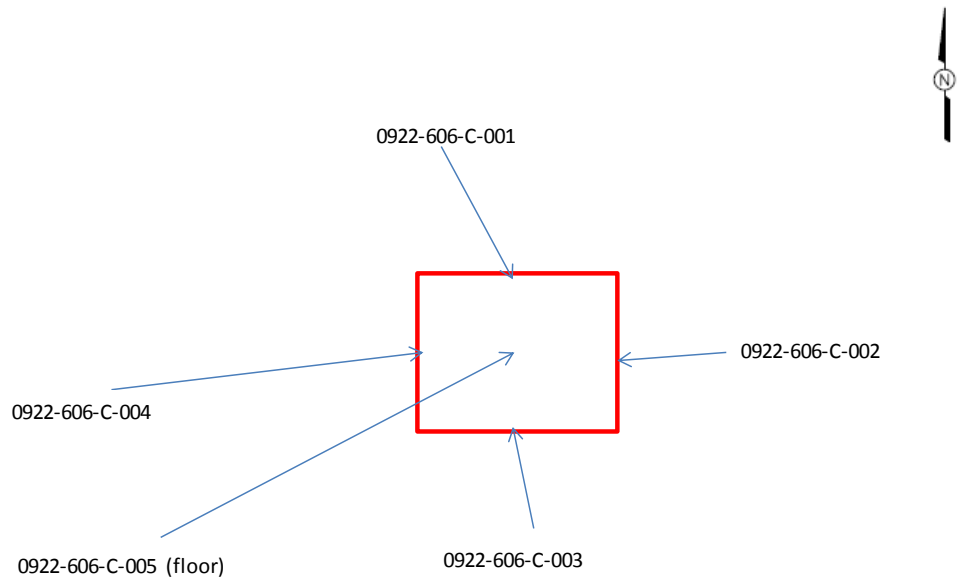


FIGURE 3-29. Building Area 606 Wash House, Process Line 10 Confirmation Diagram

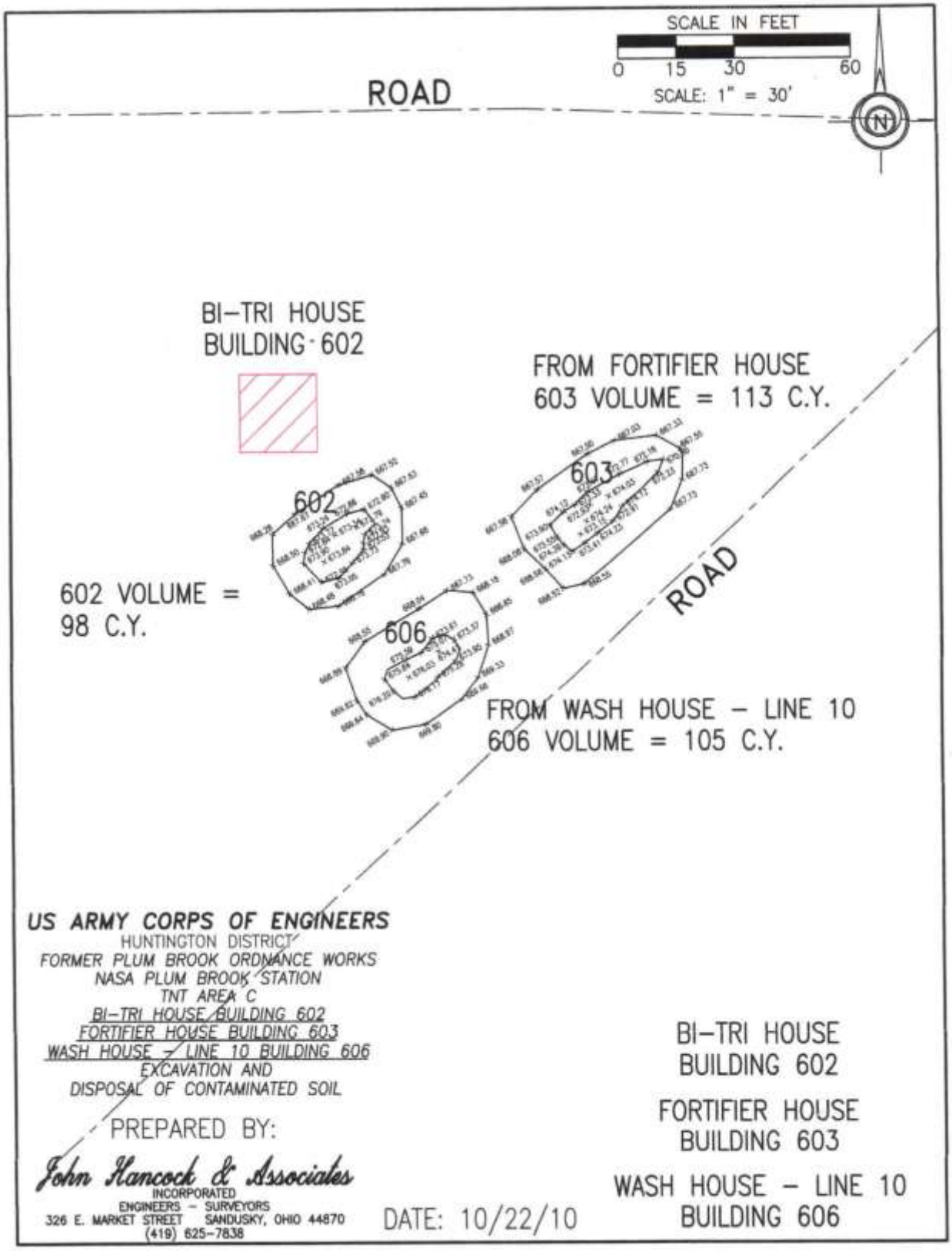


FIGURE 3-30. Building Area 606 Stockpile Diagram

TABLE 3-18. Building Area 606 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-606-C-001	0.68	0.71	0.24	0.24	0.33		0.062	0.062		0.008	0.008	0.008	0.008	0.008		8.9
0922-606-C-002	0.69	0.72	0.25	0.25	0.25		0.06	0.06		0.007	0.007	0.007	0.007	0.007		12.4
0922-606-C-003	0.25	130	1.0	0.25	1700		0.064	0.24		0.16	0.16	0.16	0.16	0.16		61.7
0922-606-C-004	1.7	2.0	0.25	0.25	1.5		0.063	0.063		0.008	0.009	0.021	0.008	0.008		13.7
0922-606-C-005	0.24	0.24	0.24	0.24	2.6		0.066	0.066		0.008	0.008	0.008	0.008	0.008		11.6
Minimum Detection (mg/kg)	0.68	0.71	1.00	ND	0.25		ND	0.24		ND	0.009	ND	ND	ND		8.9
Mean (mg/kg)	0.7	13.7	0.30	ND	340.9		ND	0.07		ND	0.02	ND	ND	ND		22
Maximum Detection (mg/kg)	0.25	2.0	1	ND	1700		ND	0.24		ND	0.009	ND	ND	ND		61.7
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.16	0.5	0.002	ND	8.5		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	4E-07	ND	3E-05		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	9					Sum mean	0.07		Sum mean	0.02					lead mean	22
Nitroaromatic ILCR	3.E-05					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-19. Building Area 606 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/l)	Classification
			0922-606-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TNTC Excavation Notes:

- Excavate approximately 104 cy of material
- Dimensions are 20’ x 20’ x 7’
- Primary contaminants – nitroaromatics
- Groundwater was noted at 6’
- Bedrock encountered at 8’

Follow-on Test Pit Notes:

- Excavate approximately 208 cy of material
- Dimensions are 40’ x 20’ x 7’
- West and center of area has concrete slab a few inches below the surface. TP2 moved NE to sample around the slab and TP3 and TP4 at very edges of slab
- All samples collected at 7 feet

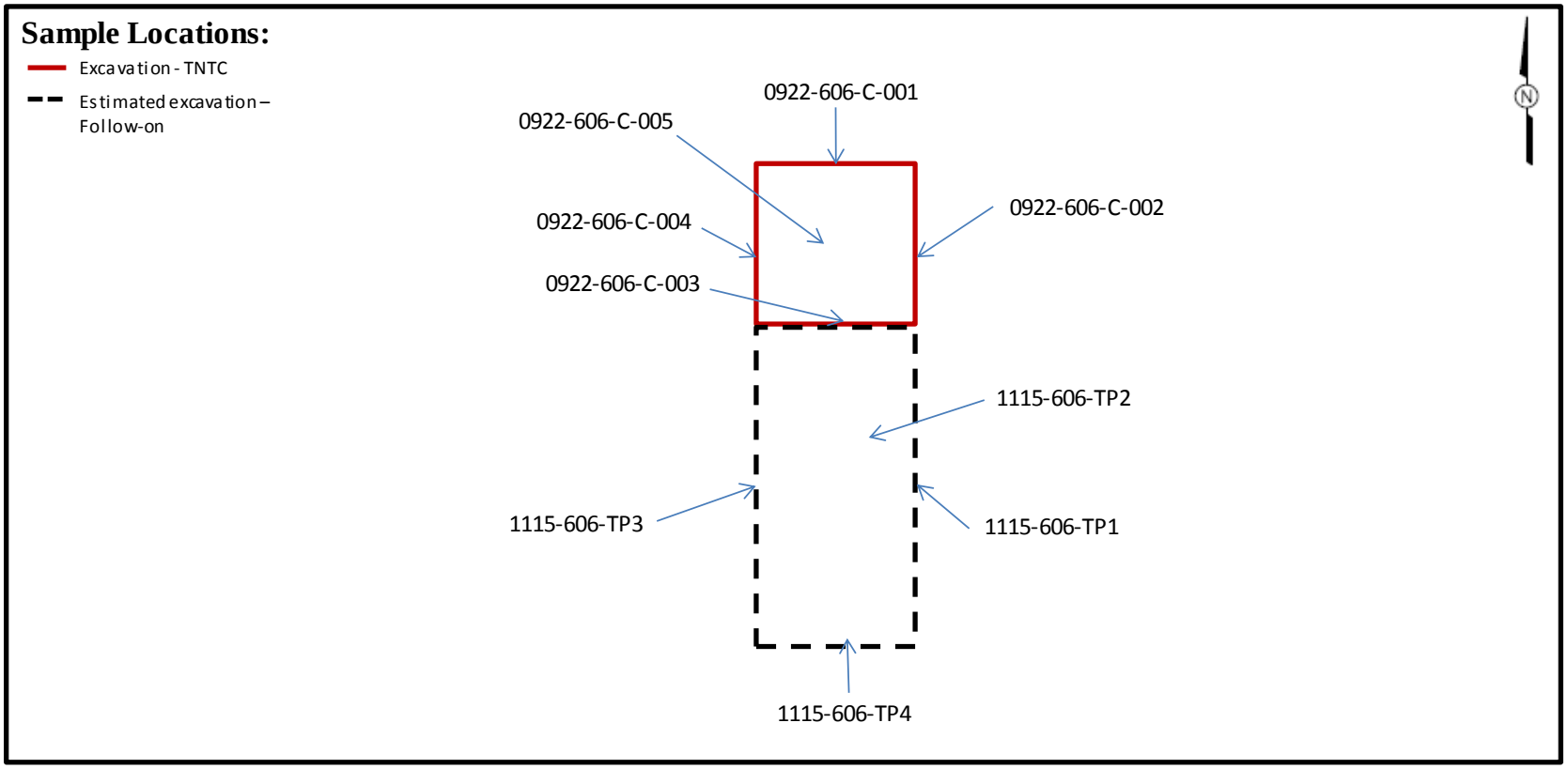


FIGURE 3-31. Building Area 606 Follow-on Test Pitting Diagram

TNTC Excavation Notes:

- Scoped volume 104 cy of material
- Dimensions are 20' x 20' x 7'
- Primary contaminants – nitroaromatics
- Groundwater was noted at 6'
- Bedrock encountered at 8'

Follow-on Confirmation and Excavation Notes:

- Excavate approximately 218 cy using surveyed dimensions and estimated depth
- Dimensions are 40' x 21' x 7'
- Sample results for the greyed-out sample numbers will not be included in calculations
- Confirmation complete, excavation completed 5/2/12
- The volume excavated was transported directly to the remediation pad. The soil was surveyed to determine the total volume of 2,657 cy

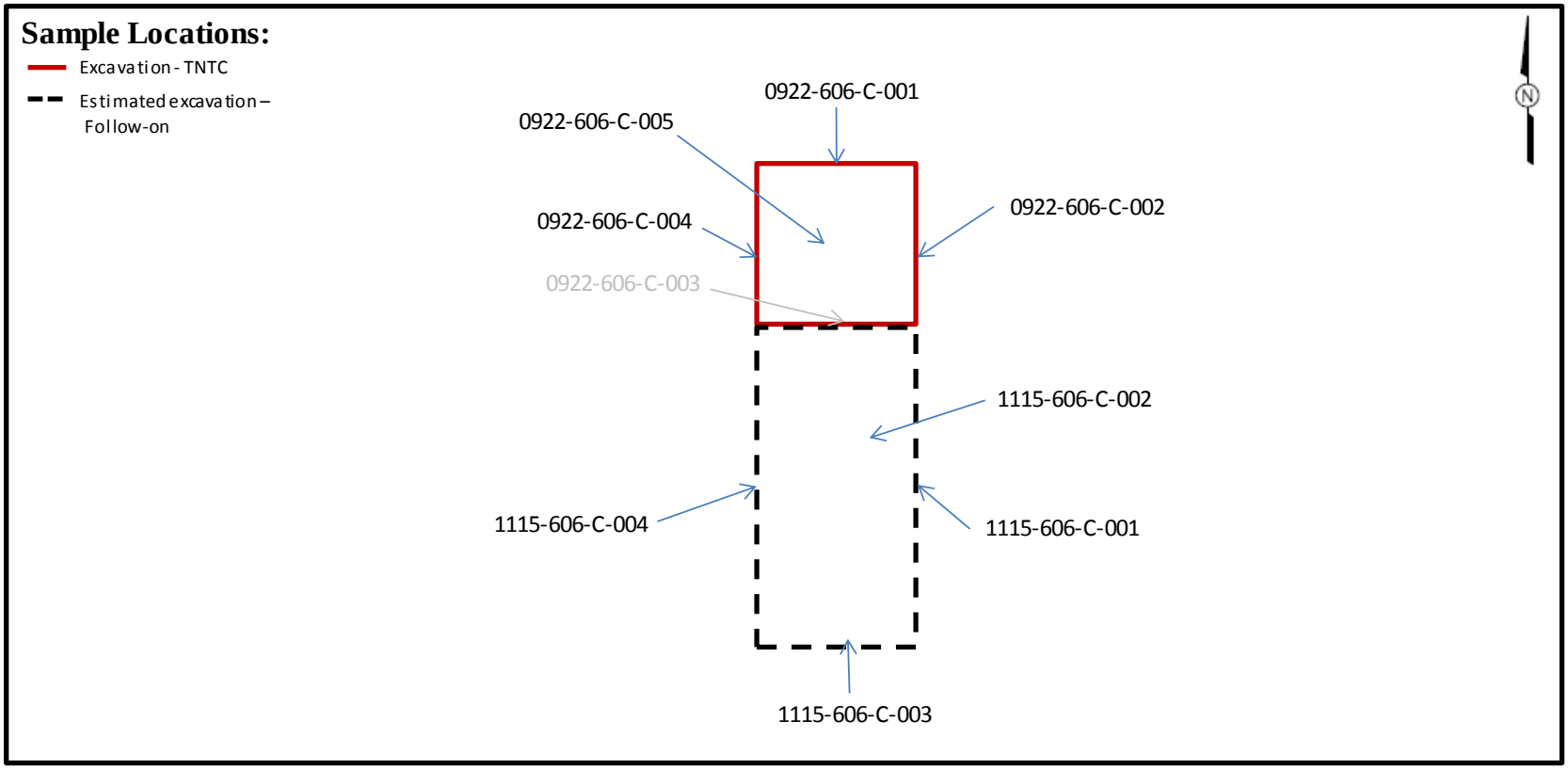


FIGURE 3-32. Building Area 606 Follow-on Confirmation Diagram

TABLE 3-20. Building Area 606 Follow-on Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-606-C-001	0.68	0.71	0.24	0.24	0.33		0.062	0.062		0.0076	0.0076	0.0076	0.0076	0.0076		8.9
0922-606-C-002	0.69	0.72	0.25	0.25	0.25		0.060	0.060		0.0073	0.0073	0.0073	0.0073	0.0073		12.4
0922-606-C-003	0.25	130	1.0	0.25	1700		0.064	0.240		0.16	0.16	0.16	0.16	0.16		62
0922-606-C-004	1.7	2.0	0.25	0.25	1.5		0.063	0.063		0.0076	0.0091	0.021	0.0076	0.0076		13.7
0922-606-C-005	0.24	0.24	0.24	0.24	2.6		0.066	0.066		0.0080	0.0080	0.0080	0.0080	0.0080		11.6
1115-606-C-001	0.253	0.253	0.253	0.253	0.438		0.0213	0.0213		0.146	0.146	0.146	0.146	0.146		57.7
1115-606-C-002	0.248	0.248	0.248	0.248	0.248		0.0227	0.0227		0.166	0.166	0.166	0.166	0.166		28.6
1115-606-C-003	0.562	0.863	0.252	0.252	62.9		0.0198	0.0198		0.131	0.131	0.184	0.131	0.131		5.06
1115-606-C-004	0.249	0.249	0.249	0.249	0.249		0.0213	0.0213		0.284	0.284	0.284	0.284	0.284		38.5
Minimum Detection (mg/kg)	0.56	0.71	ND	ND	1.5		ND	ND		ND	0.0091	0.18	ND	ND		5.1
Mean (mg/kg)	0.52	0.60	ND	ND	8.5		ND	ND		ND	0.048	0.063	ND	ND		22
Maximum Detection (mg/kg)	1.7	2.0	ND	ND	63		ND	ND		ND	0.0091	0.18	ND	ND		58
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.1	0.1	ND	ND	0.2		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	6E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.5					Sum mean	ND		Sum mean	0.11					lead mean	22
Nitroaromatic ILCR	6.E-07					less than RG?	NA		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Sample results not included in risk calculations.
- Not detected above LOQ, 0.5x the LOQ used in calculation.
-Result exceeds RG

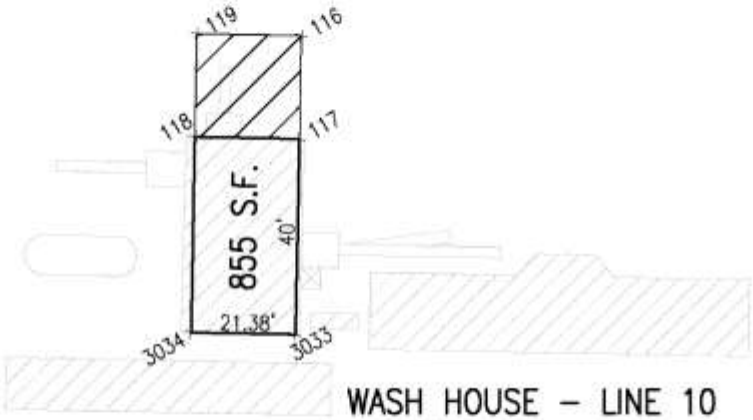
NA - Not Applicable
ND - Not detected above LOQ
NR - Analysis not requested
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.

SCALE IN FEET

0 15 30 60

SCALE: 1" = 30'

BUILDING 606			
Point #	Northing	Easting	Description
116	620602.2490	1911787.2070	606
117	620581.1590	1911786.7970	606
118	620581.5690	1911765.4170	606
119	620602.6590	1911765.8170	606
3033	620541.1663	1911786.0313	606-C-MOD
3034	620541.5763	1911764.6513	606-C-MOD



US ARMY CORPS OF ENGINEERS
HUNTINGTON DISTRICT
FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
TNT AREA C–MOD
WASH HOUSE – LINE 10 BUILDING 606
EXCAVATION AND
DISPOSAL OF CONTAMINATED SOIL

PREPARED BY:

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(419) 625–7838

DATE: 5/08/12

WASH HOUSE – LINE 10
BUILDING 606

FIGURE 3-33. Diagram of AOC 606 Follow-on with Coordinates

FIGURE 3-34. Thick Vegetation Had to be Cleared Before Excavation Could Begin at All AOCs

FIGURE 3-35. Debris in Building 606 Excavation

3.4.7. Building 603 – Fortifier House, Process Line 10

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 119 cy of material from within the surveyed boundaries. The dimensions of the excavation were 20 × 20 × 6 ft and the primary contaminants were nitroaromatics. Groundwater was noted at 8 ft and bedrock was not encountered.

Excavation on Building 603 was initiated on August 30, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The stockpile for this location was prepared at the corner of the access road into TNT C and the access road to the AOC. This corner location would serve as a stockpile area for 2 smaller excavations (602, 606) within close proximity. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Four confirmation samples were collected along the walls and one from the floor on August 31, 2010 (Figure 3-36). There was one stockpile which was sampled the same day (Figure 3-37). The confirmation samples and stockpile characterization samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 603 had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 for both. The lead mean was <400 mg/kg (Table 3-21). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-22). The stockpile was hazardous and was transported to the remediation pad for subsequent remediation.

The laboratory data for Building 603 is included in electronic format in Appendix C.2.

Figures 3-38 and 3-39 show the excavation and the completed stockpile construction at Buildings 603 and 606.

Remedial Investigation Notes:

- Scoped volume 119 cy
- Dimensions are 20'x 20'x 8'
- Primary contaminants – nitroaromatics
- Groundwater noted at 8' depth
- Bedrock was not encountered

RA-C Notes:

Began excavation 8/31/10
Stockpile setup in common area for 602, 603, and 606
Finished excavation on 8/31/10
Sampled for all COCs on 8/31/10
Surveyed stockpile volume 113 cy

Sample Locations:

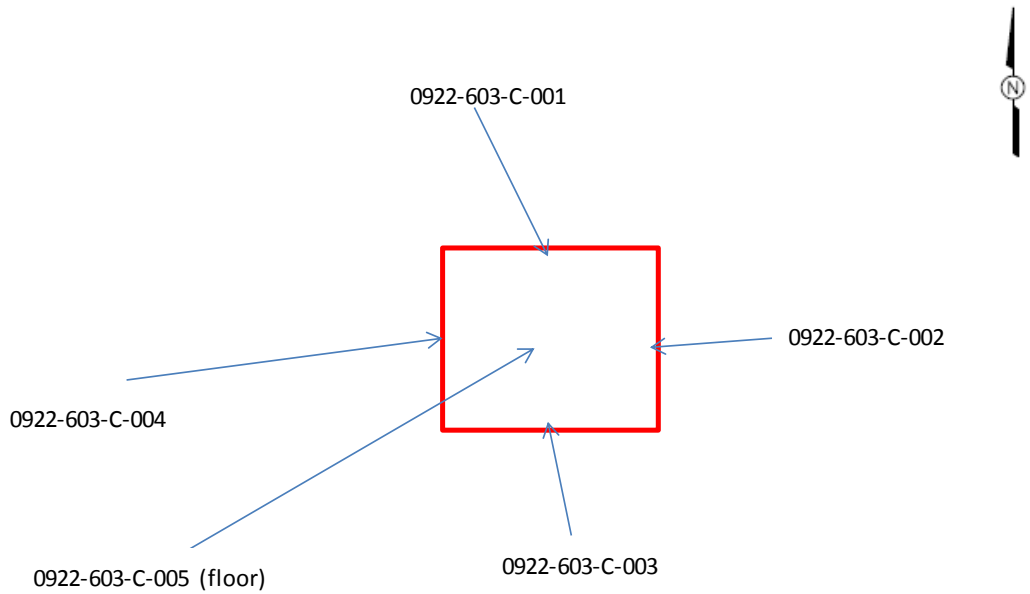


FIGURE 3-36. Building Area 603 Fortifier House, Process Line 10 Confirmation Diagram

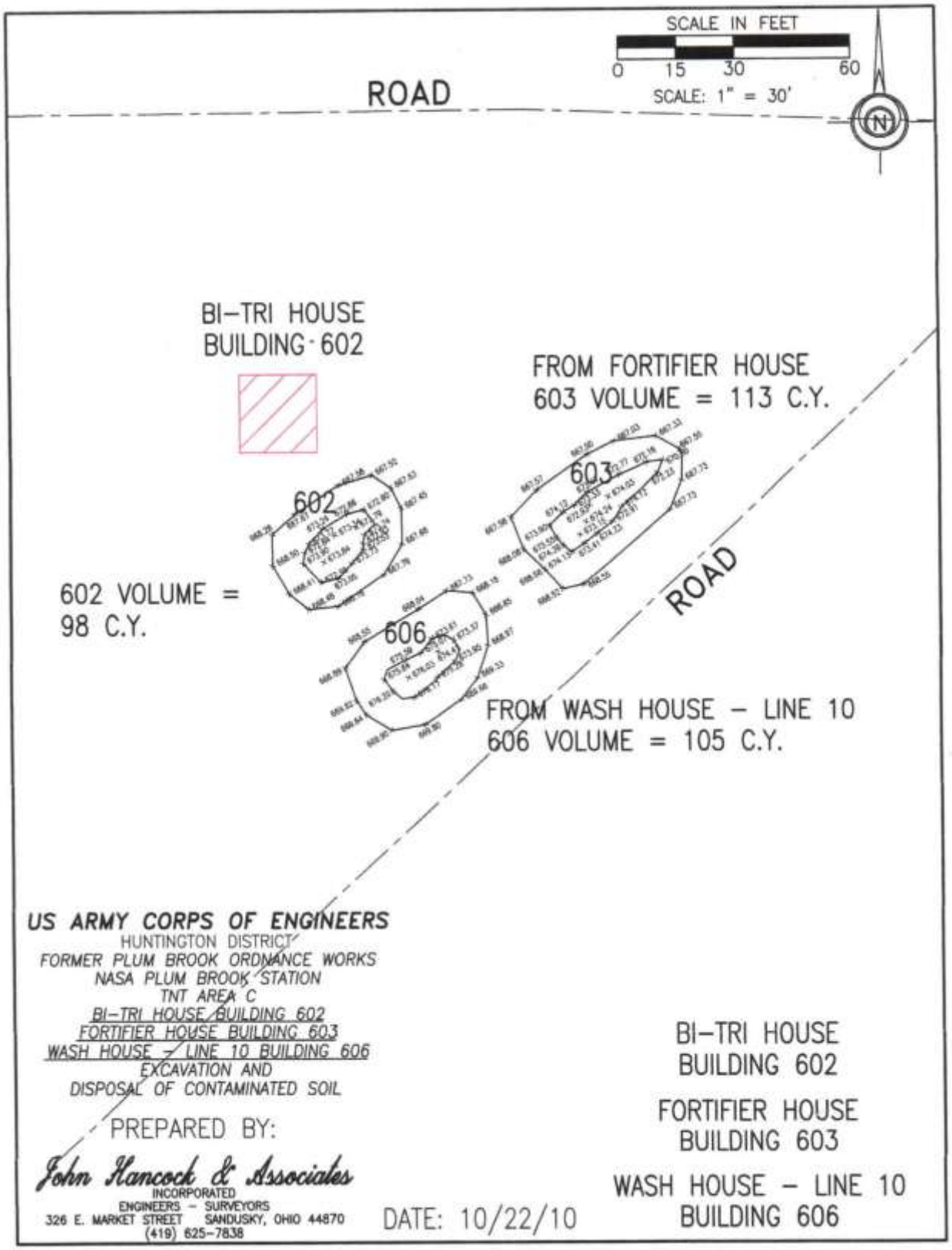


FIGURE 3-37. Building Area 603 Stockpile Diagram

TABLE 3-21. Building Area 603 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-603-C-001	0.24	0.24	0.50	0.24	0.24		0.067	0.067		0.008	0.008	0.008	0.008	0.008		6.7
0922-603-C-002	0.25	0.25	0.25	0.25	0.25		0.062	0.062		0.008	0.008	0.008	0.008	0.008		5.0
0922-603-C-003	5.9	6.8	1.6	0.43	7.6		0.3	1.4		0.079	0.073	0.46	0.073	0.093		303
0922-603-C-004	0.25	0.25	0.25	0.25	0.25		0.058	0.058		0.009	0.008	0.014	0.007	0.007		9.4
0922-603-C-005	0.25	0.25	0.25	0.25	0.25		0.063	0.063		0.008	0.008	0.008	0.008	0.008		4.5
Minimum Detection (mg/kg)	5.9	6.8	0.50	0.43	7.6		ND	1.4		0.008	0.008	0.014	ND	0.093		4.5
Mean (mg/kg)	1.3	1.5	0.50	0.19	1.6		ND	0.31		0.021	0.011	0.097	ND	0.022		66
Maximum Detection (mg/kg)	5.9	6.8	1.6	0.43	7.6		ND	1.4		0.079	0.008	0.46	ND	0.093		303
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.3	0.3	0.003	0.002	0.04		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	7E-07	2E-07	1E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.7					Sum mean	0.31		Sum mean	0.15					lead mean	66
Nitroaromatic ILCR	1.E-06					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-22. Building Area 603 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-603-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	1.7	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

FIGURE 3-38. Excavating at Building 603

FIGURE 3-39. Stockpiles for Buildings 603 and 606

3.4.8. Building 616 – Wash House, Process Line 11

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 480 cy of material from within the surveyed boundaries. The dimensions of the excavation were irregular (approximately 60 × 30 ft) with a depth of 8 ft. The primary contaminants were nitroaromatics. Groundwater was noted at 8 ft and bedrock was encountered at 16.55 ft.

Excavation on Building 616 was initiated on September 16, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The two stockpiles for this AOC were located adjacent to the excavation. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Thirteen confirmation samples were collected along the walls and two from the floor on September 16, 2010 (Figure 3-40). The stockpiles were sampled the same day (Figure 3-41). The confirmation samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 616 had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 for both. The lead mean was <400 mg/kg (Table 3-23). This AOC did not require additional excavation and was backfilled.

The excavation at Bldg 616 was situated on the downgradient side of the road and in a low area resulting in accumulation of water. Before backfilling the hole, the water was sampled to verify there were no contaminants of concern, and subsequently disposed in the west area red water ponds. This method of handling water is consistent with how the sump water was managed. The analytical results for the water samples are included in Appendix C.1.2.

The stockpile characterization parameter was TCLP (Table 3-24). The stockpiles were non-hazardous and were approved for disposal at the landfill.

The laboratory data for Building 616 is included in electronic format in Appendix C.2.

Figures 3-42 and 3-43 show the building of the stockpile pads at Building 616.

Remedial Investigation Notes:

- Scoped volume 480 cy with excavation depth at 8'
- Dimensions – irregular
- Primary contaminants – nitroaromatics and PAHs
- Groundwater noted at 8'
- Bedrock encountered at 16.55'

RA-C Notes:

Sampled for all COCs on 9/16/10

Surveyed stockpile volume 474 cy

Sample Locations:

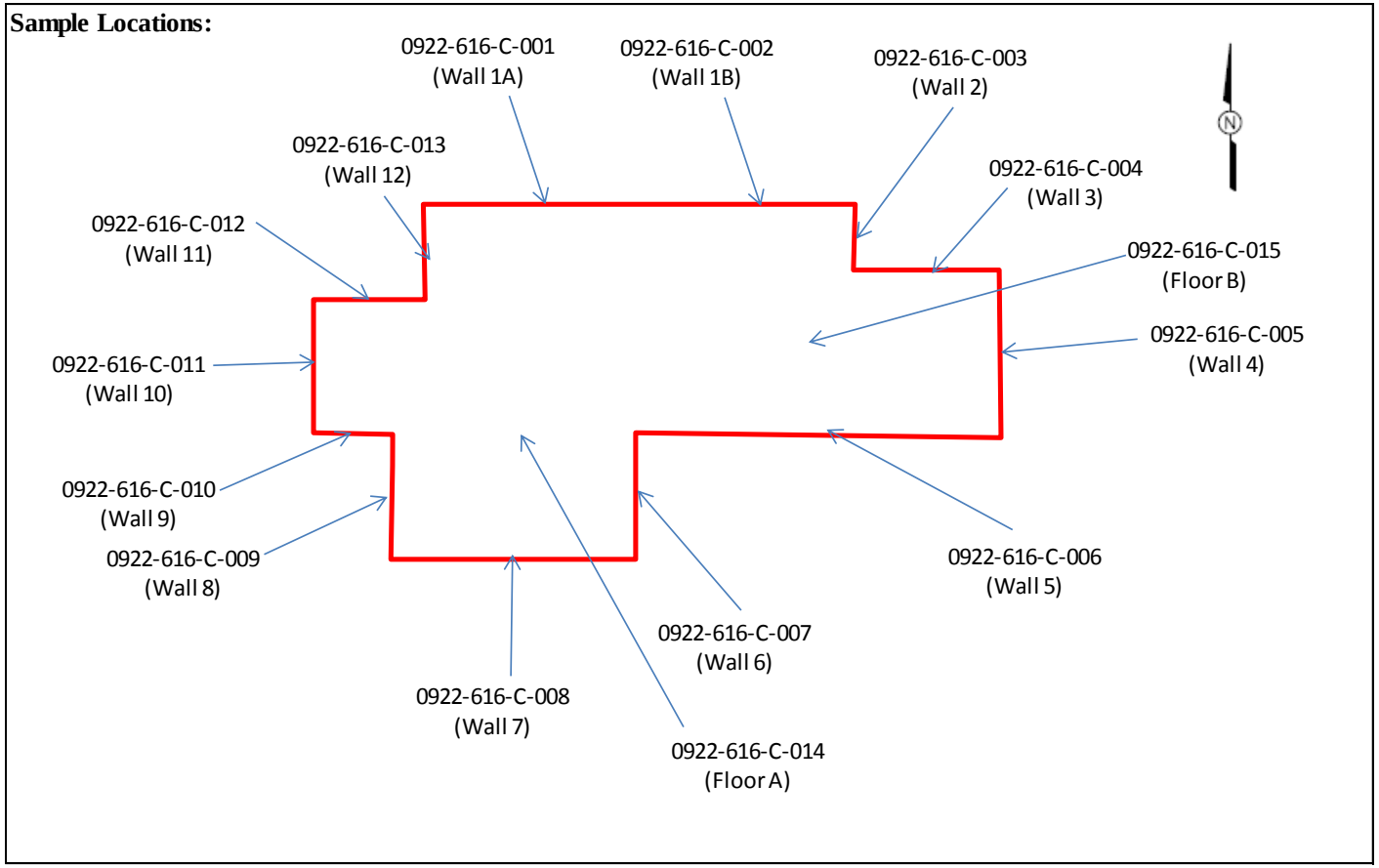


FIGURE 3-40. Building Area 616 Wash House – Process Line 11 Confirmation Diagram

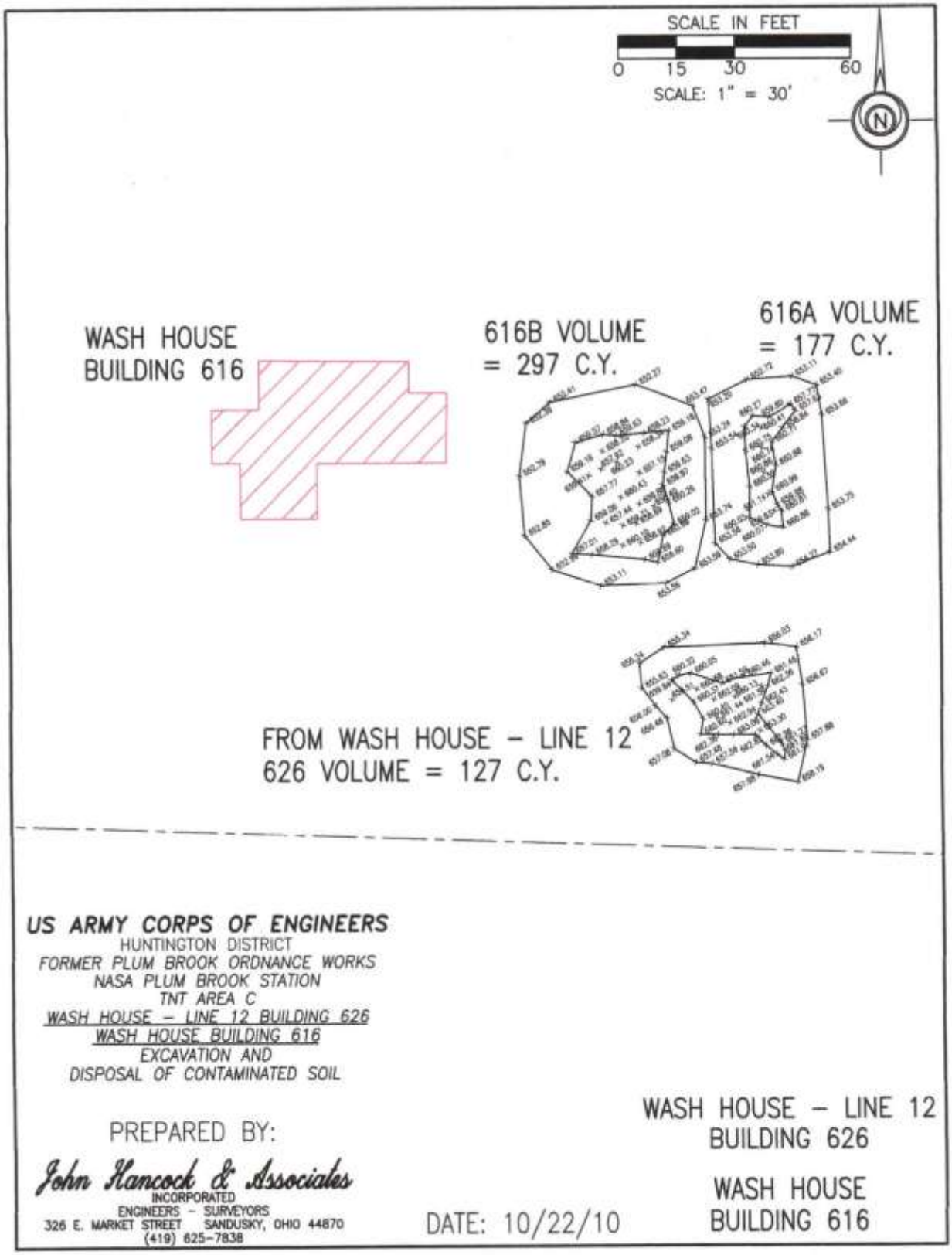


FIGURE 3-41. Building Area 616 Stockpile Diagram

TABLE 3-23. Building Area 616 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-616-C-001	0.25	0.25	0.25	0.25	0.25		0.062	0.062		0.008	0.008	0.008	0.008	0.008		3.2
0922-616-C-002	0.24	0.24	0.24	0.24	0.24		0.064	0.064		0.008	0.008	0.008	0.008	0.008		6.7
0922-616-C-003	0.24	0.24	0.24	0.24	0.24		0.061	0.061		0.007	0.008	0.015	0.007	0.007		14.7
0922-616-C-004	0.25	0.25	0.25	0.25	0.25		0.063	0.063		0.008	0.008	0.008	0.008	0.008		2.7
0922-616-C-005	0.25	0.25	0.25	0.25	0.25		0.064	0.064		0.008	0.008	0.008	0.008	0.008		8.9
0922-616-C-006	0.24	0.24	0.24	0.24	0.24		0.067	0.067		0.008	0.008	0.008	0.008	0.008		17
0922-616-C-007	0.24	0.24	0.24	0.24	0.24		0.069	0.069		0.008	0.008	0.008	0.008	0.008		10.8
0922-616-C-008	0.25	0.25	0.25	0.25	0.80		0.068	0.068		0.008	0.008	0.009	0.008	0.008		6.0
0922-616-C-009	0.25	0.25	0.25	0.25	0.28		0.065	0.065		0.008	0.008	0.008	0.008	0.008		12.6
0922-616-C-010	0.95	1.3	0.25	0.25	21		0.63	0.94		0.22	0.25	0.34	0.05	0.17		149
0922-616-C-011	0.24	0.24	0.24	0.24	0.24		0.065	0.065		0.008	0.008	0.008	0.008	0.008		3.7
0922-616-C-012	0.24	0.24	0.24	0.24	0.24		0.06	0.06		0.028	0.035	0.058	0.009	0.031		9.7
0922-616-C-013	0.24	0.24	0.24	0.24	0.24		0.069	0.069		0.015	0.008	0.008	0.008	0.008		12.0
0922-616-C-014	0.24	0.24	0.24	0.24	0.24		0.062	0.062		0.025	0.008	0.008	0.008	0.008		11.1
0922-616-C-015	0.25	0.25	0.25	0.25	9.9		0.065	0.065		0.014	0.008	0.008	0.008	0.008		20.0
Minimum Detection (mg/kg)	0.95	1.3	ND	ND	0.28		ND	0.94		0.028	0.008	0.008	0.009	0.17		3.7
Mean (mg/kg)	0.18	0.20	ND	ND	2.22		ND	0.09		0.02	0.02	0.03	0.01	0.02		19
Maximum Detection (mg/kg)	0.95	1.3	ND	ND	21		ND	0.94		0.22	0.25	0.058	0.05	0.031		149
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.04	0.05	ND	ND	0.056		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	2E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.1					Sum mean	0.09		Sum mean	0.10					lead mean	19
Nitroaromatic ILCR	2.E-07					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-24. Building Area 616 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-616-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-24. Building Area 616 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-616-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-42. Placing Soil on the Stockpile Pad at Building 616

FIGURE 3-43. The 6-mil Plastic Overlaps the Silt Fence While the Stockpile is Constructed

3.4.9. Building 626 – Wash House, Process Line 12

3.4.9.1. *TNT C RA-C*

Based on the RI, excavation in this AOC consisted of excavating approximately 119 cy of material from within the surveyed boundaries. The dimensions of the excavation were 20 × 20 × 8 ft and the primary contaminants were nitroaromatics, with a lead concentration of 134 ppm. Groundwater was noted at 8 ft and bedrock was encountered at 8.5 ft.

Excavation on Building 626 was initiated on September 20, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The stockpile for this AOC was located adjacent to Building 616 stockpiles. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Four confirmation samples were collected from a central location along three walls of the excavation and one from the floor on August 21, 2010 (Figure 3-44). A concrete wall ran the length of the south boundary, therefore no sample was collected from this wall. There was one stockpile which was sampled the same day (Figure 3-45). The confirmation samples and stockpile characterization sample were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, the stockpile for this AOC was non-hazardous and was approved for disposal at the landfill. Building 626 had a nitroaromatic HI >1 and an ILCR >1E-5. The sum mean for the PCBs and the PAHs were both <1 mg/kg and the mean of the lead was <400 mg/kg (Table 3-25). This AOC required additional excavation and was not closed out.

The stockpile characterization parameter was TCLP (Table 3-26). The stockpile was non-hazardous and was approved for disposal at the landfill.

The laboratory data for Building 626 is included in electronic format in Appendix C.2.

3.4.9.2. *Follow-on*

Based on the confirmation samples collected from the original TNT C RA-C effort, the area at Building 626 was still contaminated and additional excavation was required. The additional excavation was conducted under Follow-on.

Under the original effort, the AOC could not be closed due to contamination in the west wall and the east wall. Test pitting efforts were initiated December 6, 2011. Working on the west wall, test pit samples were collected along the length of a 40 (L) × 20 (W) × 6.5 ft (D) section. The samples were collected and submitted to Microbac Laboratories for nitroaromatics. Preliminary risk calculations indicated the area still exceeded the risk criteria due to high nitroaromatics on the floor sample. Test pitting continued on the floor to a final depth of 10 ft (Figure 3-46). The results of the test pit sample collected at 10 ft (1115-626-TP14) were used in the preliminary risk calculation and the results indicated that this section was below the risk criteria and confirmation samples were collected (Figure 3-47). Confirmation samples were collected and submitted to Microbac Laboratories for nitroaromatics, PCBs, PAHs, and TAL metals.

There were 5 rounds of test pitting conducted along the easterly extension of the AOC. From the east wall, test pit samples were collected along a 40 (L) × 20 (W) × 6.5 ft (D) and submitted to Microbac for nitroaromatic analysis. The preliminary risk calculations indicated the AOC was above the risk criteria so test pitting continued in an easterly direction, extending the length another 20 ft. The east wall of this extension had elevated concentration of nitroaromatics and the test pitting continued. The area was extended 20 ft to the east and samples were collected and the analytical process was repeated. The north wall of the extension had elevated concentrations of nitroaromatics so the north wall was extended 20 ft in a northerly direction. Test pit samples were collected and the analytical process repeated, with the results of the north wall still showing elevated concentrations of nitroaromatics. The north wall was again extended 20 ft in a northerly direction where test pit samples were collected. Preliminary risk calculations indicated that the soil was below the risk criteria. Confirmation samples were collected and submitted to Microbac Laboratories for nitroaromatics, PCBs, PAHs, and TAL metals.

The confirmation samples and risk calculations indicated the AOC had a nitroaromatic HI <1 mg/kg and an ILCR <1E-5. The sum means for PCBs and PAHs were <1 mg.kg and the lead mean was < 400 mg/kg (Table 3-27). The laboratory data for Building 626 is presented in Appendix C.2.

Following the verification that the soil in the excavation's walls and floor was no longer a risk to human health or the environment, the expanded areas were surveyed, a new diagram drawn for the AOC (Figure 3-48), and the coordinates documented on a spreadsheet. The coordinates for the expanded areas are presented in Appendix B.1. Once the coordinates were staked and surveyed, excavation began. The soil excavated from the expanded areas was transported directly to the remediation pad and configured into windrows. The soil was not segregated by AOC, but combined in the windrow for subsequent AH remediation. Following excavation and transport of the contaminated soil to the remediation pad for treatment, the AOC was backfilled with clean soil.

Figures 3-49 and 3-50 are photos of equipment decontamination completed at the AOC and the wash waters were directed into the excavation.

Remedial Investigation Notes:

- Scoped volume 119 cy with excavation depth at 8'
- Dimensions are 20'x 20' x 8'
- Primary contaminants – nitroaromatics; lead at 134 ppm
- Groundwater was noted at 8' and bedrock at 8.5'

RA-C Notes:

Began clearing and setup at 626 on 9/17/2010
Sampled walls, floor, and stockpile on 9/21/2010
Concrete wall the entire length and depth of excavation on south wall. No sample collected.
Surveyed stockpile volume 127 cy

Sample Locations:

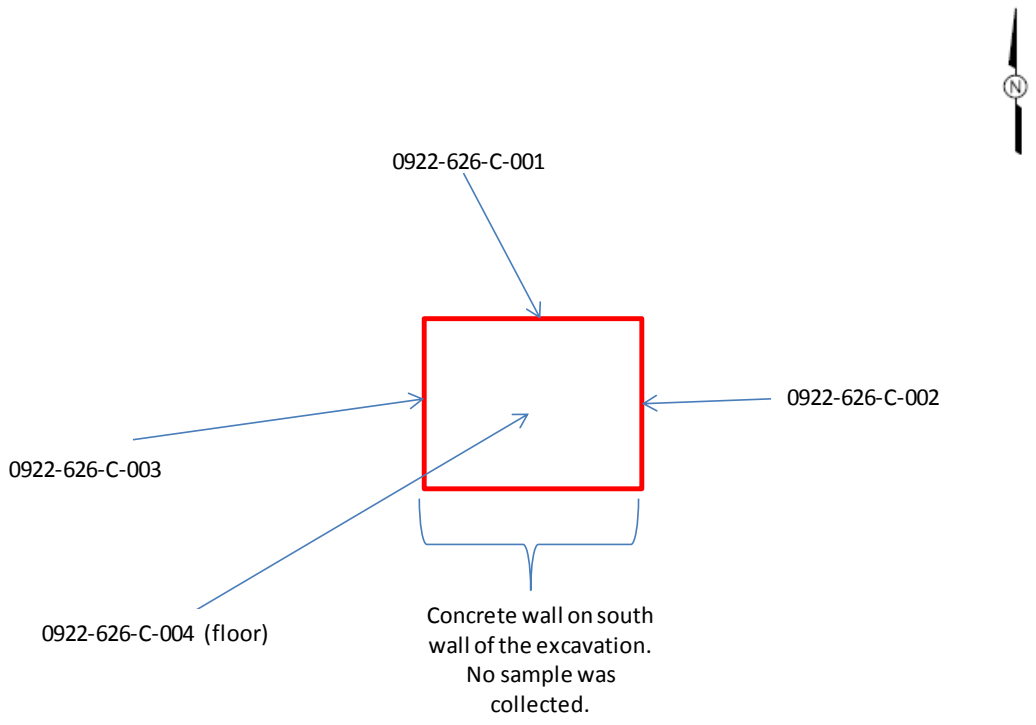


FIGURE 3-44. Building Area 626 Wash House – Process Line 12 Confirmation Diagram

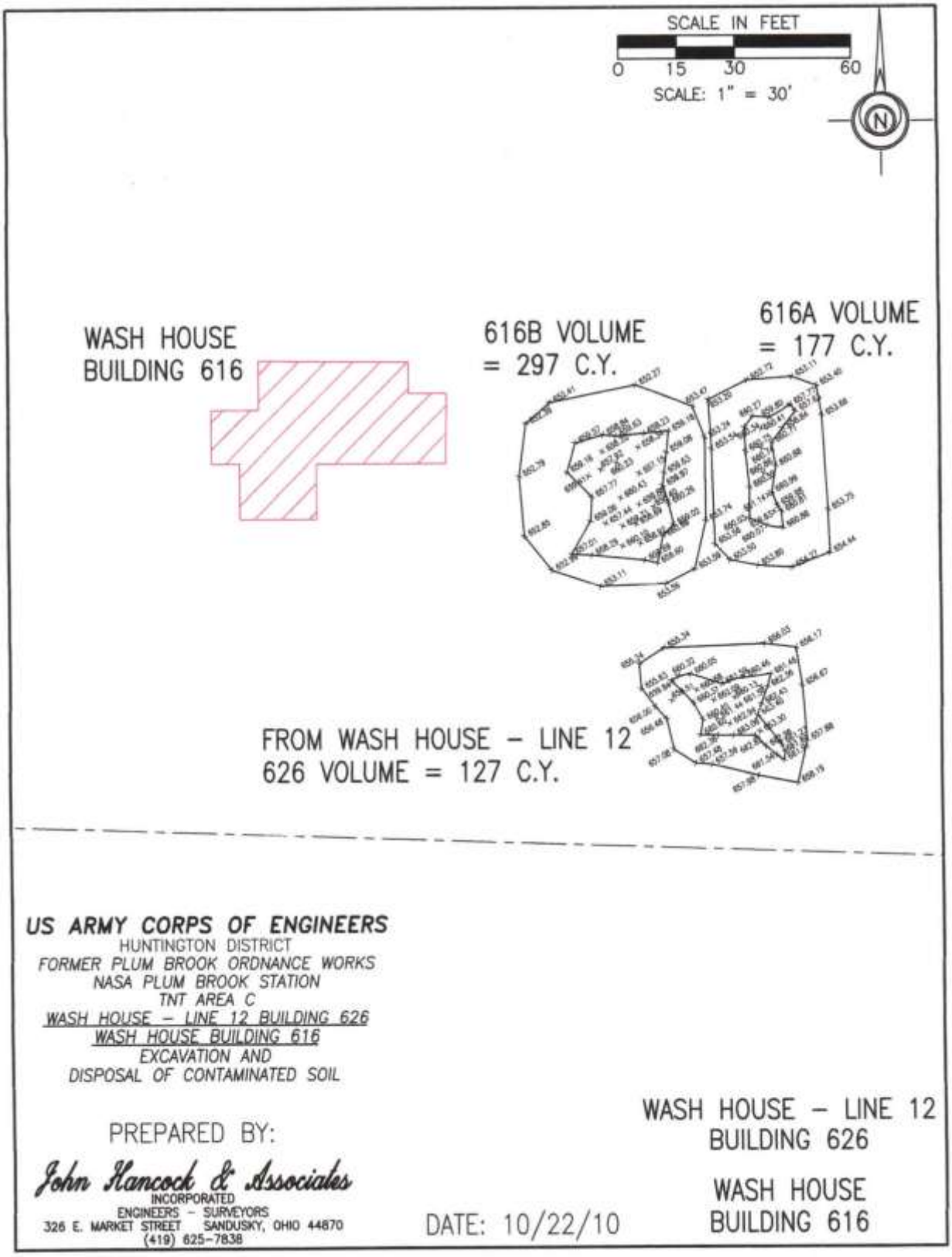


FIGURE 3-45. Building Area 626 Stockpile Diagram

TABLE 3-25. Building Area 626 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-626-C-001	0.24	0.24	0.24	0.24	1.0		0.065	0.065		0.016	0.008	0.023	0.008	0.008		19.0
0922-626-C-002	120	120	120	120	1700		0.63	0.061		0.19	0.19	0.19	0.19	0.19		75.9
0922-626-C-003	25	25	25	25	640		0.065	0.065		0.078	0.078	0.078	0.078	0.078		16.6
0922-626-C-004	0.24	0.24	0.24	0.24	14		0.064	0.064		0.008	0.008	0.008	0.008	0.008		11.1
Minimum Detection (mg/kg)	ND	ND	ND	ND	1.0		0.63	ND		0.016	0.008	0.023	ND	ND		11.1
Mean (mg/kg)	ND	ND	ND	ND	588.8		0.18	ND		0.038	0.037	0.04	ND	ND		31
Maximum Detection (mg/kg)	ND	ND	ND	ND	1700		0.63	ND		0.016	0.008	0.023	ND	ND		75.9
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	ND	ND	ND	ND	15		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	4E-05		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	15					Sum mean	0.18		Sum mean	0.12				lead mean		31
Nitroaromatic ILCR	4.E-05					less than RG?	Yes		less than RG?	Yes				less than RG?		Yes
						total 1 mg/kg			total 1 mg/kg					total 400 mg/kg		

` - Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.
NA - Not Applicable
ND - Not detected above LOQ
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.

TABLE 3-26. Building Area 626 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-626-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TNTC Excavation Notes:

- Excavate approximately 119 cy of material
- Dimensions are 20’ x 20’ x 8’
- Primary contaminants – nitroaromatics; lead at 134 ppm
- Groundwater was noted at 8’
- Bedrock encountered at 8.5’

Follow-on Test Pit Notes:

- Excavate approximately 1,007 cy of material
- Dimensions are 40’ x 20’ x 10’, 80’ x 20’ x 8’ and 40’ x 20’ x 8’
- TP1 and TP8 collected at 7 feet due to water filling hole from buried pipes
- TP2 and TP4 collected at 6.5 feet due to water filling hole from buried pipes
- TP3, TP5, TP6, TP7 collected at 6.4 or 6.5 feet due to cement pad at bottom
- TP9-TP13 collected at 8 feet
- TP14 collected at 10 feet
- TP15-TP26 collected at 8 feet, mostly or completely clay
- Greyed out sample numbers will not be included in calculations

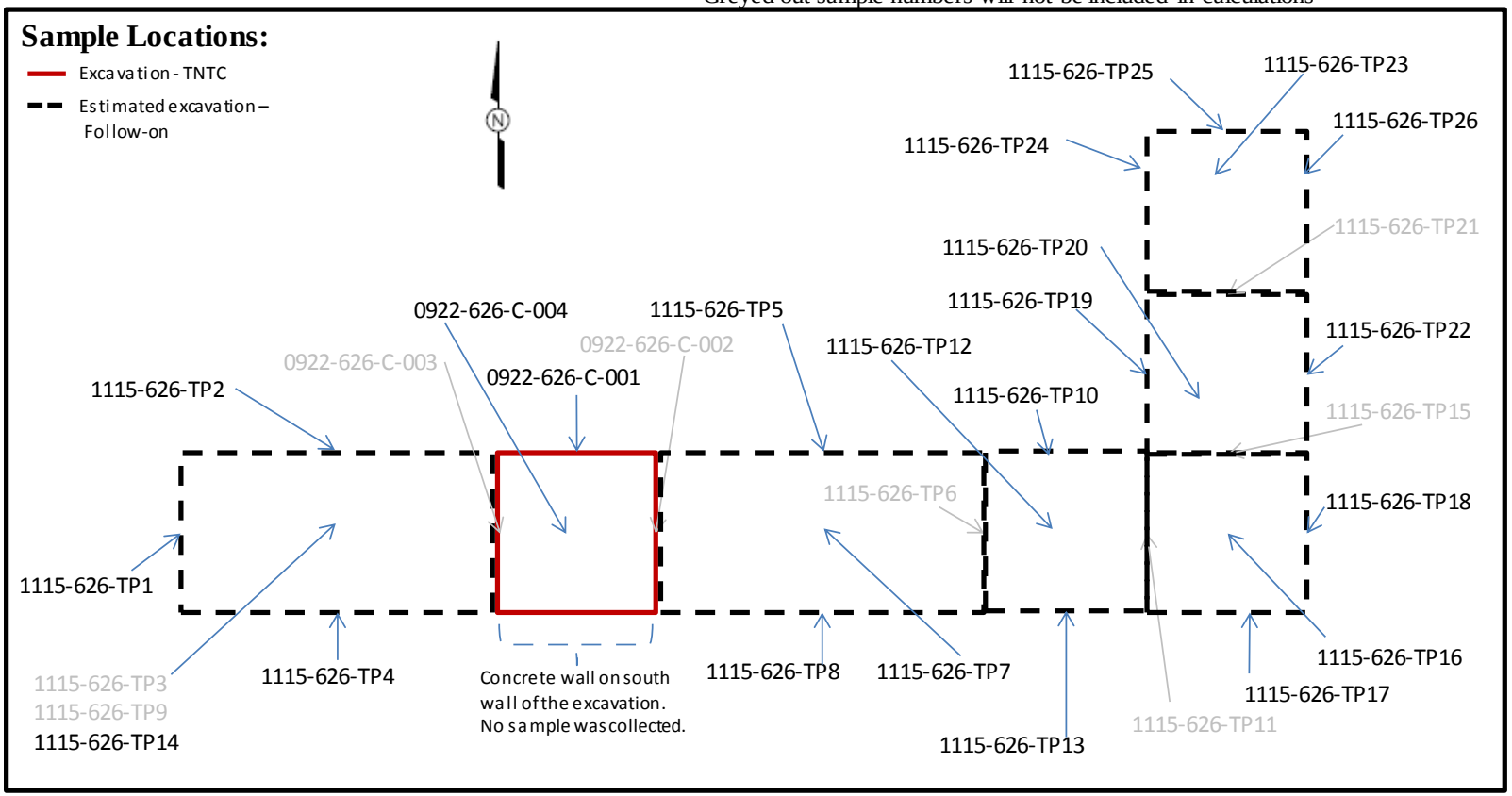


FIGURE 3-46. Building Area 626 Follow-on Test Pitting Diagram

TNTC Excavation Notes:

- Scoped volume 119 cy of material
- Dimensions are 20' x 20' x 8'
- Primary contaminants – nitroaromatics; lead at 134 ppm
- Groundwater was noted at 8'
- Bedrock encountered at 8.5'

Follow-on Confirmation and Excavation Notes:

- Excavate approximately 1088 cy in 2 areas using surveyed dimensions and estimated depth
- Dimensions are 45' x 20' x 10', 65' x 20' x 8', 40' x 20' x 8' and 20' x 20' x 9'
- Sample results for the greyed-out sample numbers will not be included in calculations
- Received revised final Microbac report, excavation complete 6/26/12
- I = 10' depth
- II = 8' depth
- III = 9' depth
- The volume excavated was transported directly to the remediation pad. The soil was surveyed to determine the total volume of 2,657 cy

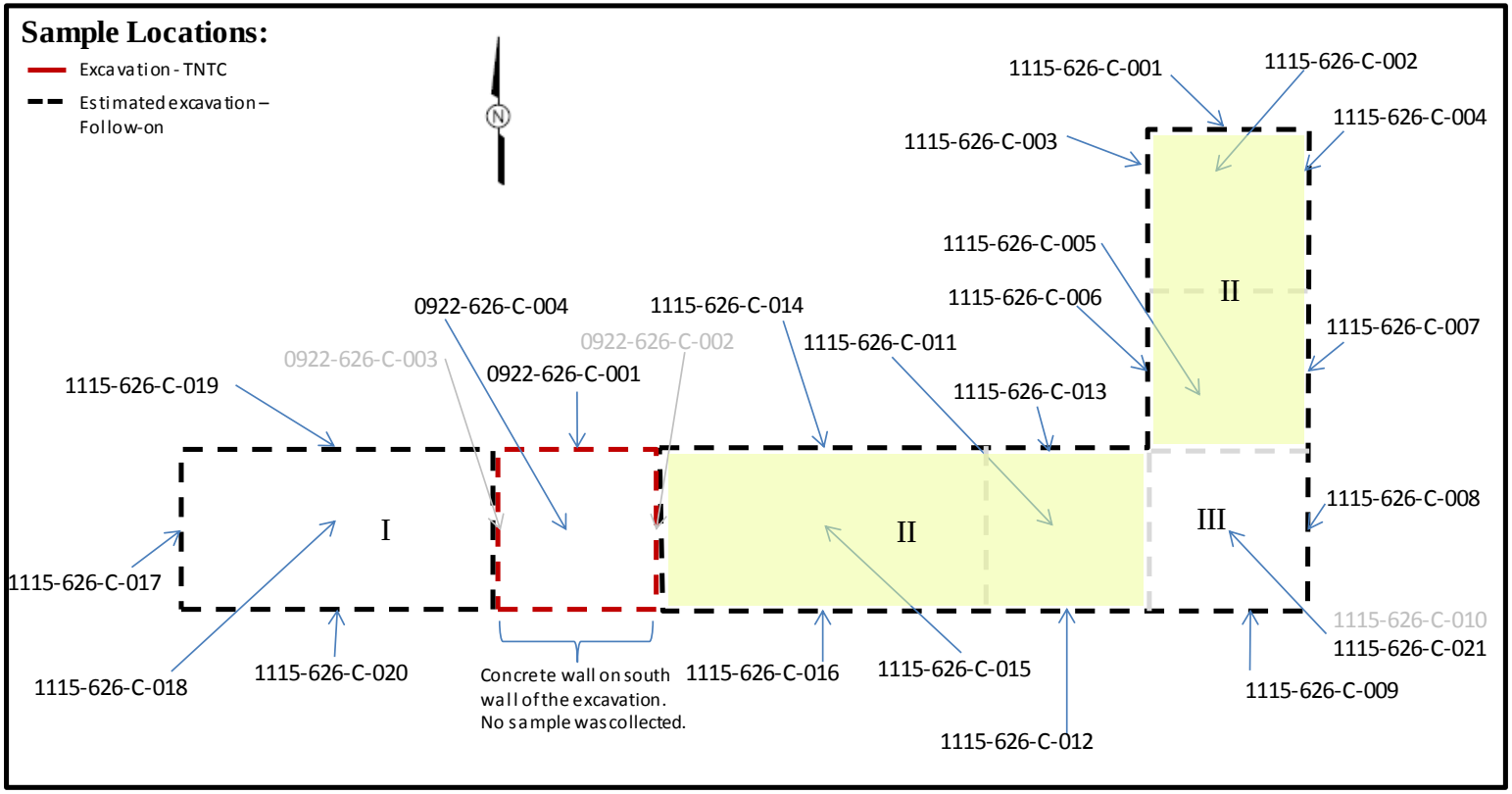


FIGURE 3-47. Building Area 626 Follow-on Confirmation Diagram

TABLE 3-27. Building Area 626 Follow-on Risk Calculations

Sample	COC Analytical Results (mg/kg)																pH
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead	
0922-626-C-001	0.24	0.24	0.24	0.24	1.0		0.065	0.065		0.016	0.0082	0.023	0.0079	0.0079		19.0	NR
0922-626-C-002	120	120	120	120	1700		0.63	0.061		0.19	0.19	0.19	0.19	0.19		76	NR
0922-626-C-003	25	25	25	25	640		0.065	0.065		0.078	0.078	0.078	0.078	0.078		17	NR
0922-626-C-004	0.24	0.24	0.24	0.24	14		0.064	0.064		0.0077	0.0077	0.0077	0.0077	0.0077		11.1	NR
1115-626-C001	0.931	0.539	0.25	0.25	1.9		0.0198	0.0198		0.141	0.131	0.137	0.131	0.131		16.8	7.91
1115-626-C002	4.44	2.68	0.248	0.248	6.95		0.019	0.019		0.653	0.579	0.526	0.127	0.31		23.1	8.23
1115-626-C003	0.581	0.421	0.247	0.247	0.247		0.0197	0.0197		0.383	0.484	0.415	0.132	0.276		8.74	7.71
1115-626-C004	0.242	0.242	0.242	0.242	0.242		0.0197	0.0197		0.140	0.140	0.140	0.140	0.140		18.3	8.24
1115-626-C005	0.243	0.243	0.243	0.243	0.243		0.0187	0.0187		0.126	0.126	0.126	0.126	0.126		12.9	8.49
1115-626-C006	0.250	0.250	0.250	0.250	0.250		0.0191	0.0191		0.145	0.145	0.145	0.145	0.145		16.2	8.03
1115-626-C007	0.246	0.246	0.246	0.246	0.246		0.0224	0.0224		3.82	3.45	2.87	1.30	1.85		10.1	8.04
1115-626-C008	0.241	0.241	0.241	0.241	0.241		0.0182	0.0182		0.124	0.124	0.124	0.124	0.124		14.3	7.54
1115-626-C009	0.794	0.564	0.246	0.246	2.95		0.0207	0.0207		0.170	0.162	0.153	0.127	0.127		18.8	7.65
1115-626-C010	13.1	4.56	0.639	0.249	31.4		0.0197	0.0197		1.31	1.31	1.31	1.31	1.31		13.3	7.88
1115-626-C011	0.250	0.250	0.250	0.250	1.25		0.0173	0.0173		0.126	0.126	0.126	0.126	0.126		10.9	8.22
1115-626-C012	0.250	0.250	0.250	0.250	0.704		0.0191	0.0191		0.129	0.129	0.129	0.129	0.129		13.3	8.33
1115-626-C013	0.241	0.241	0.241	0.241	0.835		0.0192	0.0192		0.172	0.15	0.135	0.135	0.135		5.41	7.89
1115-626-C014	0.286	0.291	0.248	0.248	0.248		0.0187	0.0187		0.152	0.152	0.152	0.152	0.152		21.7	7.73
1115-626-C015	0.250	0.250	0.250	0.250	0.250		0.0198	0.0198		0.123	0.123	0.123	0.123	0.123		10.7	8.14
1115-626-C016	0.248	0.248	0.248	0.248	11.0		0.0199	0.0199		0.131	0.131	0.131	0.131	0.131		15.3	8.03
1115-626-C017	0.264	0.250	0.250	0.250	0.250		0.0192	0.0192		0.124	0.124	0.124	0.124	0.124		12.3	8.34
1115-626-C018	2.27	1.32	0.248	0.248	184		0.0169	0.0169		0.129	0.129	0.129	0.129	0.129		13.1	7.65
1115-626-C019	1.49	1.42	0.311	0.248	3.23		0.0189	0.0189		0.128	0.128	0.128	0.128	0.128		15.0	8.50
1115-626-C020	0.367	0.247	0.247	0.247	0.287		0.192	0.192		0.131	0.131	0.131	0.131	0.131		2.69	7.53
1115-626-C021	0.249	0.249	0.249	0.249	0.249		0.0242	0.0242		0.00428	0.00416	0.00400	0.00400	0.00400		16.7	NR

Minimum Detection (mg/kg)	0.26	0.29	0.31	ND	0.29		ND	ND		0.0043	0.0042	0.023	ND	0.28		2.7
Mean (mg/kg)	0.59	0.41	0.13	ND	10		ND	ND		0.28	0.26	0.24	ND	0.16		17
Maximum Detection (mg/kg)	4.4	2.7	0.31	ND	184		ND	ND		3.8	3.5	2.9	ND	1.9		23
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.1	0.1	0.001	ND	0.3		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	2E-07	ND	8.E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.5				Sum mean		ND	Sum mean		0.94				lead mean		17
Nitroaromatic ILCR	6.E-06				less than RG?		NA	less than RG?		Yes				less than RG?		Yes
					total 1 mg/kg			total 1 mg/kg						total 400 mg/kg		

NA - Not Applicable
ND - Not detected above LOQ
NR - Analysis not requested
Risk calculations based on the mean detection.
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT A and C Focused Feasiblity Study

- Sample results not included in risk calculations.
- Not detected above LOQ, 0.5x the LOQ used in calculation.
-Result exceeds RG

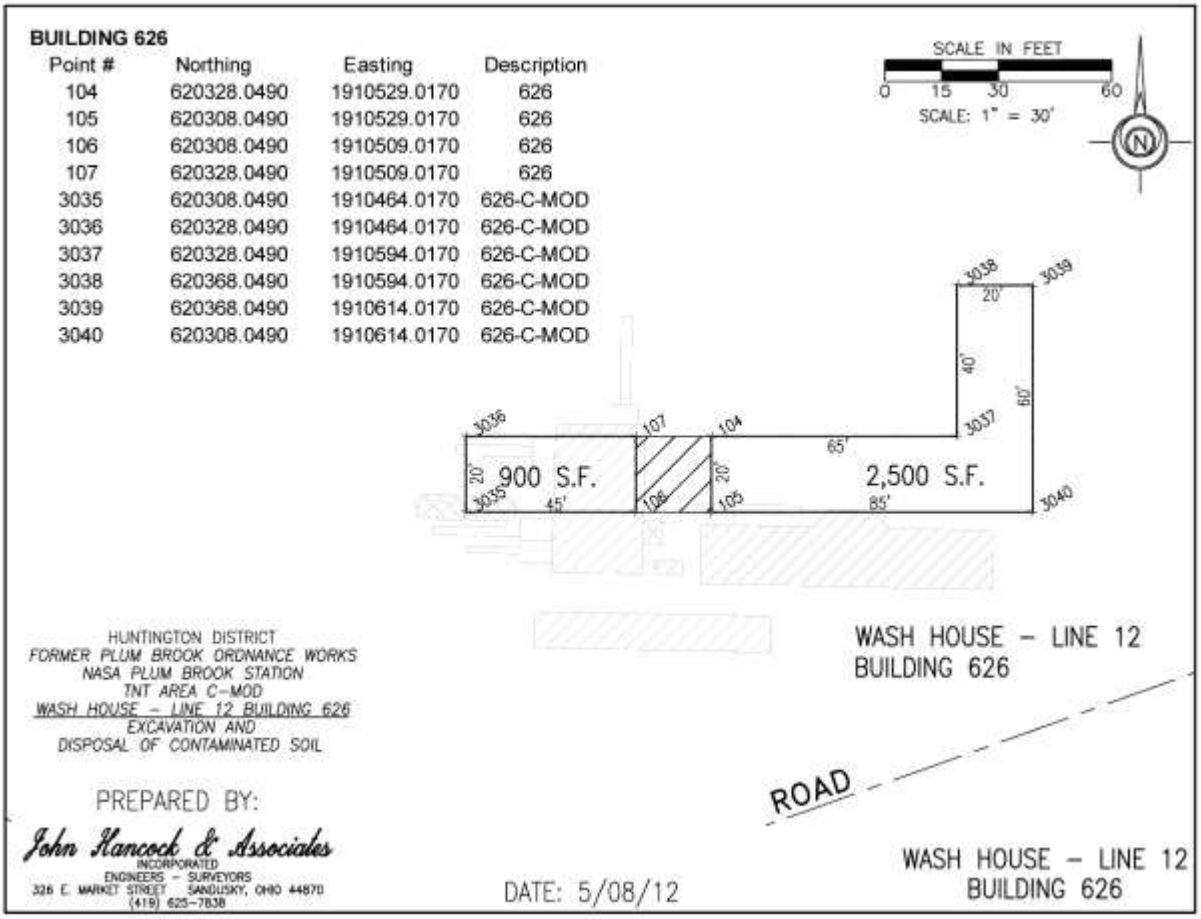


FIGURE 3-48. Diagram of AOC 626 Follow-on with Coordinates

FIGURE 3-49. Decontaminating the Equipment

FIGURE 3-50. The Depth of the Excavation was Verified at Each Excavation

3.4.10. Building 689 – Acid and Fume Recovery, Process Line 8

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 119 cy of material from within the surveyed boundaries. The dimensions of the excavation were 20 × 20 × 8 ft. The primary contaminants were nitroaromatics with lead noted at a concentration of 335 ppm. Groundwater was noted at 8 ft and bedrock was encountered at 15 ft.

Excavation on Building 689 was initiated on September 21, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. During the excavation, shale was encountered at approximately the 4 ft depth. The excavation continued to the 8 ft depth. The shale was excavated from the hole and stockpiled separately. There were two stockpiles for this AOC located adjacent to the excavation. One of the stockpiles consisted of almost all clay and the second was shale. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Four confirmation samples were collected along the walls of the excavation on September 27, 2010 (Figure 3-51). There was no sample from the floor because refusal was encountered at 8 ft. The stockpiles were sampled the same day (Figure 3-52). The confirmation samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 689 had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 mg/kg for both. The lead mean was <400 mg/kg (Table 3-28). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-29). Additionally, the landfill requested total petroleum hydrocarbons on the shale stockpile. The stockpiles were non-hazardous and were approved for disposal at the landfill.

The laboratory data for Building 689 is included in electronic format in Appendix C.2.

Shale was encountered at Building 689 as shown in Figures 3-53 and 3-54.

Remedial Investigation Notes:

- Scoped volume 119 cy
- Excavation depth is 8’
- Dimensions are 20’ x 20’ x 8’
- Primary contaminant is nitroaromatics
- Lead was detected at 335 parts per million (ppm)
- Groundwater was noted at 8’
- Bedrock encountered at 15’

RA-C Notes:

Sampled walls and stockpiles
Soil and shale was stockpiled seperately
Hit shale at 6' continued to specified depth (8')
Shale will be submitted for TPH GRO/DRO
Noted petroleum odor when excavating shale
Shale will be submitted for TPH GRO/DRO
Surveyed stockpile volume 112 cy

Sample Locations:

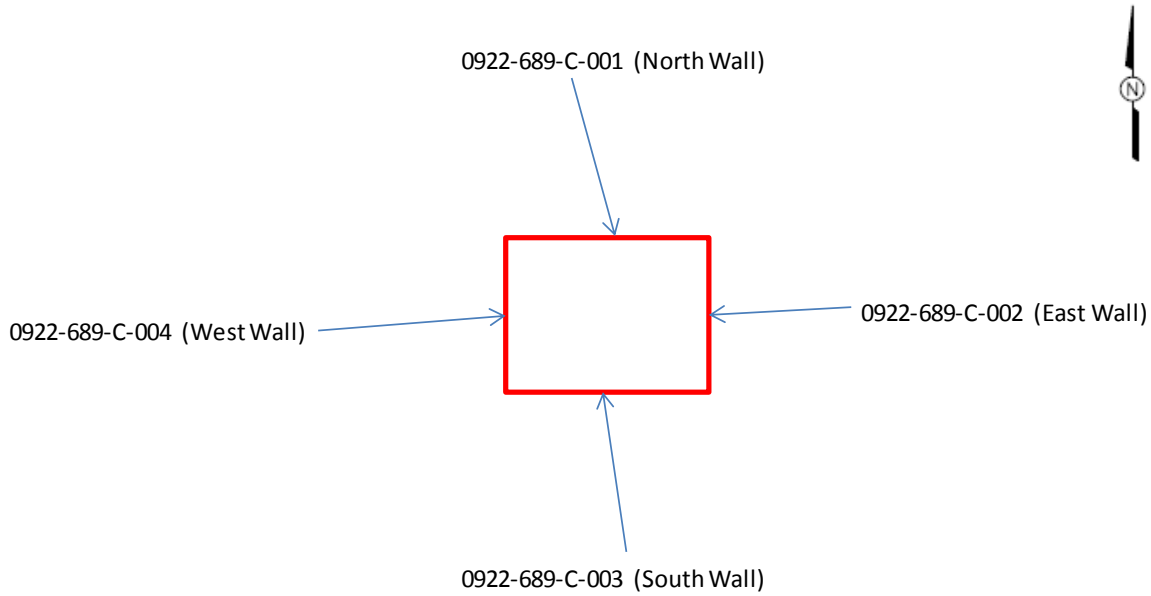


FIGURE 3-51. Building Area 689 Acid Fume and Recovery – Process Line 8 Confirmation Diagram

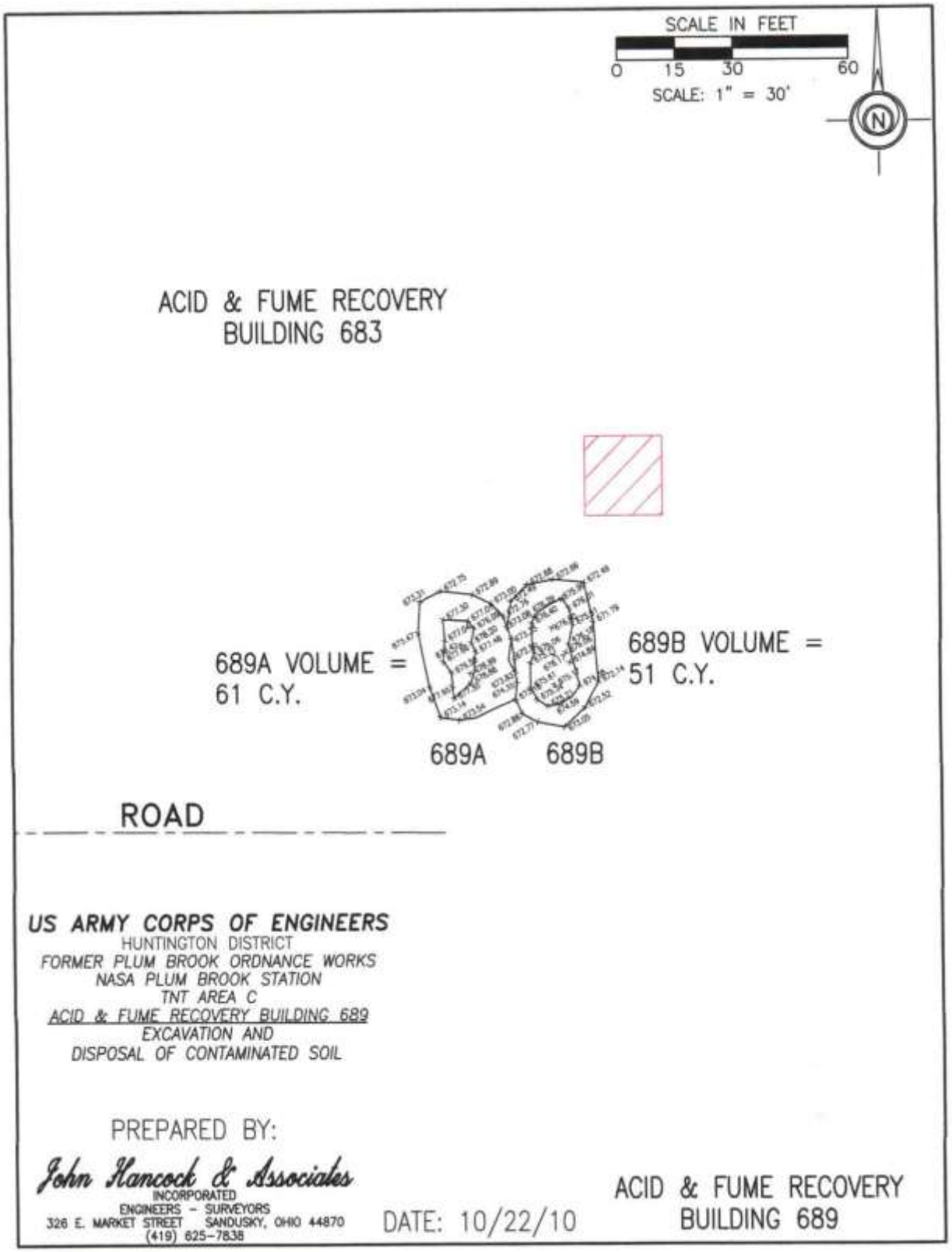


FIGURE 3-52. Building Area 689 Stockpile Diagram

TABLE 3-28. Building Area 689 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-689-C-001	0.24	0.24	0.28	0.24	0.24		0.06	0.06		0.02	0.02	0.02	0.02	0.02		10.5
0922-689-C-002	0.42	0.27	0.49	0.24	0.24		0.061	0.062		0.27	0.23	0.31	0.04	0.03		37.8
0922-689-C-003	0.25	0.25	0.25	0.25	0.25		0.062	0.062		0.01	0.01	0.04	0.01	0.03		17.5
0922-689-C-004	0.39	0.24	1.2	0.51	0.24		0.059	0.23		0.03	0.03	0.04	0.03	0.03		53.4
Minimum Detection (mg/kg)	0.39	0.27	0.28	0.24	ND		ND	0.062		0.01	0.01	0.04	0.04	0.03		10.5
Mean (mg/kg)	0.26	0.16	0.52	0.25	ND		ND	0.09		0.08	0.07	0.10	0.02	0.02		30
Maximum Detection (mg/kg)	0.42	0.27	1.2	0.51	ND		ND	0.23		0.27	0.23	0.31	0.04	0.03		53.4
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.1	0.04	0.003	0.002	ND		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	7E-07	2E-07	ND		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.1					Sum mean	0.09		Sum mean	0.3					lead mean	30
Nitroaromatic ILCR	1.E-06					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-29. Building Area 689 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.299	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-29. Building Area 689 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.287	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-53. Shale and Debris Were Encountered at Building 689

FIGURE 3-54. Shale at Building 689

3.4.11. Building 692 – Bi-Tri House, Process Line 9

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 845 cy of material from within the surveyed boundaries. The dimensions of this excavation were irregular (approximately 80 × 70 ft) with a depth of 8 ft. The primary contaminants were nitroaromatics. Groundwater was noted at 8 ft and bedrock was encountered at 15 ft.

Excavation on Building 692 was initiated on September 30, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The four stockpiles for this AOC were located adjacent to the excavation. As with previous excavations, there were quantities of debris uncovered during the excavation which was set aside.

Nineteen confirmation samples were collected along the walls and five from the floor on October 12, 2010 (Figure 3-55). The stockpiles were sampled the same day (Figure 3-56). The confirmation samples and stockpile samples were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 692 had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 for both. The lead mean was <400 mg/kg (Table 3-30). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-31). Three of the four stockpiles were non-hazardous and were approved for disposal at the landfill. The fourth stockpile was hazardous and transported to the remediation pad for treatment.

The laboratory data for Building 692 is included in electronic format in Appendix C.2.

Figure 3-57 shows the cleared area for the excavation activities. Notice the survey stakes in the background and equipment is staged. The cleared area in the foreground is where the stockpiles will be placed. Plastic and silt fence will be erected as the stockpiles are constructed. Figure 3-58 shows the stratification of soil encountered at the AOC and area-wide.

Remedial Investigation Notes:

- Scoped volume 845 cy
- Dimensions are irregular
- Excavation depth is 8'
- Primary contaminants are nitroaromatics
- Groundwater was noted at 8'
- Bedrock encountered at 15'

RA-C Notes:

Surveyed stockpile volume 962 cy

Sample Locations:

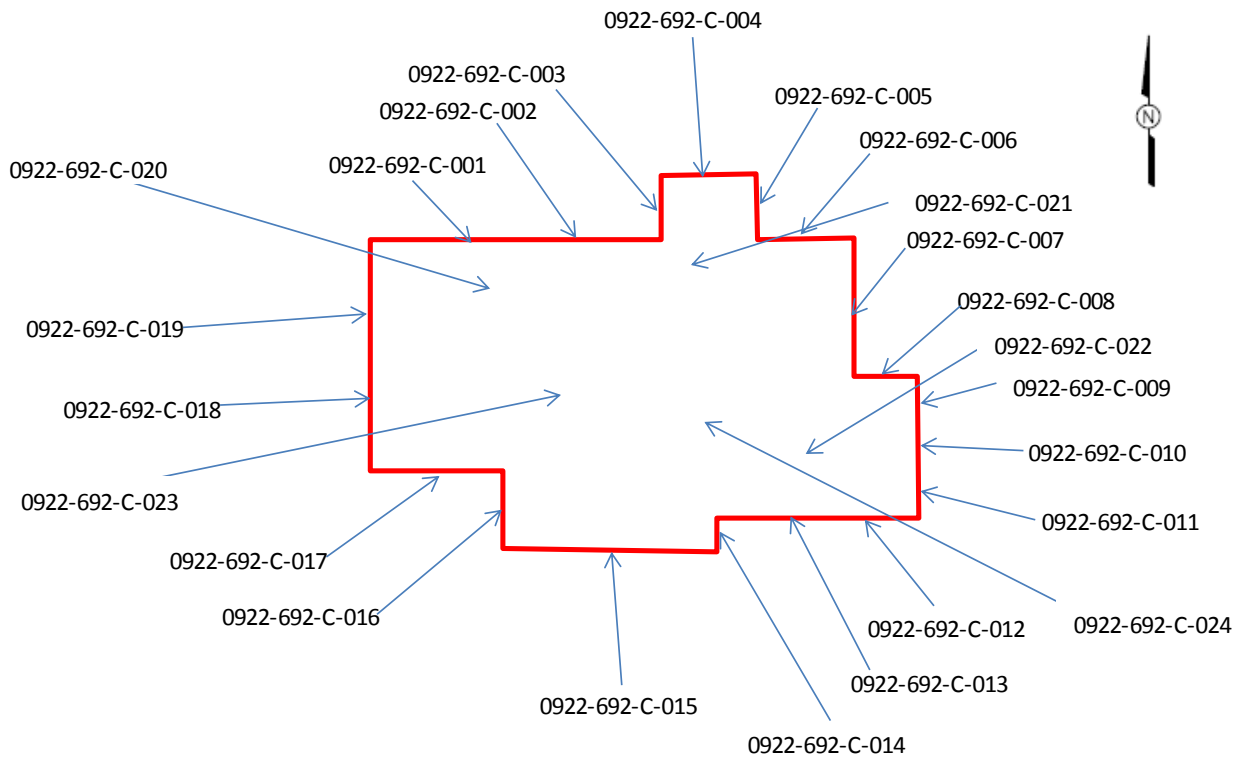


FIGURE 3-55. Building Area 692 Bi-Tri House – Process Line 9 Confirmation Diagram

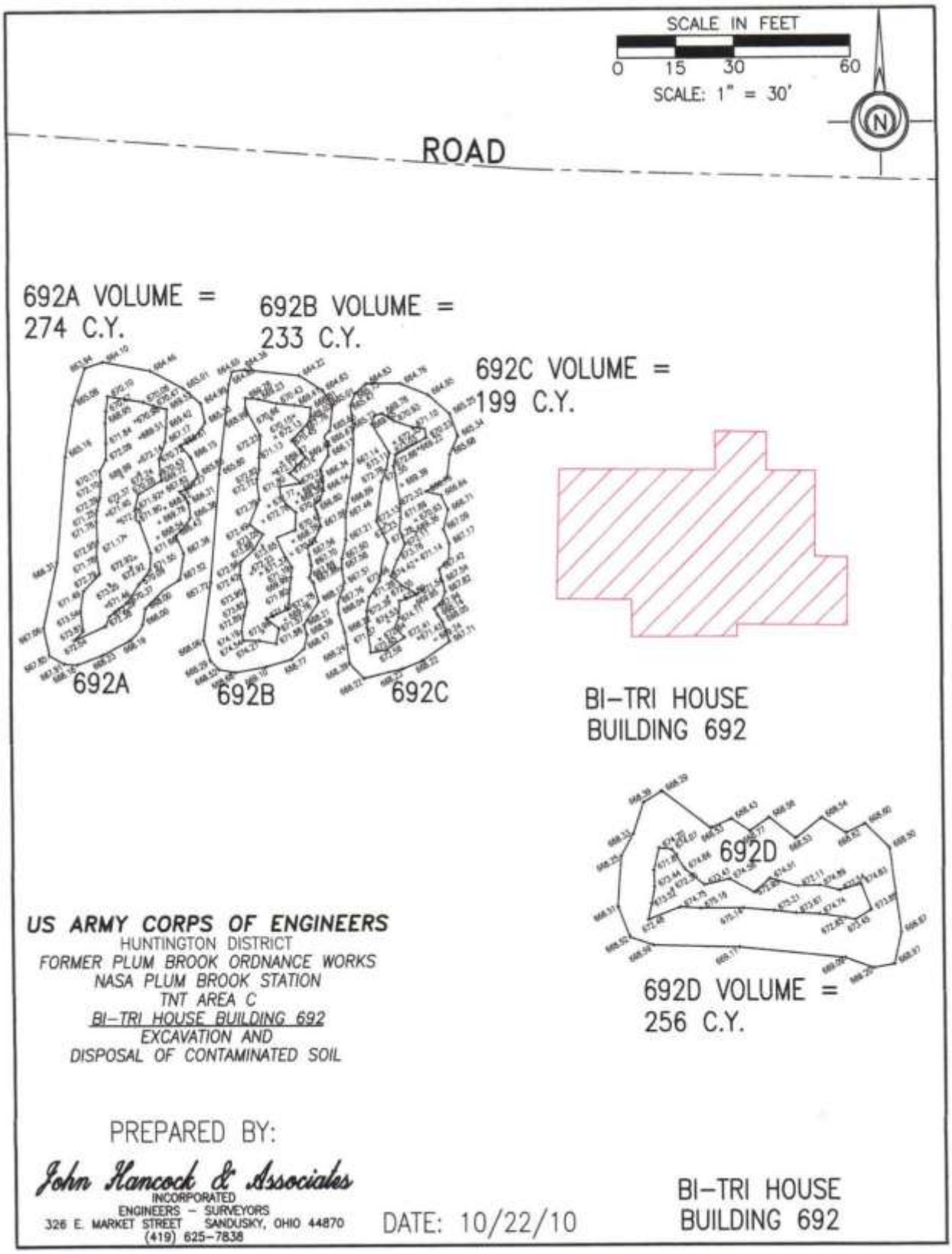


FIGURE 3-56. Building Area 692 Stockpile Diagram

TABLE 3-30. Building Area 692 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-692-C-001	0.25	0.125	0.125	0.125	0.125		0.032	0.032		0.037	0.12	0.17	0.039	0.11		7.8
0922-692-C-002	0.25	0.125	0.125	0.125	0.125		0.029	0.029		0.004	0.004	0.004	0.0036	0.0036		6.3
0922-692-C-003	0.24	0.12	0.12	0.12	0.12		0.029	0.029		0.004	0.004	0.004	0.0036	0.0036		8.9
0922-692-C-004	0.33	0.51	0.12	0.12	0.12		0.029	0.029		0.003	0.003	0.003	0.0035	0.0035		3
0922-692-C-005	0.78	1.3	0.12	0.12	4.5		0.029	0.13		0.004	0.004	0.01	0.0035	0.0035		4.8
0922-692-C-006	0.59	0.125	0.59	1.1	57		0.285	1.5		0.004	0.004	0.004	0.0035	0.0035		11.5
0922-692-C-007	0.22	0.11	0.11	0.11	0.11		0.032	0.032		0.004	0.004	0.008	0.0038	0.0038		13.2
0922-692-C-008	0.22	0.11	0.11	0.11	0.11		0.031	0.031		0.004	0.004	0.004	0.0037	0.0037		9.7
0922-692-C-009	0.24	0.12	0.12	0.12	0.12		0.031	0.031		0.004	0.004	0.004	0.0037	0.0037		6.8
0922-692-C-010	0.24	0.12	0.12	0.12	0.12		0.03	0.03		0.004	0.004	0.004	0.0036	0.0036		4.1
0922-692-C-011	0.25	0.125	0.125	0.125	0.125		0.031	0.031		0.004	0.004	0.004	0.0038	0.0038		7.8
0922-692-C-012	0.25	0.125	0.125	0.125	0.125		0.03	0.03		0.004	0.004	0.004	0.0037	0.0037		5.8
0922-692-C-013	0.24	0.12	0.12	0.12	0.12		0.031	0.28		0.004	0.004	0.004	0.0038	0.0038		46.3
0922-692-C-014	0.25	0.125	0.125	0.125	0.125		0.029	0.029		0.003	0.003	0.003	0.0035	0.0035		4.5
0922-692-C-015	0.39	0.37	0.36	0.12	0.12		0.029	0.071		0.004	0.004	0.004	0.0035	0.0035		4.6
0922-692-C-016	0.45	0.46	0.125	0.125	0.125		0.03	0.03		0.004	0.004	0.004	0.0036	0.0036		4.8
0922-692-C-017	0.22	0.11	0.11	0.11	0.11		0.031	0.031		0.029	0.034	0.049	0.0037	0.019		8.2
0922-692-C-018	0.24	0.12	0.12	0.12	0.12		0.031	0.031		0.013	0.012	0.02	0.0038	0.0093		5.2
0922-692-C-019	0.25	0.125	0.125	0.125	0.125		0.029	0.029		0.004	0.004	0.004	0.0035	0.0035		5.1
0922-692-C-020	0.21	0.105	0.105	0.105	0.105		0.03	0.03		0.008	0.004	0.008	0.0036	0.0036		4
0922-692-C-021	0.25	0.125	0.125	0.125	0.32		0.03	0.03		0.004	0.004	0.004	0.0037	0.0037		2.8
0922-692-C-022	0.25	0.125	0.125	0.125	0.125		0.033	0.033		0.004	0.004	0.004	0.0039	0.0039		3.1
0922-692-C-023	0.25	0.125	0.125	0.125	0.69		0.029	0.029		0.004	0.004	0.004	0.0035	0.0035		1.9
0922-692-C-024	0.32	0.115	0.115	0.115	0.9		0.03	0.03		0.004	0.004	0.004	0.0036	0.0036		2.8
Minimum Detection (mg/kg)	0.25	0.125	ND	ND	0.32		ND	0.029		0.008	0.004	0.008	0.0037	0.0037		1.9
Mean (mg/kg)	0.21	0.15	0.09	0.10	2.69		ND	0.10		0.0051	0.0085	0.012	0.0034	0.0073		7.6
Maximum Detection (mg/kg)	0.25	0.125	ND	ND	0.125		ND	0.03		0.029	0.004	0.004	0.0037	0.0037		8.2
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.05	0.03	ND	ND	0.067		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	ND	ND	2E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.2				Sum mean	0.1			mean	0.04				lead mean		8
Nitroaromatic ILCR	2.E-07				less than RG?	Yes			less than RG?	Yes				less than RG?		Yes
					total 1 mg/kg				total 1 mg/kg					total 400 mg/kg		

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-31. Building Area 692 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-692-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-31. Building Area 692 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-692-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.061	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-31. Building Area 692 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-692-D-003	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	4.2	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

FIGURE 3-57. Building 692 is Cleared and Ready for Excavation and Stockpiling

FIGURE 3-58. Stratification of Soil

3.4.12. Drainage Ditch – Sediment Area (Adjacent to Building 618)

3.4.12.1. *TNT C RA-C*

This area is adjacent to Building 618 which was not part of this project. However, the sample descriptions refer to 618 since this is the closest building to the drainage ditch.

Davey Resource Group representative stated that this area is a man-made drainage ditch along the edge of an access road. The ditch has a flat bottom and appears to hold water at times. The ditch flows west, eventually entering a very small intermittent stream. Davey noted the ditch is a wetland based upon vegetation, hydrology, and soils. The vegetation in the ditch bottom consists of *Glyceria striata* (fowl manna grass) and *Fraxinus pennsylvanica* (green ash), both of which are wetland plant species. Blackened leaves and a few water marks are present indicating the ditch holds standing water for significant periods of time. The soils are hydric, with a dark, organic surface layer that is underlain by sand and clay. The ditch has a direct surface water connection with a small intermittent stream to the west. This is a non-isolated wetland subject to federal regulation (TMG, 2010b, Appendix A).

USACE wetlands experts were contacted prior to the contractor initiating this project and they stated the area was well below the minimum acreage (1/10th acre) that would require mitigation, impact would be minimal in the absence of mitigation, the area would self-mitigate from the natural carry-down action of the upstream seed bank, and therefore would not require monitoring.

Representatives from USACE, Ohio EPA, Shaw Environmental and Davey Resources Group agreed that the area should be resampled to determine if the COC levels are still above the RGs prior to remediation efforts. Two composite samples were collected from the bottom of the drainage ditch August 19, 2010 and submitted to Test America for nitroaromatics analysis. The results of the resampling indicated the soil and sediment in the drainage ditch had concentrations of nitroaromatic COCs above the RG (Table 3-32). The decision documentation is provided in Appendix C.1.3 and the lab report (Lab No. A0H200502) is provided in Appendix C.2.

The laboratory data was provided to USACE and the decision was made to proceed with remediation of the drainage ditch. The approach to excavating the was different from the other AOCs in TNT C due to the soil and sediment characteristics and minimizing the disturbance to the adjacent ditch bank and vegetation and maintaining the integrity of the seed bank that was contained in the top layers of the soil and sediment. The specific considerations/practices implemented are summarized below:

- The soil and sediment in the ditch were evaluated by Barnes Nursery to determine if they had a soil blend that was of the equivalent characteristics of the ditch soil and sediment. Barnes was able to provide suitable material for the backfill so the wetland conditions would remain intact.
- The source of borrow for the sediment area was sampled to ensure the material was not contaminated or a risk.
- The top 2-3” of soil and sediment in the 10 × 60 ft area was peeled back and stockpiled/saved next to the ditch. This layer maintained the seed cover and was

subsequently placed back in the ditch following completion of confirmation, excavation and backfill.

- The material excavated during the remediation was stockpiled on the pavement (adjacent to the ditch) on plastic sheeting with containment constructed of straw bales and covered with plastic after sampling. No clearing was done in the vegetated areas along the banks of the ditch.
- Trucks used to move the soil and sediment from the excavation to the stockpile stayed on the paved roadway adjacent to the ditch. Any excavated material that spilled onto the roadway from the equipment was quickly contained and placed in the bed of the truck.
- Need to get this area sampled and backfilled as quickly as possible w/ placement of the seed bank on it to promote development of wetland conditions.
- During backfill, care was taken to ensure that drainage in the ditch was maintained. Observation of the ditch when it contained water was indicative of where grading was necessary to promote drainage. After the excavation was backfilled and graded, hand tools were used to increase the grade for drainage.
- There was minimal tree disturbance with the exception of removing the invasive honeysuckle to get access to the ditch.

Based on the RI, excavation in this AOC consisted of excavating approximately 44 cy of material from within the surveyed boundaries. The dimensions of this excavation were approximately 80 × 10 ft with a depth of 2 ft. The primary contaminants were nitroaromatics. Groundwater and bedrock was not encountered in the AOC.

Excavation in the sediment area adjacent to Building 618 was initiated and completed on October 14, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpile. The excavation continued to the 2 ft depth. The single stockpile for this AOC was located on the paved roadway adjacent to the excavation. There was minimal debris removed from the excavation. Bushy vegetation was knocked down and removed to an adjacent clearing for access into the area.

Four confirmation samples were collected from equidistant locations along the length of the ditch, two samples were collected from each end of the ditch area and two samples were collected from the floor of the ditch (Figure 3-59). There was one stockpile which was sampled the same day (Figure 3-60). The confirmation samples and stockpile sample were submitted to Test America for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. The COCs for the sediment area risk evaluation included 2-ADNT, 4-ADNT, and 2,4,6-TNT. The drainage ditch (Building 618) had a nitroaromatic HI >1 and an ILCR <1E-5 (Table 3-33). This AOC required additional excavation and was not closed out.

The stockpile characterization parameter was TCLP (Table 3-34). Based on the laboratory data, the stockpile for this AOC was non-hazardous and was approved for disposal at the landfill.

The laboratory data for the sediment area (Building 618) is included in electronic format in Appendix C.2.

3.4.12.2. *Follow-on*

The additional excavation was conducted under Follow-on. The west wall of the previous excavation had an elevated nitroaromatic sample (0922-618-C-006). An additional 100 ft in length was sampled at 2 ft depth, resulting in seven wall samples and three floor samples. All three floor samples were elevated in nitroaromatics, so all three were resampled at a depth of 4 ft. Samples indicated only one floor sample was still elevated for nitroaromatics (1115-618-TP13), so an additional floor sample was collected at 6 ft, along with the nearest three walls (Figure 3-61). Results indicated that confirmation samples could be collected. The west wall and first set of wall and floor sample were collected at 6 ft, the remaining confirmation samples were collected at 4 ft (Figure 3-62).

The results of the confirmation analysis indicated the AOC had a nitroaromatic HI of <1 and a nitroaromatic ILCR of <1E-5 (Table 3-35). The risk calculations indicated that the excavation was "clean" and excavation for closure was initiated.

Following the verification that the soil and sediment in the excavation's walls and floor was no longer a risk to human health or the environment, the expanded areas were surveyed, a new diagram drawn for the AOC (Figure 3-63), and the coordinates documented on a spreadsheet. The coordinates for the expanded areas are presented in Appendix B.1. Once the coordinates were staked and surveyed, excavation began. The soil and sediment excavated from the expanded areas was transported directly to the remediation pad and configured into windrows. The soil and sediment was not segregated by AOC, but combined in the windrow for subsequent AH remediation. Following excavation and transport of the contaminated soil to the remediation pad for treatment, and the confirmation samples indicated the walls and floor of the AOC was below the risk criteria, the AOC was backfilled with clean soil with characteristics similar to the soil and sediment removed from the ditch.

Figure 3-64 shows the worker checking the air with a photoionization detector (PID) in the work area at Building 618 and Figure 3-65 show the excavation and stockpile area at Building 618 drainage ditch.

TABLE 3-32. Drainage Ditch - Area 618 - Sediment Only - Location TNTC-SD009 Pre-excavation Analysis

Sample	COC Analytical Results		
	2-ADNT	4-ADNT	2,4,6-TNT
0922-SD-001 (Grab)	18	0.12	120
0922-SD-002 (Composite)	1.5	0.125	9.1
Remedial Goal (mg/kg)	5	5	41.0
Remedial HQ	0.3	0.3	0.3
Remedial ILCR	NA	NA	9.E-07
0922-SD-001 COC HQ	1.08	0.0072	0.87804878
0922-SD-002 COC HQ	0.09	0.0075	0.06658537
0922-SD-001 COC ILCR	NA	NA	3.E-06
0922-SD-002 COC ILCR	NA	NA	2.E-07
0922-SD-001 Total HI	1.9652488		
0922-SD-001 Total ILCR	3.E-06		
0922-SD-002 Total HI	0.1640854		
0922-SD-002 Total ILCR	2.E-07		

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG

NA - Not Applicable

Remedial Investigation Notes:

- Scoped volume 44 cy
- Dimensions area 60' x 10' x 2'
- Primary contaminants are nitroaromatics
- Groundwater is not expected within the 2' depth of the excavation

RA-C Notes:

Surveyed stockpile volume 36 cy

Sample Locations:

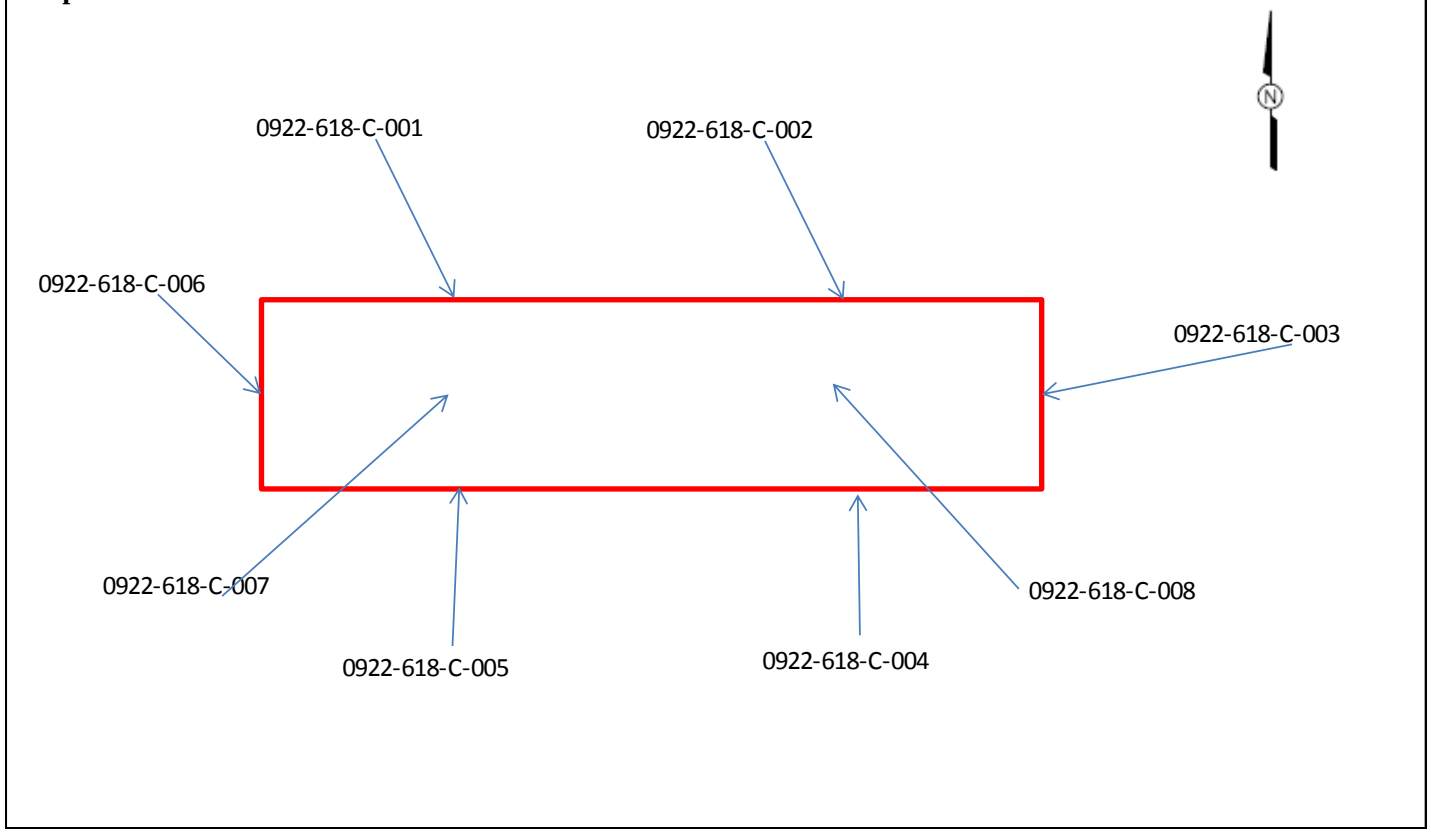


FIGURE 3-59. Drainage Ditch - Area 618 Confirmation Diagram

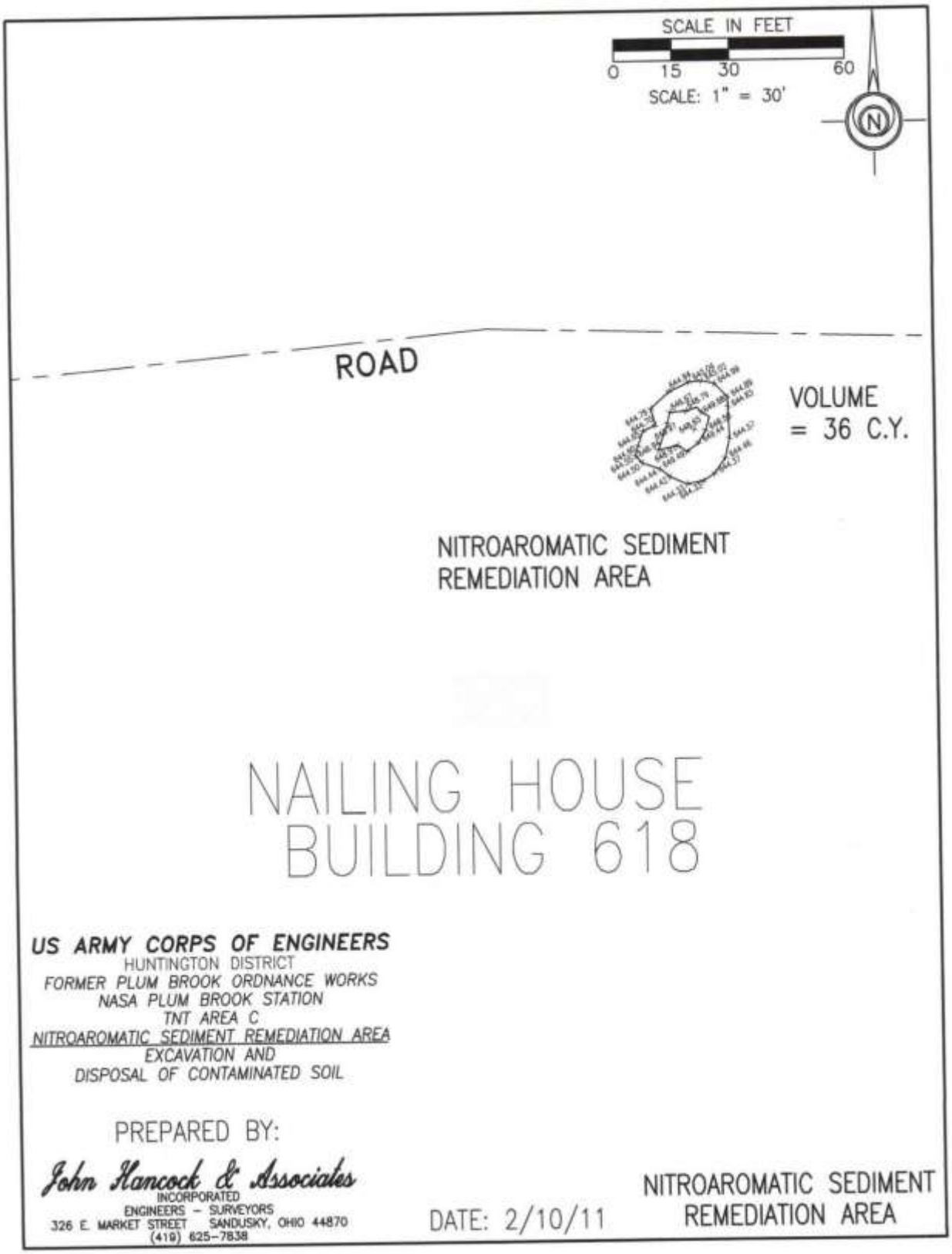


FIGURE 3-60. Drainage Ditch - Area 618 Stockpile Diagram

TABLE 3-33. Drainage Ditch - Area 618 Risk Calculations

Sample	COC Analytical Results (mg/kg)		
	2-ADNT	4-ADNT	2,4,6-TNT
0922-618-C-001	0.96	1.4	170
0922-618-C-002	0.25	0.25	0.28
0922-618-C-003	8.0	4.3	89
0922-618-C-004	0.22	0.22	0.4
0922-618-C-005	0.44	0.41	63
0922-618-C-006	0.25	0.25	2700
0922-618-C-007	3.9	1.6	110
0922-618-C-008	0.24	0.24	0.24

Minimum Detection (mg/kg)	0.44	0.41	0.28
Mean (mg/kg)	1.72	1.02	391.60
Maximum Detection (mg/kg)	8.0	4.3	2700
Remedial Goal (mg/kg)	5	5	41.0
Remedial HQ*	0.3	0.3	0.3
Remedial ILCR*	NA	NA	9.E-07
Excavation COC HQ	0.10	0.06	2.865
Excavation COC ILCR	NA	NA	8.5961E-06
Nitroaromatic HI	3		
Nitroaromatic ILCR	9.E-06		

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at sample location.

NA - Not Applicable
ND - Not detected above LOQ
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.

TABLE 3-34. Drainage Ditch - Area 618 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-618-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TNTC Excavation Notes:

- Excavate approximately 45 cy of material
- Dimensions are 60’ x 10’ x 2’
- Primary contaminants – nitroaromatics
- Groundwater is not expected within the 2’ depth of the excavation
- Bedrock is not expected within the 2’ depth of the excavation

Follow-on Test Pit Notes:

- Excavate approximately 171 cy of material
- Dimensions are 10’ x 100’ x 4’ plus 10’ x 30’ x 2 (sloped to 6 feet west end)
- Drainage ditch had running water ranging from 5-12 inches in depth, shallower downstream
- Excavation of TP1, TP3, TP5 and TP6 measured from bottom of water level
- TP1-TP10 collected at 2 feet from soil surface
- TP11-TP13 collected at 4 feet from soil surface
- TP14-TP17 collected 6 feet from soil surface

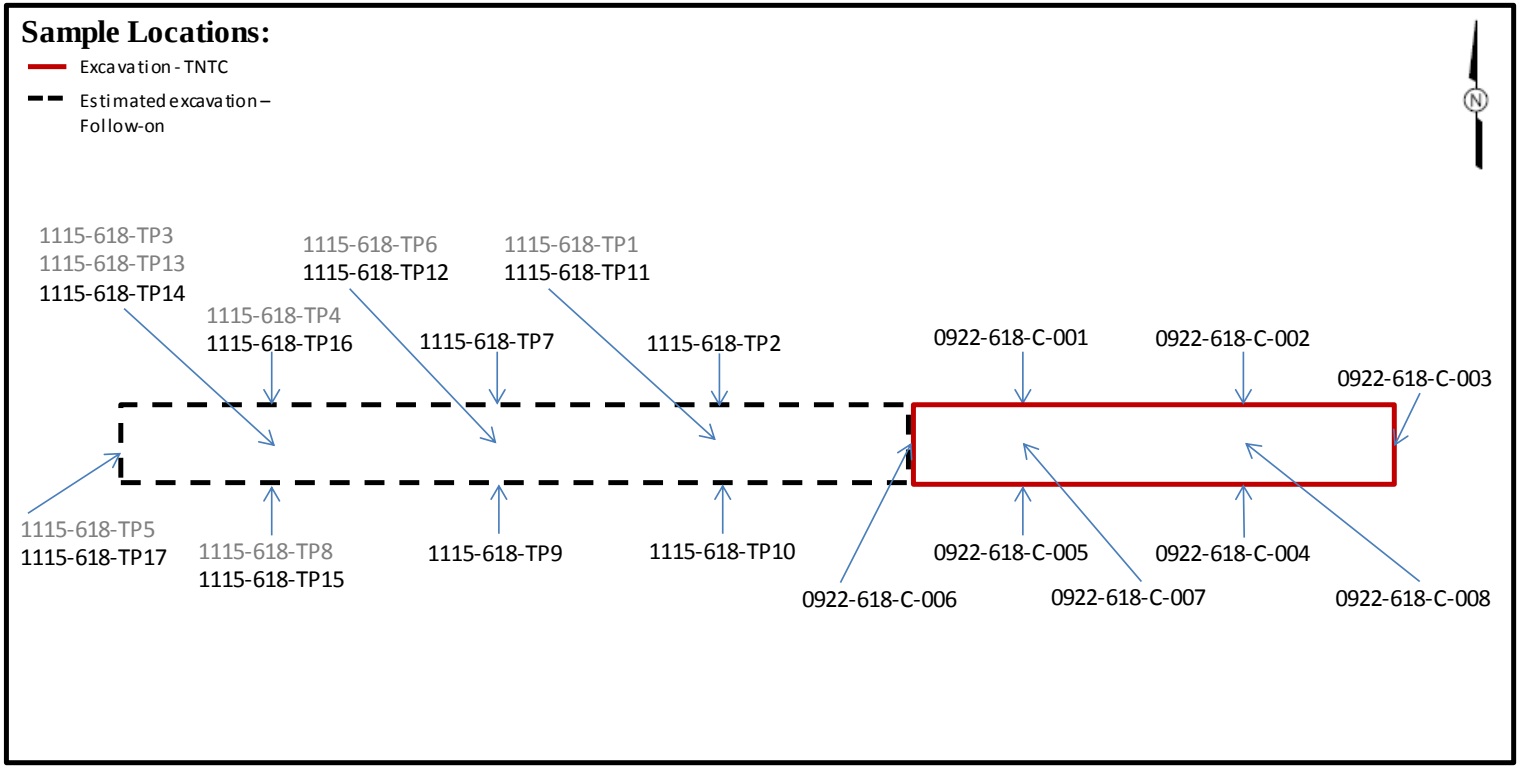


FIGURE 3-61. Drainage Ditch - Area 618 Follow-on Test Pitting Diagram

TNTC Excavation Notes:

- Scoped volume 45 cy of material
- Dimensions are 60’ x 10’ x 2’
- Primary contaminants – nitroaromatics
- Groundwater is not expected within the 2’ depth of the excavation
- Bedrock is not expected within the 2’ depth of the excavation

Follow-on Confirmation and Excavation Notes:

- Excavate approximately 180 cy using surveyed dimensions and estimated depth
- Dimensions are 73’ x 10’ x 4’ plus 32’ x 10’ x 6’ (sloped to 6 feet west end)
- Drainage ditch had running water ranging from 5-12 inches in depth, shallower downstream
- Sampling depth estimated from soil surface
- Sample results for the greyed-out sample numbers will not be included in calculations
- Confirmation complete, excavation completed 5/15/12
- The volume excavated was transported directly to the remediation pad. The soil was surveyed to determine the total volume of 2,657 cy

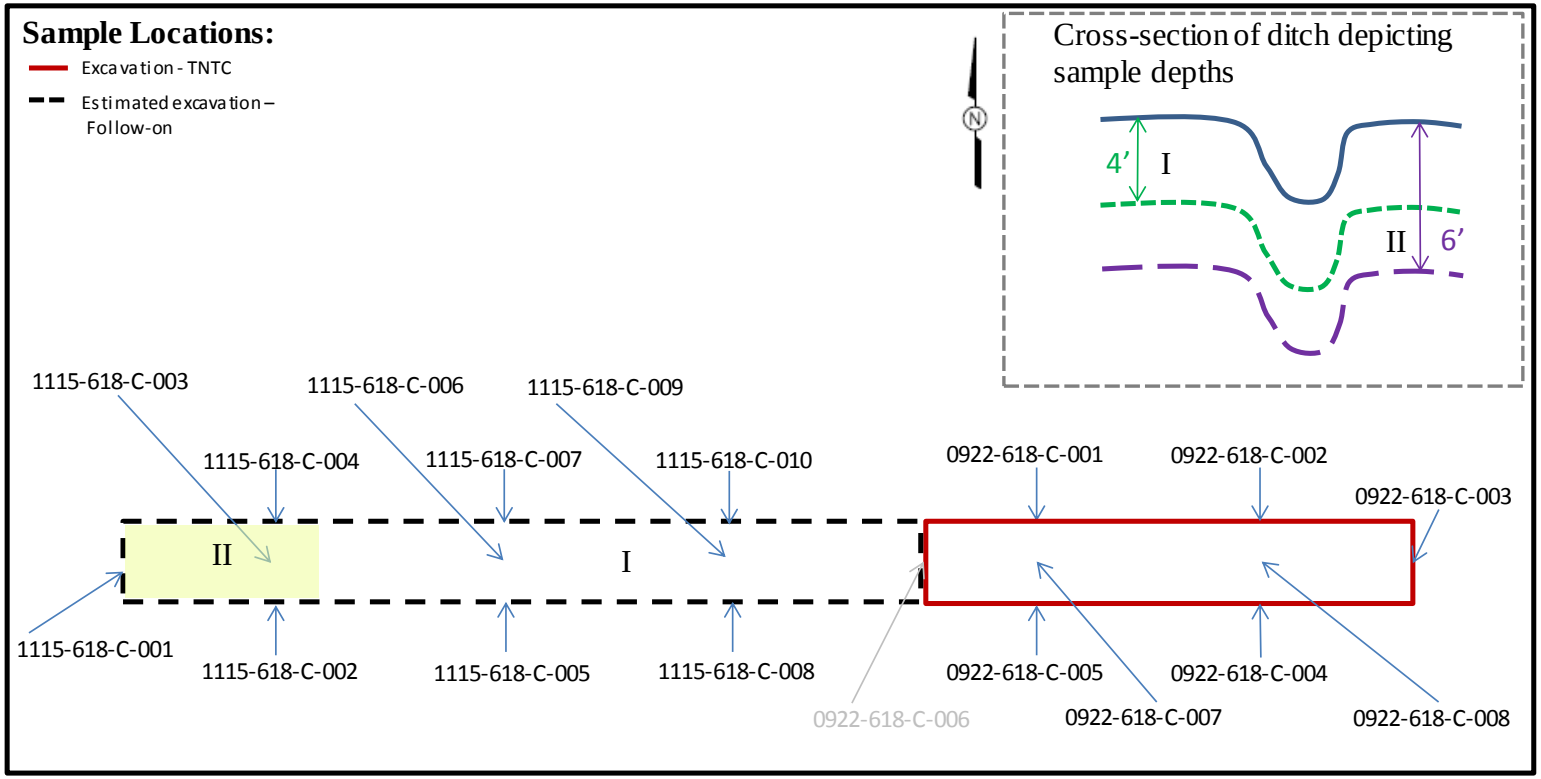


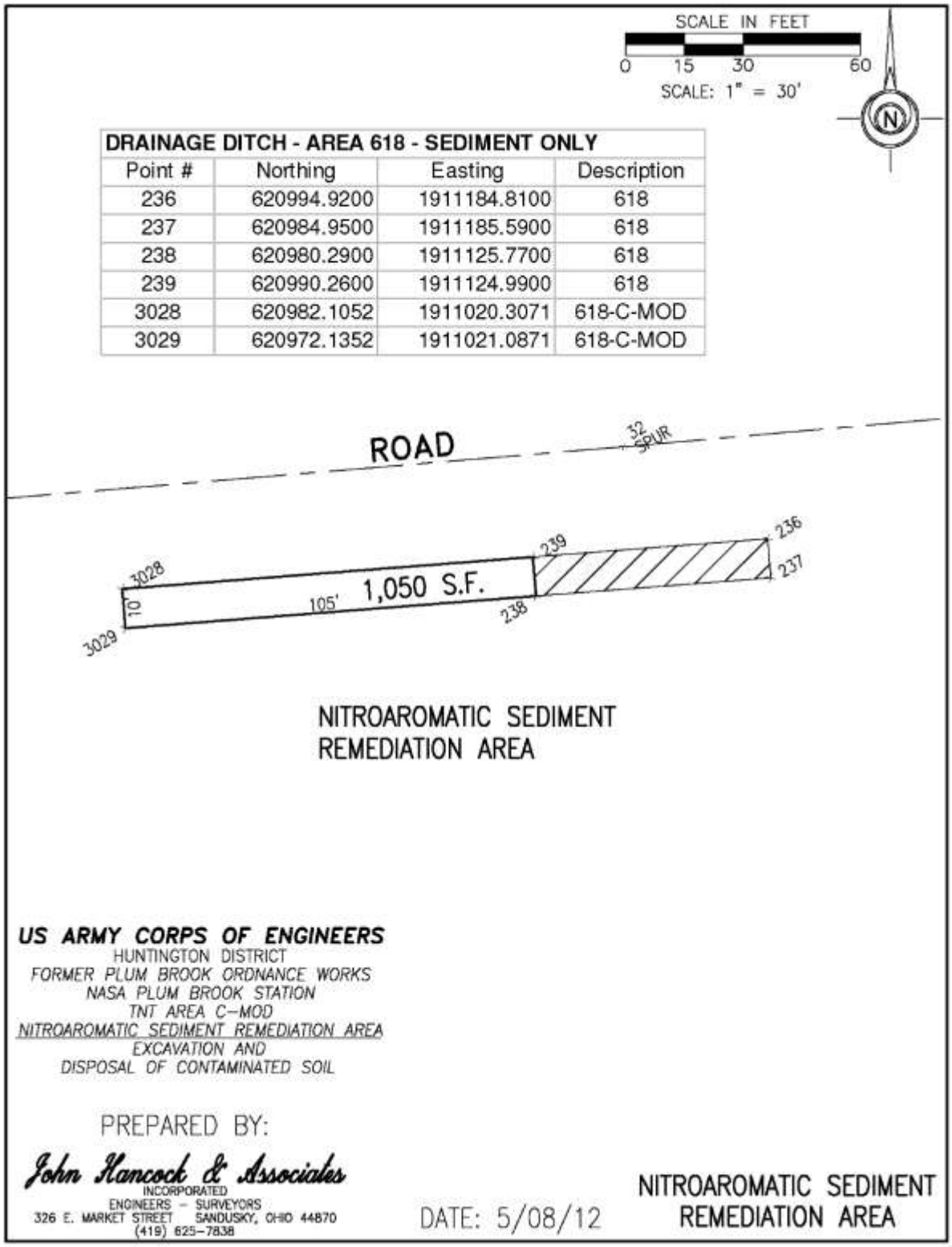
FIGURE 3-62. Drainage Ditch - Area 618 Follow-on Confirmation Diagram

TABLE 3-35. Drainage Ditch - Area 618 Follow-on Risk Calculations

Sample	COC Analytical Results (mg/kg)		
	2-ADNT	4-ADNT	2,4,6-TNT
0922-618-C-001	0.96	1.4	170
0922-618-C-002	0.25	0.25	0.28
0922-618-C-003	8.0	4.3	89
0922-618-C-004	0.22	0.22	0.4
0922-618-C-005	0.44	0.41	63
0922-618-C-006	0.25	0.25	2700
0922-618-C-007	3.9	1.6	110
0922-618-C-008	0.24	0.24	0.24
1115-618-C-001	0.288	0.304	9.44
1115-618-C-002	7.66	2.92	50.1
1115-618-C-003	6.53	2.72	57.5
1115-618-C-004	0.296	0.307	3.90
1115-618-C-005	0.588	0.249	0.226
1115-618-C-006	14.6	7.98	376
1115-618-C-007	0.245	0.245	0.266
1115-618-C-008	0.250	0.250	0.444
1115-618-C-009	2.44	1.70	141
1115-618-C-010	27.1	10.4	287
Minimum Detection (mg/kg)	0.30	0.30	0.23
Mean (mg/kg)	4.3	2.0	80
Maximum Detection (mg/kg)	27	10	376
Remedial Goal (mg/kg)	5	5	41.0
Remedial HQ*	0.3	0.3	0.3
Remedial ILCR*	NA	NA	9.E-07
Excavation COC HQ	0.26	0.12	0.58
Excavation COC ILCR	NA	NA	1.8E-06
Nitroaromatic HI	1		
Nitroaromatic ILCR	2.E-06		

- Sample results not included in risk calculations.
- Not detected above LOQ, 0.5x the LOQ used in calculation.
-Result exceeds RG

NA - Not Applicable
ND - Not detected above LOQ
NR - Analysis not requested
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.



DRAINAGE DITCH - AREA 618 - SEDIMENT ONLY			
Point #	Northing	Easting	Description
236	620994.9200	1911184.8100	618
237	620984.9500	1911185.5900	618
238	620980.2900	1911125.7700	618
239	620990.2600	1911124.9900	618
3028	620982.1052	1911020.3071	618-C-MOD
3029	620972.1352	1911021.0871	618-C-MOD

FIGURE 3-63. Diagram of Drainage Ditch - AOC 618 Follow-on with Coordinates

FIGURE 3-64. Checking Air Quality at Building 618 Drainage Ditch

FIGURE 3-65. Erosion Control in Place at Building 618 Drainage Ditch

3.4.13. Building 629 – Acid and Fume Recovery, Process Line 12

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating approximately 1,333 cy of material from within the surveyed boundaries. The overall dimensions of the excavation were 60 × 60 ft with a depth of 10 ft. There was an area inside the perimeter boundaries of approximately 280 cy that was co-contaminated with lead and low levels of PCBs. The primary contaminants were nitroaromatics, but the co-contaminated soil (nitroaromatics, PCBs and lead) will be segregated from the nitroaromatics-only soil. Groundwater was not encountered but bedrock was noted at 10 ft.

Excavation on Building 629 was initiated on October 19, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpiles. The six stockpiles for this AOC were located adjacent to the excavation. As with previous excavations, there was concrete debris from building foundations uncovered during the excavation, which was set aside.

Eight confirmation samples were collected along the walls and four from the floor on November 9, 2010 (Figure 3-66). The stockpiles were sampled the same day (Figure 3-67). The confirmation samples and stockpile samples were submitted to Microbac Laboratories in Marietta, Ohio for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 629 had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 mg/kg for both. The lead mean was <400 mg/kg (Table 3-36). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-37). All of the six stockpiles were hazardous and were transported to the remediation pad for treatment.

The laboratory data for Building 629 is included in electronic format in Appendix C.2.

Due to the potential of employee exposure to lead dusts, personnel monitoring was conducted on November 16, 2010 to evaluate the potential for exposure to lead. The equipment operator and the laborer who were working closets to the excavation wore the pump and cassette filter and an ambient location was selected downwind of the excavation, just outside the north boundary of the excavation. The cassette samples were logged and the pumps and cassettes were returned to American Analytical Laboratories, Inc. located in Akron, Ohio. The results of the personnel sampling did not indicate any potential exposure issues. The results of the monitoring are provided in Appendix C.1.4 for this excavation.

Figure 3-68 shows the excavation of co-contaminated soil being done first. Notice the survey markers indicating the location of the co-contaminated soil. This AOC has a noticeable odor similar to cherry cough drops, characteristic of nitroaromatics. Respiratory protection was required at Building 629 as shown in Figure 3-69.

Remedial Investigation Notes:

- Scoped volume 1,333 cy
- Overall dimension is 60’ x 60’ x 10’, a smaller area (280 cy) is present within this excavation that is to be segregated, if possible
- Contaminants – nitroaromatics (1,053 cy), and lead and PCBs (280 cy)

RA-C Notes:

Surveyed stockpile volume 1,354 cy

Sample Locations:

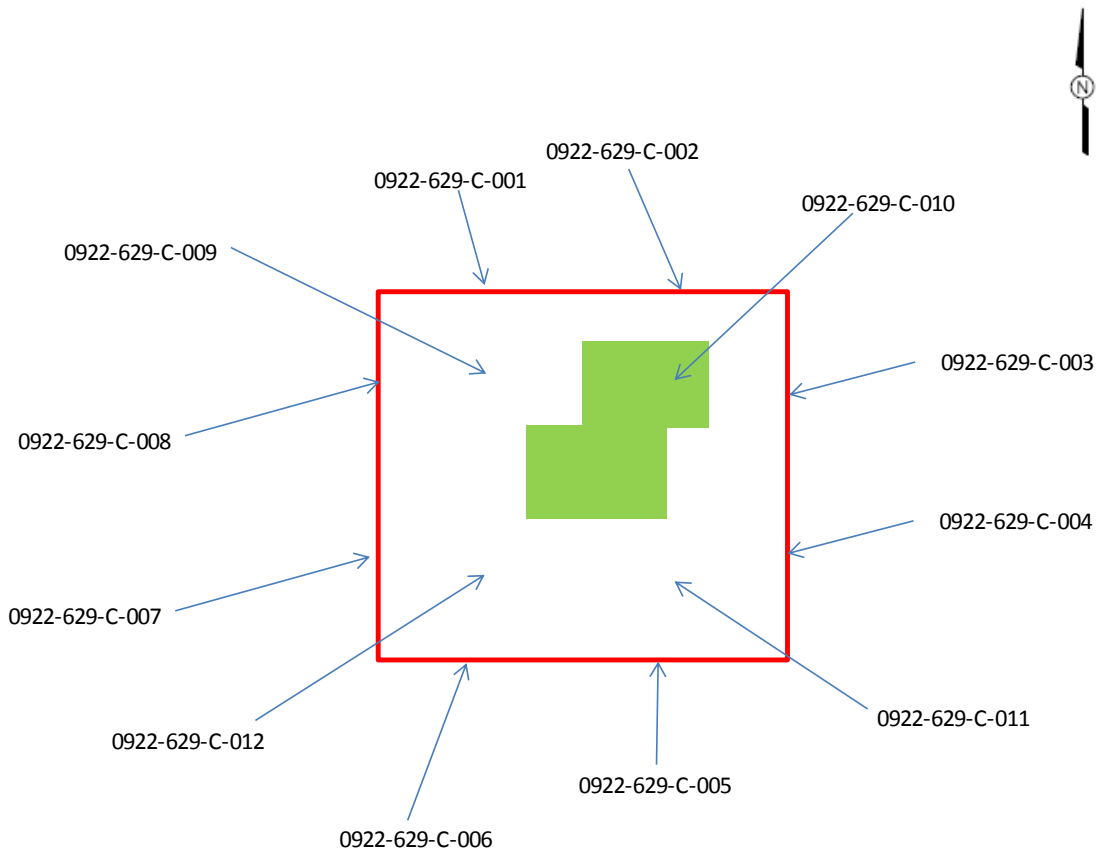


FIGURE 3-66. Building Area 629 Acid and Fume Recovery – Process Line 12 Confirmation Diagram

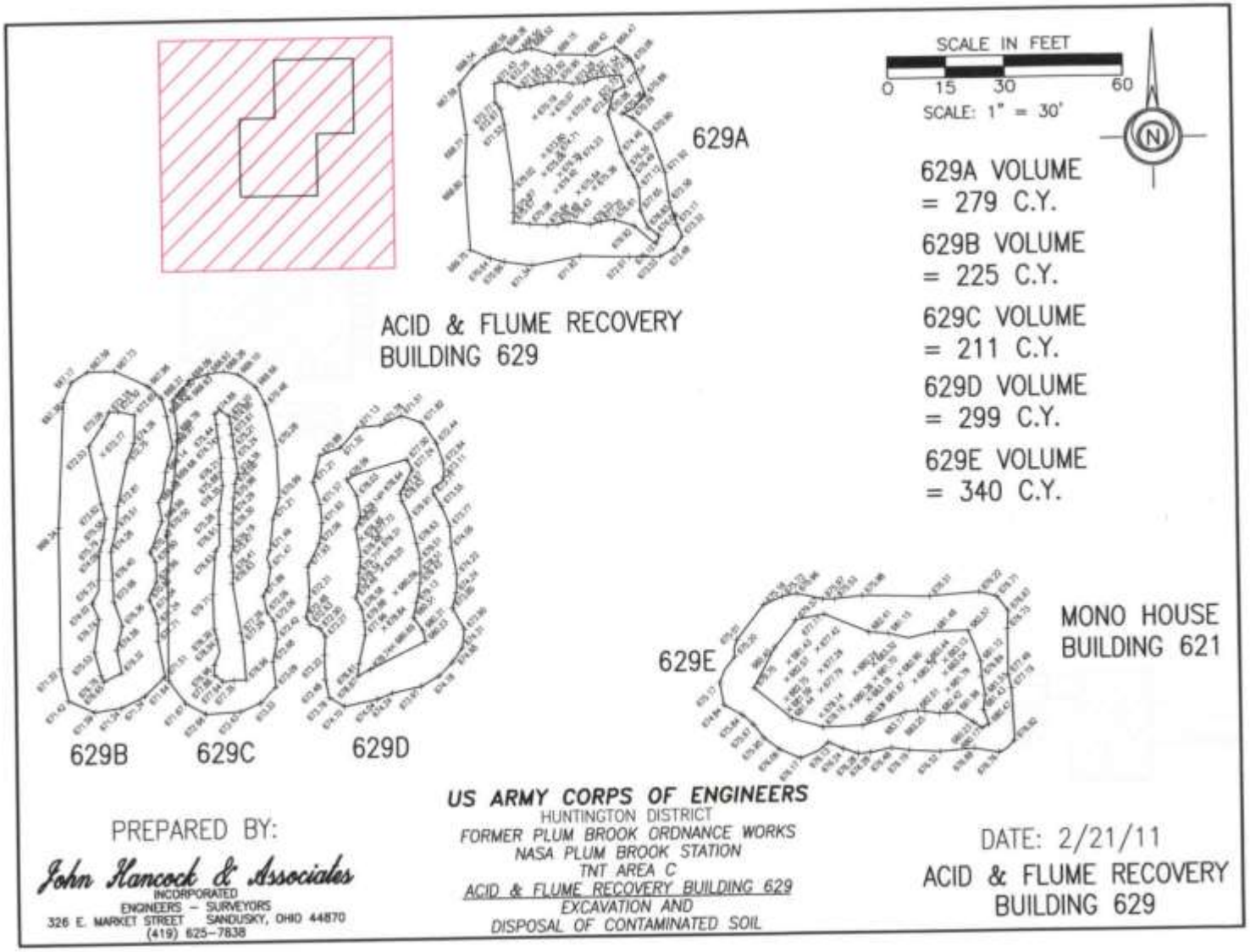


FIGURE 3-67. Building Area 629 Stockpile Diagram

TABLE 3-36. Building Area 629 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-629-C-001	0.247	0.247	0.247	0.247	0.247		0.0169	0.0169		0.167	0.167	0.167	0.167	0.167		6.49
0922-629-C-002	0.25	0.25	0.25	0.25	0.25		0.0167	0.0167		0.176	0.176	0.176	0.176	0.176		3.41
0922-629-C-003	0.247	0.247	0.247	0.247	0.247		0.0151	0.0151		0.163	0.163	0.163	0.163	0.163		5.69
0922-629-C-004	0.242	0.242	0.242	0.242	0.242		0.0162	0.0162		0.186	0.186	0.186	0.186	0.186		9.07
0922-629-C-005	0.25	0.25	0.315	0.25	0.25		0.0165	0.0544		0.902	0.902	0.902	0.902	0.902		74.9
0922-629-C-006	0.916	0.519	7.65	0.249	0.249		0.016	0.016		0.186	0.186	0.186	0.186	0.186		19.5
0922-629-C-007	0.248	0.248	0.675	0.248	0.248		0.0175	0.501		0.19	0.19	0.19	0.19	0.19		82.6
0922-629-C-008	0.248	0.248	0.308	0.248	0.248		0.0169	0.976		0.173	0.173	0.173	0.173	0.173		67.4
0922-629-C-009	0.484	0.484	10.2	4.29	0.484		0.0162	0.136		0.806	0.806	0.806	0.806	0.806		44
0922-629-C-010	0.442	0.249	0.263	0.249	0.249		0.0182	0.0917		0.924	0.924	0.924	0.924	0.924		65.2
0922-629-C-011	0.488	0.488	13.9	5.68	0.488		0.0158	0.0599		0.899	0.899	0.899	0.899	0.899		19.5
0922-629-C-012	0.241	0.241	1.01	0.33	0.241		0.0173	0.0291		0.185	0.185	0.185	0.185	0.185		7.16
Minimum Detection (mg/kg)	0.442	0.519	0.26	0.33	ND		ND	0.0291		ND	ND	ND	ND	ND		7.16
Mean (mg/kg)	0.24	0.18	2.90	0.95	ND		ND	0.16		ND	ND	ND	ND	ND		34
Maximum Detection (mg/kg)	0.916	0.519	13.9	5.68	ND		ND	0.976		ND	ND	ND	ND	ND		82.6
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.06	0.04	0.02	0.01	ND		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	4E-06	1E-06	ND		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.1					Sum mean	0.2		mean	ND					lead mean	34
Nitroaromatic ILCR	5.E-06					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-37. Building Area 629 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-629-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.160	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.58	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

TABLE 3-37. Building Area 629 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-629-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.199	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.736	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

TABLE 3-37. Building Area 629 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-629-D-003	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	ND	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	1.94	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

TABLE 3-37. Building Area 629 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-629-D-004	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.174	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	0.98	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

TABLE 3-37. Building Area 629 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-629-D-005	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.103	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	1.14	Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Hazardous**
			Stockpile Recommended For:	**Treatment**

ND -Not detected above LOQ.

FIGURE 3-68. Soil Co-contaminated with Nitroaromatics and Lead was Excavated First

FIGURE 3-69. Respiratory Protection was Required at Building 629

3.4.14. Building 686 – Wash House, Process Line 8

3.4.14.1. *TNT C RA-C*

Based on the RI, excavation in this AOC consisted of excavating approximately 1,226 cy of material from within the surveyed boundaries. The dimensions of the excavation were irregular with a depth of 4 ft. The primary contaminants were nitroaromatics. There was an area within the perimeter of the excavation, approximately 30 × 30 × 4 ft that was co-contaminated with lead and PCBs. This co-contaminated soil was segregated from the nitroaromatics-only soil. Groundwater was noted at 3-3.5 ft and bedrock was encountered at 12 ft.

Clearing in this AOC was initiated on November 10, 2010 with clearing the area, erecting silt fence and putting down plastic for the stockpiles. Excavation was initiated on November 16, 2010. The stockpiles for this AOC were placed across the access road to the north of the excavation. As with previous excavations, there were quantities of debris uncovered and excavated and set aside.

A groundwater monitoring well, TNTC-MW6, was located within the perimeter of this AOC. The well was constructed by Dames and Moore in 1994 as part of a site-wide groundwater investigation which is detailed in the document *Sitewide Groundwater Investigation Final Report* (D&M, 1997b). The well was a shallow well (12.2 ft deep) and was not used to evaluate the deeper groundwater. After discussions with USACE and the RI contractor, the decision was made to abandon the well. The casing of the well was exposed and cut off approximately one foot above the bottom of the excavation and Benseal®, a bentonite material was carefully placed inside the casing until the casing was full. Photos of the well abandonment are included in Appendix B. The Ohio Department of Natural Resources well abandonment form and the documentation of the decision to close the well is included in Appendix C.1.5.

Twenty-two confirmation samples were collected from along all walls of the excavation and five confirmation samples were collected from the areas of the floor (Figure 3-70). There were five stockpiles generated from this excavation, one of which was segregated due to noted lead concentrations (Figure 3-71). The confirmation samples and the stockpile characterization samples were submitted to Microbac Laboratories.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Building 686 had a nitroaromatic HI >1 and an ILCR <1E-5. The sum mean for the PCBs was <1 mg/kg and the mean of the lead was <400 mg/kg. The sum mean of the PAHs was >1mg/kg (Table 3-38). This AOC required additional excavation and was not closed out.

The stockpile characterization parameter was TCLP (Table 3-39). Based on the laboratory data, the stockpiles for this AOC were non-hazardous and subsequently approved for disposal at the landfill.

The laboratory data for Building 686 is included in electronic format in Appendix C.2.

3.4.14.2. *Follow-on*

Test pitting was initiated on December 7, 2011 as part of the Follow-on. There were four areas around the perimeter of the previous excavation that had elevated nitroaromatics. The four areas

were subsequently labeled A through D, clockwise from the north. In addition, areas A, B, and C had elevated concentrations of PAHs. Area A test pit samples were collected at 4 ft depth, including five wall and three floor samples. Area B, also at 4 ft, had three wall samples and one floor sample collected. Area C on the southeast corner had only two wall samples and one floor sample at 4 ft. Area D, on the southwest corner, had 3 wall samples and one floor sample at 4 ft (Figure 3-72). Results indicated that Area A, Area C and Area D were ready for confirmation sampling, all of which were collected at 4 ft (Figure 3-73). Risk calculations indicated that one floor sample (1115-686-C-002) should be replaced so a replacement confirmation sample was collected at the same location at 6 ft.

Area B sample results indicated elevated PAHs for all four samples so two perimeters at 10 ft intervals were sampled resulting in nine wall samples and two floor samples, all at 4 ft. A floor sample (1115-686-TP34) and two wall samples were elevated for PAHs so the west wall of Area B was extended further west to merge with Area A, creating one more floor sample and one wall sample. The elevated floor sample required a deeper sample so the original floor sample (1115-686-TP14) and TP34 were both collected at 6 ft. The elevated wall sample (1115-686-TP27) was adjacent to the elevated floor sample so an area was extended to the east with three more floor samples and one more floor sample, all collected at 6 ft. Results indicated clean samples in the eastern section at 6 ft depth, but the original floor sample at 6 ft (1115-686-TP31) and the northwest corner wall sample (1115-686-TP33) were elevated.

An additional floor sample was collected at 6 ft, just north of TP31, and an additional perimeter around TP33 including one floor and three additional wall samples were collected at 4 ft. Results indicated that the contamination at 6 ft did not extend north so a deeper sample to 8 ft was collected at TP31. Also, the east wall of the northern samples was elevated (1115-686-TP40) so an additional floor and three wall samples was collected at 4 ft (Figure 3-74). Results from Round 5 of test pitting indicated that confirmation samples could be collected, at depths ranging from 4 to 8 ft (Figure 3-75). Risk calculation indicated the risk was below the risk criteria and the area was ready to be excavated.

The confirmation samples and risk calculations indicated the AOC had a nitroaromatic HI <1 mg/kg and an ILCR <1E-5. The sum means for PCBs and PAHs were <1 mg.kg and the lead mean was <400 mg/kg (Table 3-40). The laboratory data for Building 686 is presented in Appendix C.2.

Following the verification that the soil in the excavation's walls and floor was no longer a risk to human health or the environment, the expanded areas were surveyed, a new diagram drawn for the AOC (Figure 3-76), and the coordinates documented on a spreadsheet. The coordinates for the expanded areas are presented in Appendix B.1. Once the coordinates were staked and surveyed, excavation began. The soil excavated from the expanded areas was transported directly to the remediation pad and configured into windrows. The soil was not segregated by AOC, but combined in the windrow for subsequent AH remediation. Following excavation and transport of the contaminated soil to the remediation pad for treatment, the AOC was backfilled with clean soil.

Figure 3-77 shows a couple of test pits or confirmation pits at Building 686. Figure 3-78 shows the excavation following the initial effort, but before test pitting. Notice all of the debris encountered.

Remedial Investigation Notes:

- Scoped volume 1,226 cy at a depth of 4'
- Dimensions are irregular with internal excavation area within total area
- Smaller excavation area dimensions are 30' x 30' x 4'
- Primary contaminant is nitroaromatics (1,092 cy)
- Internal excavation area contaminant is lead and low-level PCBs
- Groundwater was noted at 3.0'-3.5'
- Bedrock was encountered at 12'

RA-C Notes:

Surveyed stockpile volume 1,284 cy

Sample Locations:

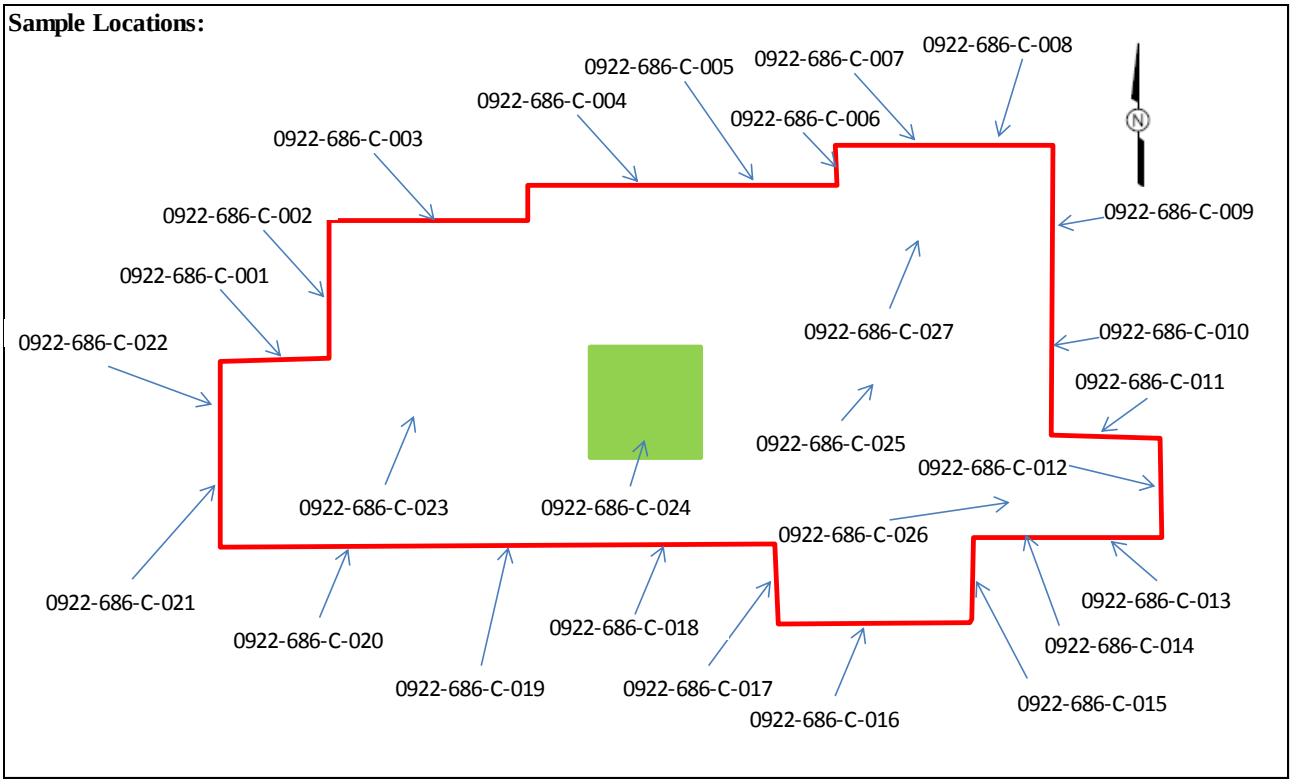


FIGURE 3-70. Building Area 686 Wash House – Process Line 8 Confirmation Diagram

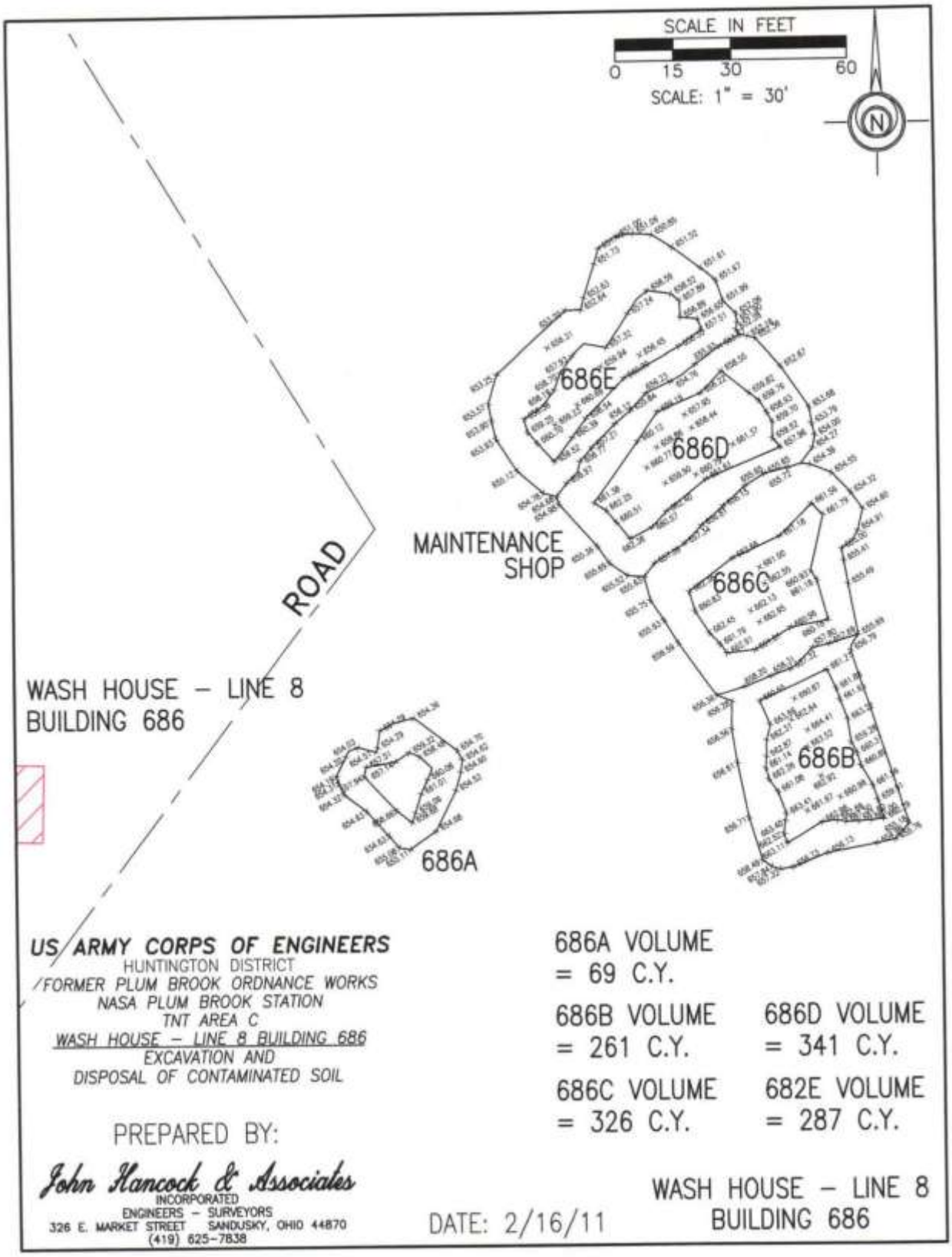


FIGURE 3-71. Building Area 686 Stockpile Diagram

TABLE 3-38. Building Area 686 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-686-C-001	0.344	0.25	0.25	0.25	0.25		0.017	0.017		0.175	0.175	0.175	0.175	0.175		3.02
0922-686-C-002	1.35	1.97	0.25	0.25	27.8		0.017	0.124		0.26	0.315	0.256	0.162	0.178		200
0922-686-C-003	1.48	1.9	0.245	0.245	59.8		0.017	0.046		0.746	0.693	0.529	0.353	0.377		68.5
0922-686-C-004	1.39	2.44	0.249	0.249	51.9		0.018	0.035		0.982	1.02	1.11	0.382	0.564		27.7
0922-686-C-005	1.08	1.77	0.247	0.247	138		0.016	0.016		2.29	2.4	2.69	0.951	1.29		8.55
0922-686-C-006	0.397	0.154	0.25	0.25	28.3		0.017	0.017		0.169	0.169	0.169	0.169	0.169		6.03
0922-686-C-007	1.09	1.81	0.249	0.249	60.9		0.016	0.035		9.97	8.81	7.58	1.77	4.38		15.9
0922-686-C-008	0.244	0.244	0.244	0.244	0.244		0.019	0.019		0.66	0.78	0.681	0.166	0.432		4.57
0922-686-C-009	1.83	3.58	0.25	0.25	65.7		0.016	0.029		6.34	5.58	5.64	1.62	2.89		15.5
0922-686-C-010	0.249	0.249	0.249	0.249	0.486		0.016	0.016		0.166	0.166	0.166	0.166	0.166		2.57
0922-686-C-011	2.92	1.14	0.435	0.25	8.74		0.016	0.023		0.962	1.11	0.813	0.185	0.055		7.77
0922-686-C-012	4.67	1.79	0.244	0.244	27.5		0.017	0.166		0.176	0.176	0.176	0.176	0.176		9.54
0922-686-C-013	3.97	5.77	0.785	0.246	396		0.016	0.016		0.18	0.18	0.18	0.18	0.18		30.0
0922-686-C-014	5.08	1.97	0.25	0.25	371		0.02	0.02		0.171	0.171	0.256	0.171	0.171		13.9
0922-686-C-015	0.247	0.247	0.247	0.247	0.119		0.018	0.018		0.171	0.171	0.171	0.171	0.171		2.14
0922-686-C-016	0.246	0.246	0.246	0.246	0.246		0.019	0.019		0.186	0.186	0.186	0.186	0.186		2.33
0922-686-C-017	0.243	0.243	0.243	0.243	0.243		0.019	0.019		0.181	0.181	0.181	0.181	0.181		7.21
0922-686-C-018	0.25	0.25	0.25	0.25	1.55		0.018	0.018		0.181	0.181	0.25	0.181	0.181		18
0922-686-C-019	0.245	0.245	0.245	0.245	0.561		0.018	0.018		0.177	0.177	0.177	0.177	0.177		3.27
0922-686-C-020	0.247	0.247	0.247	0.247	210		0.017	0.017		0.667	0.912	1.39	0.202	0.54		2.82
0922-686-C-021	0.248	0.248	0.248	0.248	0.248		0.019	0.019		0.167	0.167	0.167	0.167	0.167		3.18
0922-686-C-022	0.248	0.248	0.248	0.248	0.248		0.017	0.017		0.182	0.182	0.182	0.182	0.182		2.44
0922-686-C-023	0.245	0.245	0.245	0.245	0.245		0.018	0.018		0.158	0.158	0.158	0.158	0.158		3.27
0922-686-C-024	0.245	0.245	0.245	0.245	0.245		0.017	0.017		0.162	0.162	0.162	0.162	0.162		2.03
0922-686-C-025	0.25	0.25	0.25	0.25	0.899		0.018	0.018		0.178	0.178	0.178	0.178	0.178		1.71
0922-686-C-026	0.247	1.98	0.247	0.247	0.247		0.016	0.016		0.194	0.194	0.261	0.194	0.194		3.35
0922-686-C-027	3.94	1.93	0.25	0.25	17.5		0.018	0.018		0.278	0.285	0.402	0.175	0.175		1.83

Minimum Detection (mg/kg)	0.344	0.154	0.44	ND	0.119		ND	0.023		0.26	0.285	0.256	0.202	0.178		2.57
Mean (mg/kg)	1.2	1.1	0.2	ND	54.4		ND	0.023		0.913	0.866	0.855	0.169	0.455		17
Maximum Detection (mg/kg)	5.08	5.77	0.785	ND	396		ND	0.166		9.97	8.81	7.58	0.202	4.38		30
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.27	0.26	0.001	ND	1.359		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	2E-07	ND	4E-06		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	2				Sum mean		0.02	Sum mean		3				lead mean		17
Nitroaromatic ILCR	4.E-06				less than RG?		Yes	less than RG?		No				less than RG?		Yes
					total 1 mg/kg			total 1 mg/kg						total 400 mg/kg		

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-39. Building Area 686 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.299	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-39. Building Area 686 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.287	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-39. Building Area 686 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-003	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.359	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	1.51	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-39. Building Area 686 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-004	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.294	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-39. Building Area 686 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-686-D-005	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.144	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TNTC Excavation Notes:

- Excavate approximately 1,226 cy of material
- Dimensions are irregular with internal excavation area within total area
- Smaller excavation area dimensions are 30' x 30' x 4'
- Primary contaminants – nitroaromatics (1,092 cy)
- Internal excavation area contaminant is lead and low-level PCBs
- Groundwater was noted at 3.0'-3.5'
- Bedrock encountered at 12'

Follow-on Test Pit Notes:

- Excavate approximately 186 cy of material, 4 areas
- Dimensions are 20' x 80' x 4', 20' x 20' x 4', 40' x 15' x 4' and 25' x 10' x 4'
- TP12 moved closer to previous wall due to blacktop pavement
- All samples collected at 4 feet

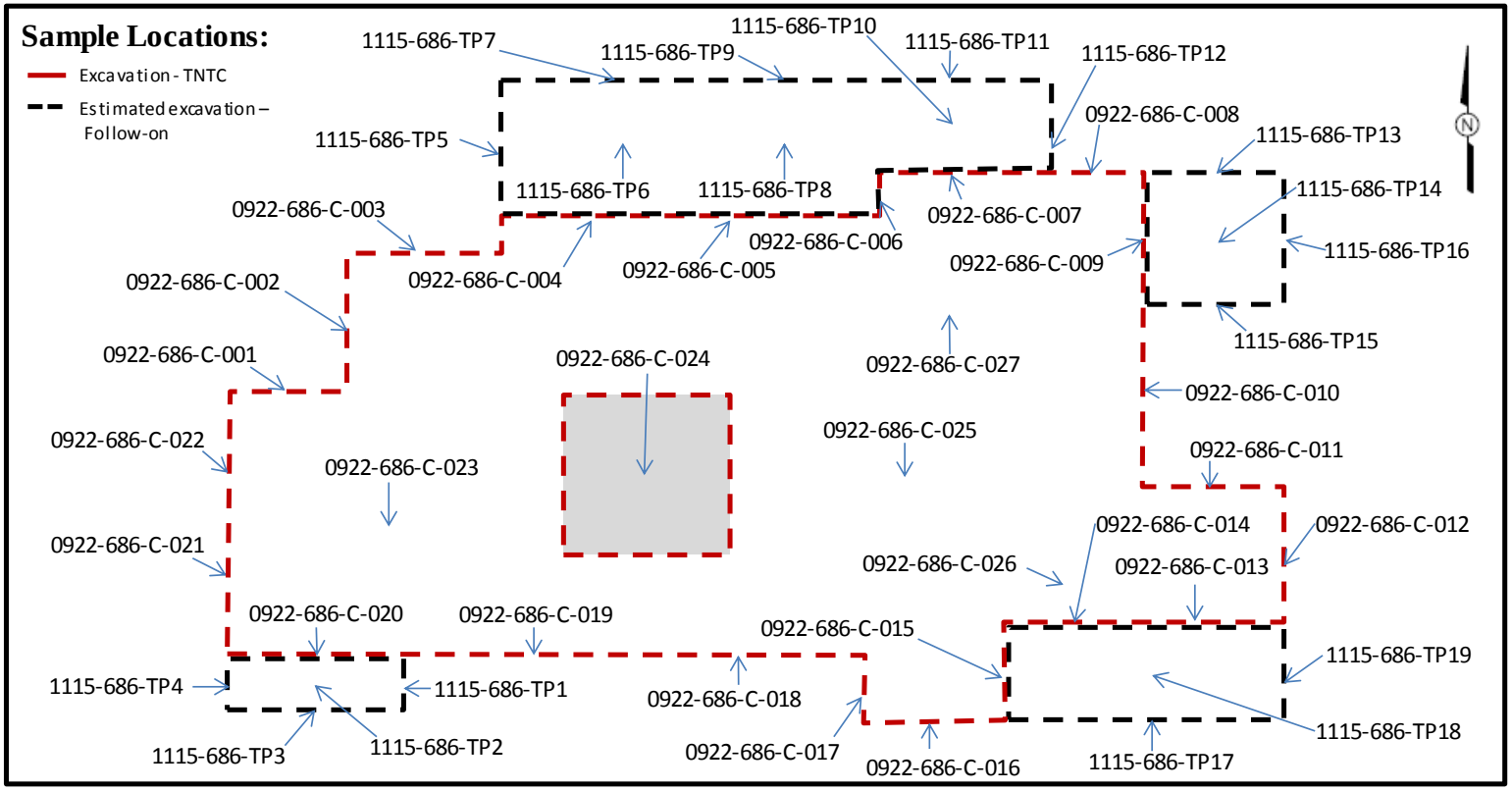


FIGURE 3-72. Building Area 686 Follow-on Test Pitting Diagram Area A, Area C, and Area D

TNTC Excavation Notes:

- Scoped volume 1,226 cy of material
- Dimensions are irregular with internal excavation area within total area
- Smaller excavation area dimensions are 30' x 30' x 4'
- Primary contaminants – nitroaromatics (1,092 cy)
- Internal excavation area contaminant is lead and low-level PCBs
- Groundwater was noted at 3.0'-3.5'
- Bedrock encountered at 12'

Follow-on Confirmation and Excavation Notes:

- Excavate approximately 1084 cy in 4 areas using surveyed dimensions and estimated depth
- Excavate 264 cy from Area A, 676 cy from Area B, 83 cy from Area C, and 61 cy from Area D
- Dimensions are 21' x 85' x 4', 70' x 72' x 6' irregular, 40' x 14' x 4', 25' x 11' x 6'
- Area B detail on next image
- Sample results for the greyed-out sample numbers will not be included in calculations
- Risk calculations complete, excavation complete 6/14/12
- The volume excavated was transported directly to the remediation pad. The soil was surveyed to determine the total volume of 2,657 cy

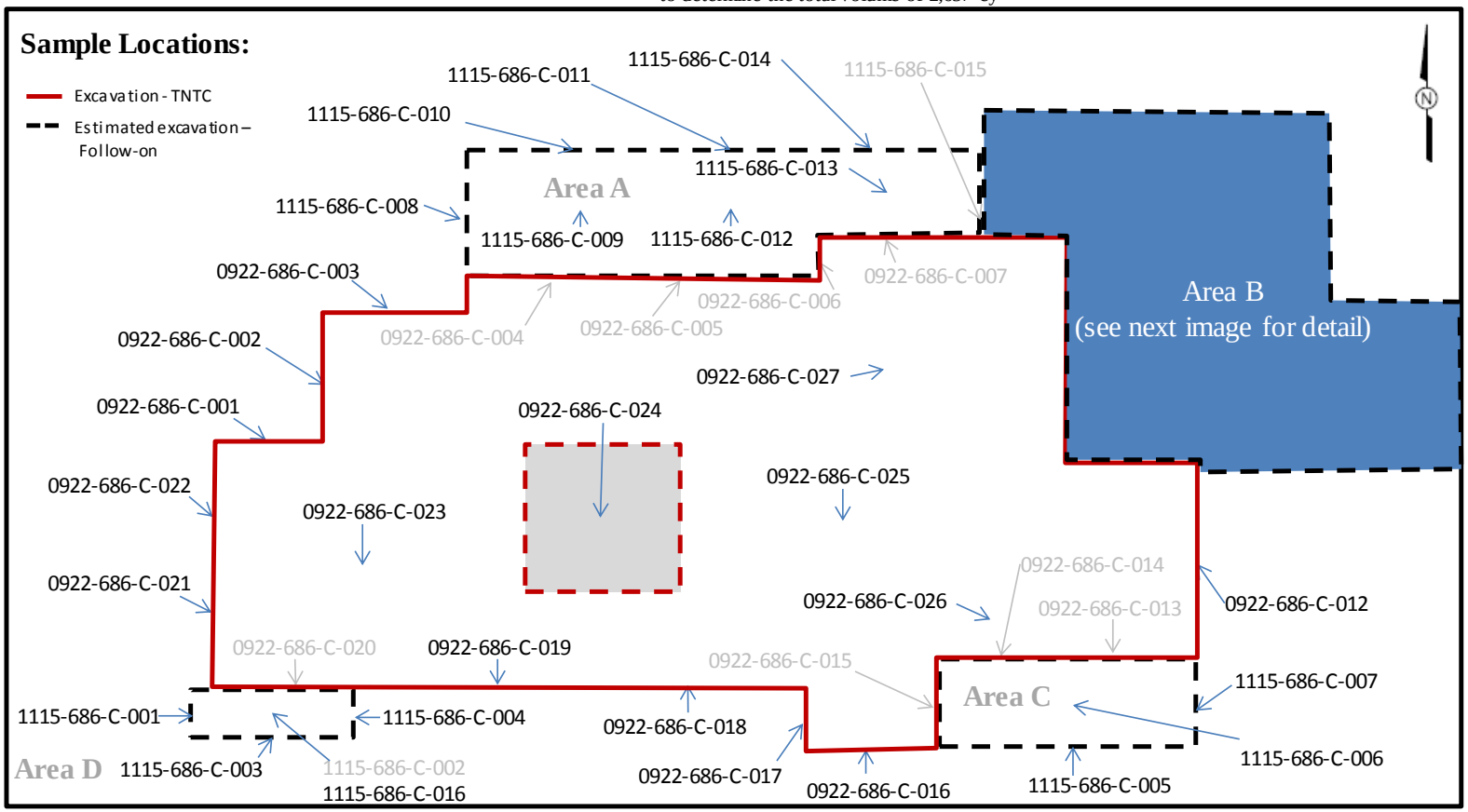


FIGURE 3-73. Building Area 686 Follow-on Confirmation Diagram Area A, Area C, and Area D

TNTC Excavation Notes:

- See previous image for full details

Follow-on Test Pit Notes:

- Area 686B excavate approximately 785 cy of material
- Dimensions are approximately 30x60x6, 50x40x4, 20x30x4
- Primary contaminant for this area - SVOCs
- TP31, TP34-TP39 at 6 feet
- TP44 collected at 8 feet, solid clay
- All other TP samples collected at 4 feet
- See previous image for additional details on 686
- Greyed out sample numbers will not be included in the calculations

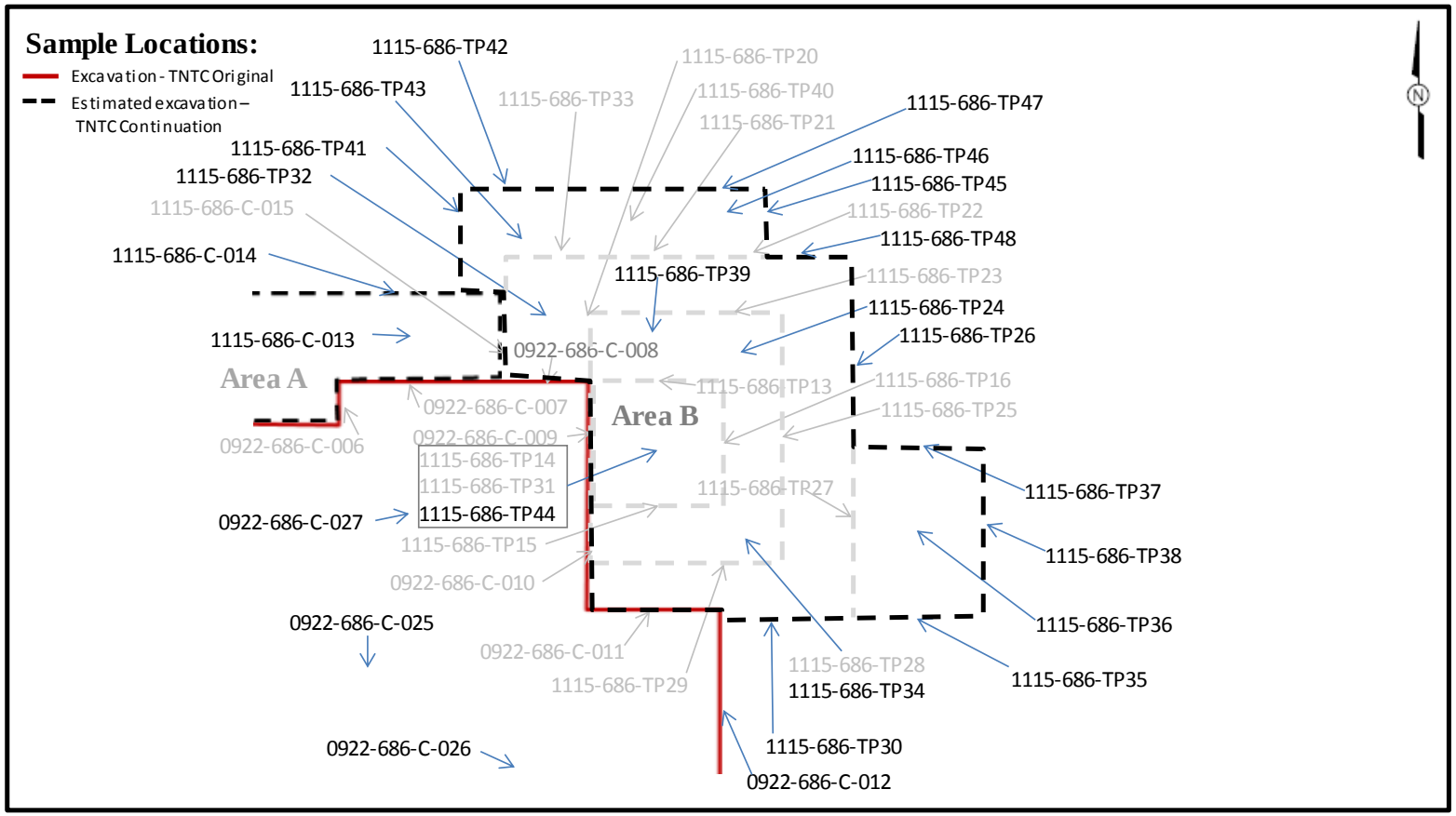


FIGURE 3-74. Building Area 686 Follow-on Test Pitting Diagram Area B

TNTC Excavation Notes:

- See previous image for full details

Follow-on Confirmation and Excavation Notes:

- Area 686B excavate approximately 676 cy using surveyed dimensions and estimated depth
- Dimensions are approximately 72' x 51' with varying depths (4-8') and irregular margins
- Primary contaminant for this area - SVOCs
- See previous image for additional details on 686
- Sample results for the greyed-out sample numbers will not be included in calculations

- I = 4' depth
- II = 10' x 20' x 6' depth
- III = 20' x 20' x 8' depth
- IV = 25' x 20' x 6' depth
- V = 20' x 20' x 6' depth

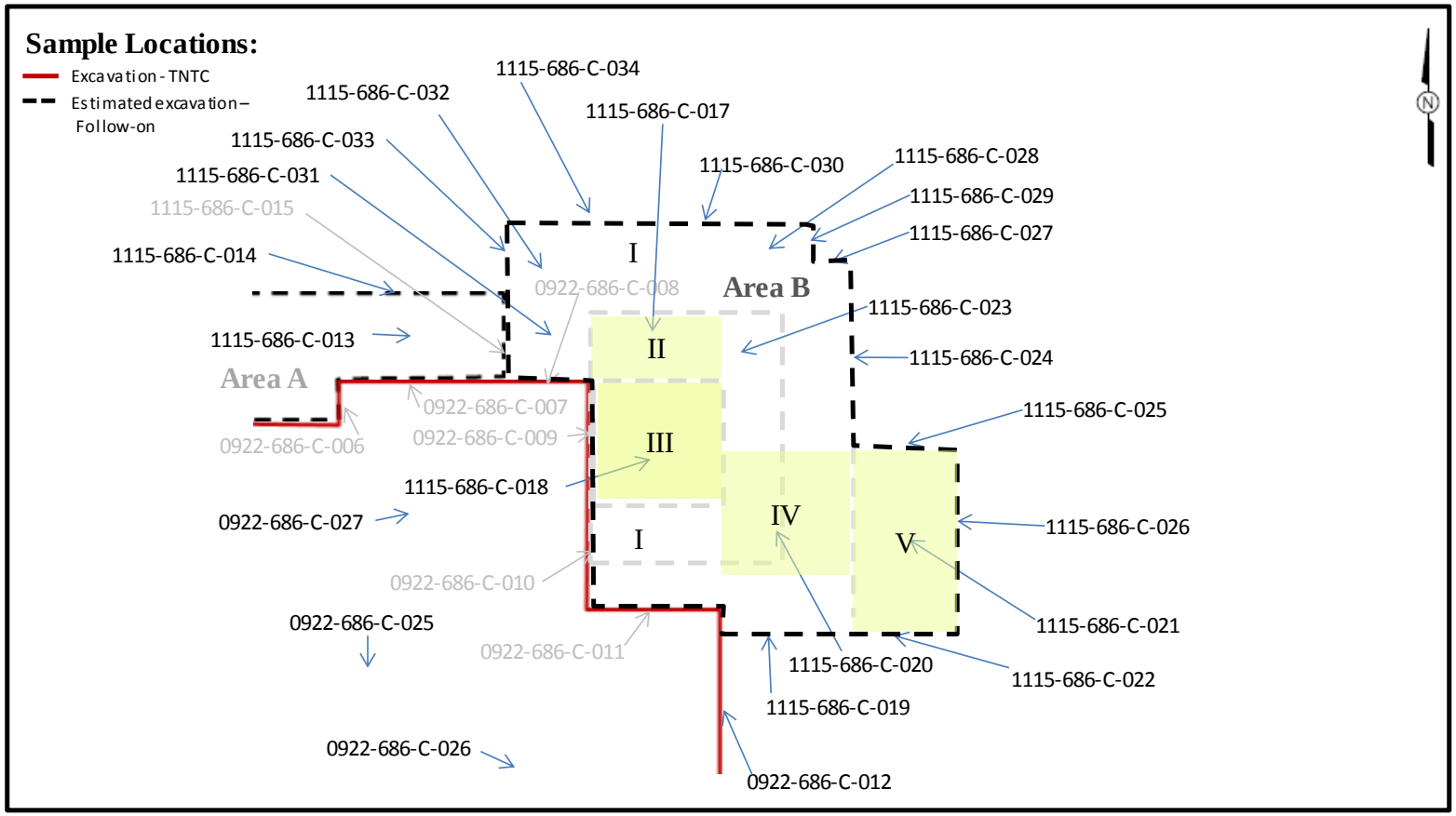


FIGURE 3-75. Building Area 686 Follow-on Confirmation Diagram Area B

TABLE 3-40. Building Area 686 Follow-on Risk Calculations

Sample	COC Analytical Results (mg/kg)																pH
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead	
0922-686-C-001	0.344	0.250	0.250	0.250	0.250		0.0168	0.0168		0.175	0.175	0.175	0.175	0.175		3.02	NR
0922-686-C-002	1.35	1.97	0.250	0.250	27.8		0.0165	0.124		0.260	0.315	0.256	0.162	0.178		200	NR
0922-686-C-003	1.48	1.9	0.245	0.245	59.8		0.0168	0.0463		0.746	0.693	0.529	0.353	0.377		68.5	NR
0922-686-C-004	1.4	2.4	0.25	0.25	52		0.0181	0.0347		0.98	1.0	1.1	0.38	0.56		28	NR
0922-686-C-005	1.1	1.8	0.25	0.25	140		0.0164	0.0164		2.3	2.4	2.7	0.95	1.3		8.6	NR
0922-686-C-006	0.4	0.15	0.25	0.25	28		0.0174	0.0174		0.17	0.17	0.17	0.17	0.17		6.0	NR
0922-686-C-007	1.1	1.8	0.25	0.25	61		0.0161	0.0350		10.0	8.8	7.6	1.8	4.4		16	NR
0922-686-C-008	0.24	0.24	0.24	0.24	0.24		0.0185	0.0185		0.66	0.78	0.68	0.17	0.43		4.6	NR
0922-686-C-009	1.8	3.6	0.25	0.25	66		0.0164	0.0285		6.3	5.6	5.6	1.6	2.9		16	NR
0922-686-C-010	0.25	0.25	0.25	0.25	0.49		0.0162	0.0162		0.17	0.17	0.17	0.17	0.17		2.6	NR
0922-686-C-011	2.9	1.1	0.44	0.25	8.7		0.0164	0.0226		0.96	1.10	0.81	0.19	0.55		7.8	NR
0922-686-C-012	4.67	1.79	0.244	0.244	27.5		0.0165	0.166		0.176	0.176	0.176	0.176	0.176		9.54	NR
0922-686-C-013	4.0	5.8	0.79	0.25	400		0.0155	0.016		0.18	0.18	0.18	0.18	0.18		30	NR
0922-686-C-014	5.1	2.0	0.25	0.25	370		0.0195	0.020		0.17	0.17	0.26	0.17	0.17		14	NR
0922-686-C-015	0.25	0.25	0.25	0.25	0.12		0.0178	0.018		0.17	0.17	0.17	0.17	0.17		2.1	NR
0922-686-C-016	0.246	0.246	0.246	0.246	0.246		0.0186	0.0186		0.186	0.186	0.186	0.186	0.186		2.33	NR
0922-686-C-017	0.243	0.243	0.243	0.243	0.243		0.0188	0.0188		0.181	0.181	0.181	0.181	0.181		7.21	NR
0922-686-C-018	0.250	0.250	0.250	0.250	1.55		0.0179	0.0179		0.181	0.181	0.250	0.181	0.181		18	NR
0922-686-C-019	0.245	0.245	0.245	0.245	0.561		0.0181	0.0181		0.177	0.177	0.177	0.177	0.177		3.27	NR
0922-686-C-020	0.25	0.25	0.25	0.25	210		0.0174	0.0174		0.67	0.91	1.4	0.20	0.54		2.8	NR
0922-686-C-021	0.248	0.248	0.248	0.248	0.248		0.0190	0.0190		0.167	0.167	0.167	0.167	0.167		3.18	NR
0922-686-C-022	0.248	0.248	0.248	0.248	0.248		0.0169	0.0169		0.182	0.182	0.182	0.182	0.182		2.44	NR
0922-686-C-023	0.245	0.245	0.245	0.245	0.245		0.0183	0.0183		0.158	0.158	0.158	0.158	0.158		3.27	NR
0922-686-C-024	0.245	0.245	0.245	0.245	0.245		0.0169	0.0169		0.162	0.162	0.162	0.162	0.162		2.03	NR
0922-686-C-025	0.250	0.250	0.250	0.250	0.899		0.0180	0.0180		0.178	0.178	0.178	0.178	0.178		1.71	NR
0922-686-C-026	0.247	1.98	0.247	0.247	0.247		0.0158	0.0158		0.194	0.194	0.261	0.194	0.194		3.35	NR
0922-686-C-027	3.94	1.93	0.25	0.25	17.5		0.0179	0.0179		0.278	0.285	0.402	0.175	0.175		1.83	NR
1115-686-C-001	0.248	0.248	0.248	0.248	0.248		0.0189	0.0189		0.629	0.438	0.661	0.125	0.242		3.98	NR
1115-686-C-002	0.248	0.248	0.248	0.248	0.248		0.0227	0.0227		0.166	0.166	0.166	0.166	0.166		28.6	NR
1115-686-C-003	0.250	0.250	0.250	0.250	0.250		0.0229	0.0229		0.133	0.133	0.226	0.133	0.133		4.10	NR
1115-686-C-004	0.247	0.247	0.247	0.247	0.247		0.0221	0.0221		0.141	0.141	0.252	0.141	0.141		2.41	NR
1115-686-C-005	1.56	0.441	1.39	0.247	0.247		0.0223	0.0223		0.164	0.164	0.164	0.164	0.164		2.52	NR
1115-686-C-006	2.27	0.527	1.42	0.250	0.250		0.0217	0.0217		0.147	0.147	0.216	0.147	0.147		3.11	NR
1115-686-C-007	0.245	0.245	0.245	0.245	0.245		0.0199	0.0199		0.157	0.157	0.157	0.157	0.157		2.84	NR
1115-686-C-008	0.252	0.252	0.252	0.252	0.252		0.0207	0.0207		0.243	0.249	0.383	0.137	0.159		3.90	NR
1115-686-C-009	0.246	0.246	0.246	0.246	0.345		0.0197	0.0197		0.705	0.694	0.594	0.130	0.357		25.3	NR
1115-686-C-010	0.251	0.251	0.251	0.251	0.251		0.0199	0.0199		0.180	0.164	0.284	0.129	0.129		4.28	NR
1115-686-C-011	0.246	0.246	0.246	0.246	0.246		0.0202	0.0202		0.135	0.135	0.219	0.135	0.135		5.24	NR
1115-686-C-012	0.246	0.246	0.246	0.246	0.246		0.0216	0.0216		0.170	0.183	0.302	0.144	0.144		6.05	NR
1115-686-C-013	0.392	0.517	0.247	0.247	6.37		0.0206	0.0206		0.137	0.137	0.137	0.137	0.137		2.94	NR
1115-686-C-014	0.245	0.245	0.245	0.245	0.245		0.0194	0.0194		0.131	0.131	0.131	0.131	0.131		3.88	NR
1115-686-C-015	0.247	0.247	0.247	0.247	0.247		0.0201	0.0201		1.32	1.33	1.24	0.216	0.578		3.99	NR
1115-686-C-016	0.250	0.250	0.250	0.436	0.116		0.0220	0.0220		0.139	0.139	0.177	0.139	0.139		2.95	NR
1115-686-C-017	0.249	0.249	0.249	0.249	0.249		0.0193	0.0193		1.34	1.41	1.21	0.300	0.804		4.13	5.38
1115-686-C-018	0.249	0.249	0.249	0.249	0.249		0.0190	0.0190		0.207	0.207	0.207	0.207	0.207		11.6	9.16
1115-686-C-019	0.249	0.249	0.249	0.249	0.249		0.0215	0.0215		0.219	0.219	0.219	0.219	0.219		1.77	8.66
1115-686-C-020	0.246	0.246	0.246	0.246	0.246		0.0213	0.0213		0.234	0.234	0.234	0.234	0.234		2.56	8.93
1115-686-C-021	0.249	0.249	0.249	0.249	0.249		0.0201	0.0201		0.201	0.201	0.201	0.201	0.201		6.04	8.97
1115-686-C-022	0.244	0.244	0.244	0.244	0.244		0.0240	0.0240		0.202	0.202	0.202	0.202	0.202		2.07	8.98
1115-686-C-023	0.249	0.249	0.249	0.249	0.249		0.0247	0.0247		0.232	0.232	0.232	0.232	0.232		2.65	7.18
1115-686-C-024	0.250	0.250	0.250	0.250	0.250		0.0205	0.0205		0.217	0.217	0.217	0.217	0.217		2.13	7.23
1115-686-C-025	0.249	0.249	0.249	0.249	0.249		0.0199	0.0199		0.199	0.199	0.199	0.199	0.199		2.02	8.65
1115-686-C-026	0.247	0.247	0.247	0.247	0.247		0.0195	0.0195		0.217	0.217	0.217	0.217	0.217		6.28	8.77
1115-686-C-027	0.248	0.248	0.248	0.248	0.248		0.0217	0.0217		0.208	0.208	0.208	0.208	0.208		3.40	7.64
1115-686-C-028	0.249	0.249	0.249	0.249	0.249		0.021	0.021		0.220	0.220	0.220	0.220	0.220		3.14	6.97
1115-686-C-029	0.250	0.250	0.250	0.250	0.250		0.0212	0.0212		0.204	0.204	0.204	0.204	0.204		4.75	8.21
1115-686-C-030	0.249	0.249	0.249	0.249	0.249		0.0209	0.0209		0.198	0.198	0.198	0.198	0.198		7.32	7.78
1115-686-C-031	0.243	0.243	0.243	0.243	0.243		0.0188	0.0188		0.180	0.180	0.180	0.180	0.180		6.00	6.81
1115-686-C-032	0.248	0.248	0.248	0.248	0.248		0.0192	0.0192		1.13	1.20	1.05	0.182	0.522		5.94	6.97
1115-686-C-033	0.247	0.247	0.247	0.247	0.247		0.0203	0.0203		0.203	0.203	0.203	0.203	0.203		4.9	6.80
1115-686-C-034	0.248	0.248	0.248	0.248	0.248		0.0200	0.0200		0.189	0.189	0.189	0.189	0.189		4.23	6.75
Minimum Detection (mg/kg)	0.34	0.44	1.4	0.44	0.12		ND	0.046		0.17	0.16	0.18	0.30	0.16		1.7	NA
Mean (mg/kg)	0.44	0.34	0.18	0.13	3.1		ND	0.016		0.19	0.19	0.21	0.094	0.13		11	NA
Maximum Detection (mg/kg)	4.7	2.0	1.4	0.44	60		ND	0.17		1.3	1.4	1.2	0.30	0.80		200	NA
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400	NA
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA	NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA	NA
Excavation COC HQ	0.1	0.08	0.001	0.001	0.1		NA	NA		NA	NA	NA	NA	NA		NA	NA
Excavation COC ILCR	NA	NA	3E-07	1E-07	2E-07		NA	NA		NA	NA	NA	NA	NA		NA	NA
Nitroaromatic HI	0.3				Sum mean		0.016	Sum mean		0.82				lead mean		11	
Nitroaromatic ILCR	6.E-07				less than RG?		Yes	less than RG?		Yes				less than RG?		Yes	
					total 1 mg/kg			total 1 mg/kg						total 400 mg/kg			

NA - Not Applicable
ND - Not detected above LOQ
NR - Analysis not requested
Risk calculations based on the mean detection.
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

- Sample results not included in risk calculations.
- Not detected above LOQ, 0.5x the LOQ used in calculation.
-Result exceeds RG

BUILDING 686			
Point #	Northing	Easting	Description
183	620443.2090	1912986.5270	686
185	620404.4190	1913080.6870	686
188	620371.3990	1913059.5470	686
189	620385.3990	1913059.5470	686
193	620404.0290	1913100.2070	686
194	620451.0290	1913044.1370	686
195	620441.9490	1913043.9370	686
196	620450.2190	1913081.6770	686
197	620384.1790	1913099.7170	686

3041	620464.5009	1912987.0047	686-C-MOD
3042	620462.6387	1913071.8488	686-C-MOD
3043	620474.4289	1913072.1076	686-C-MOD
3044	620473.3167	1913122.7800	686-C-MOD
3045	620468.3179	1913122.6703	686-C-MOD
3046	620468.2294	1913126.7020	686-C-MOD
3047	620432.7094	1913125.9224	686-C-MOD
3048	620432.3819	1913140.8415	686-C-MOD
3049	620400.8384	1913140.1491	686-C-MOD
3050	620401.7161	1913100.1588	686-C-MOD
3051	620371.3956	1913099.4085	686-C-MOD
3052	620381.8680	1912973.1579	686-C-MOD
3053	620370.4315	1912973.1579	686-C-MOD
3054	620370.4323	1912948.1579	686-C-MOD
3055	620381.8625	1912948.1583	686-C-MOD

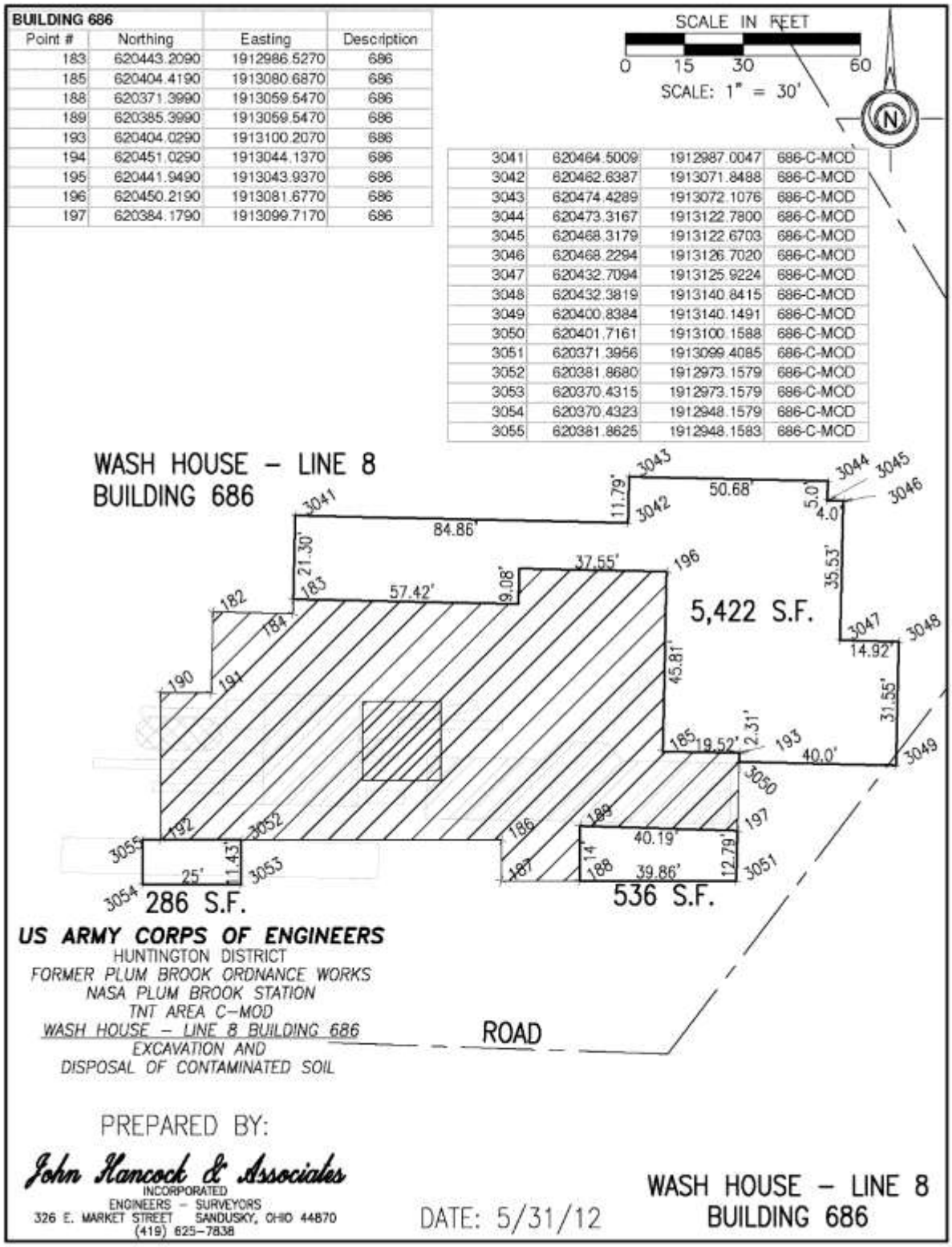


FIGURE 3-76. Diagram of AOC 686 Follow-on with Coordinates

FIGURE 3-77. Test-Pitting at Building 686

FIGURE 3-78. Building 686 After Initial Excavation but Prior to Test Pitting

3.4.15. Building 682 – Bi-Tri House, Process Line 8

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating two separate areas. Area I had an approximate soil volume of 540 cy with a depth of 4 ft was situated south of Area II. Area II was situated along the access road and had a total volume of 996 cy with depths of 4 ft and 8 ft. There was an area inside the perimeter boundaries of Area I with a volume of 57 cy that was co-contaminated with lead. The stockpile from the excavation of the co-contaminated soil was segregated from the nitroaromatics-contaminated soil. The primary contaminants were nitroaromatics and lead in Area I and nitroaromatics in Area II.

Excavation on Building 682 was initiated on October 14, 2010 with clearing the area and erecting silt fence and putting down plastic for the stockpiles. Prior to the initial excavation during preparation and clearing of the AOC, it was noticed that the coordinates for the lead-contaminated soil location were inadvertently omitted from the AOC coordinates. The surveyors contacted the RI contractor who provided the additional information. The surveyors staked the coordinates for the lead soil and excavation was commenced. There were eight stockpiles for this AOC which were located adjacent to the excavations. As with previous excavations, there was concrete debris from building foundations uncovered during the excavation, which was set aside.

In Area I, seventeen confirmation samples were collected along the walls and five samples from the floor. In Area II, 10 confirmation samples were collected along the walls and 4 samples from the floor (Figure 3-79). The stockpiles were sampled the same day (Figure 3-80). The confirmation samples and stockpile samples were submitted to Microbac Laboratories in Marietta, Ohio for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 682 Area I had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 mg/kg for both. The lead mean was <400 mg/kg (Table 3-41). Building 682 Area II had a nitroaromatic HI <1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 mg/kg for both. The lead mean was <400 mg/kg (Table 3-42). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP. There were eight stockpiles from this excavation (four for Area I [Table 3-43] and four for Area II [Table 3-44]) and all were non-hazardous and transported to the landfill for use as daily cover.

The laboratory data for Building 682 Area I, and Area II are included in electronic format in Appendix C.2.

Figure 3-81 shows the excavation at Building 682. Figure 3-82 shows the excavation when backfilling is almost complete.

Remedial Investigation Notes:

Area I – consists of two excavations, a smaller excavation within the larger excavation – total scoped volume is 540 cy

- Excavate approximately 483 cy at a depth of 4' – contaminated with nitroaromatics
- Excavate approximately 57 cy from within the larger excavation – contaminated with lead
- Segregate the lead contaminated soil from the nitroaromatic soil and treat accordingly (alkaline hydrolysis for nitroaromatics and stabilization for lead)
- Bedrock encountered at 8'

Area II – consists of excavation of drainage ditch and surrounding area to two different depths

- Total scoped volume 996 cy
- Drainage ditch – excavate approximately 141 cy at a depth of 5'
- Area surrounding ditch – excavate approximately 855 cy at a depth of 8'

RA-C Notes:

Surveyed stockpile volume for lead 44 cy

Surveyed stockpile volume for nitroaromatics 1,723 cy

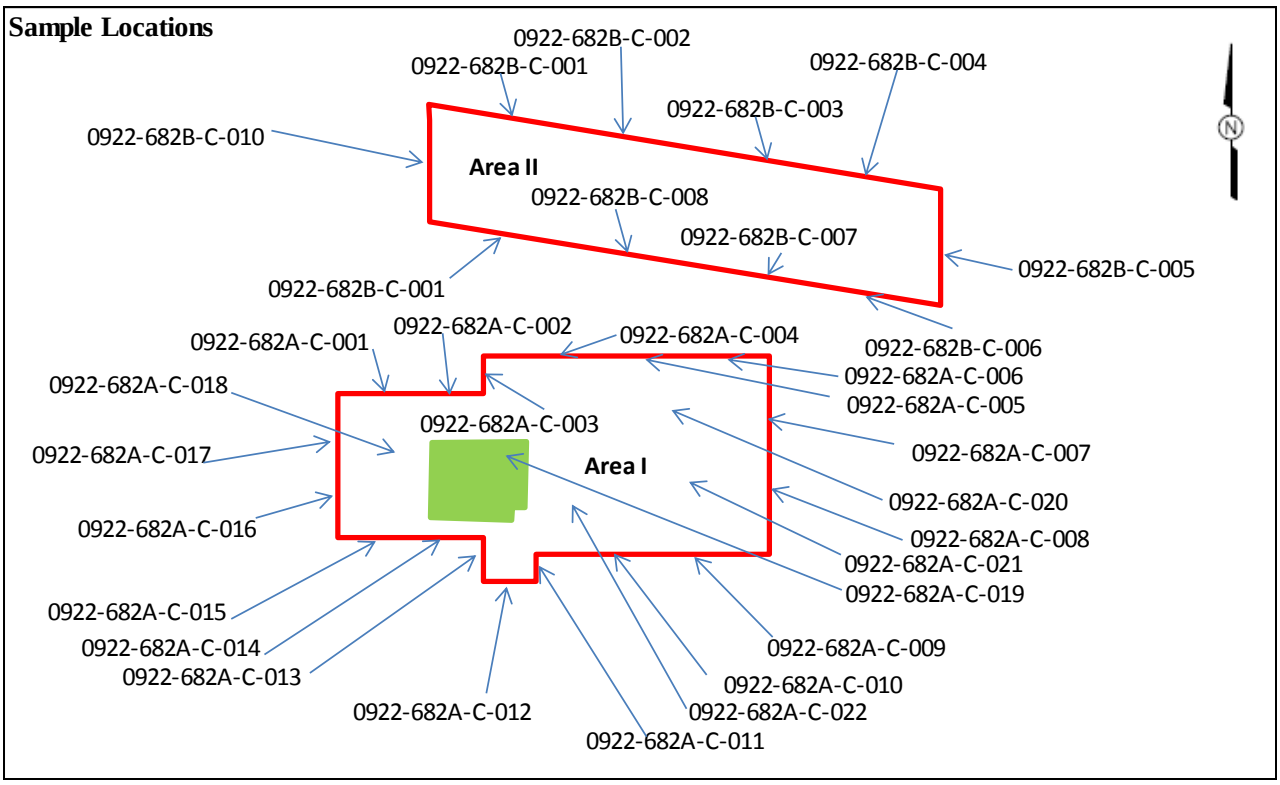


FIGURE 3-79. Building Area 682 Bi-Tri House – Process Line 8 Confirmation Diagram

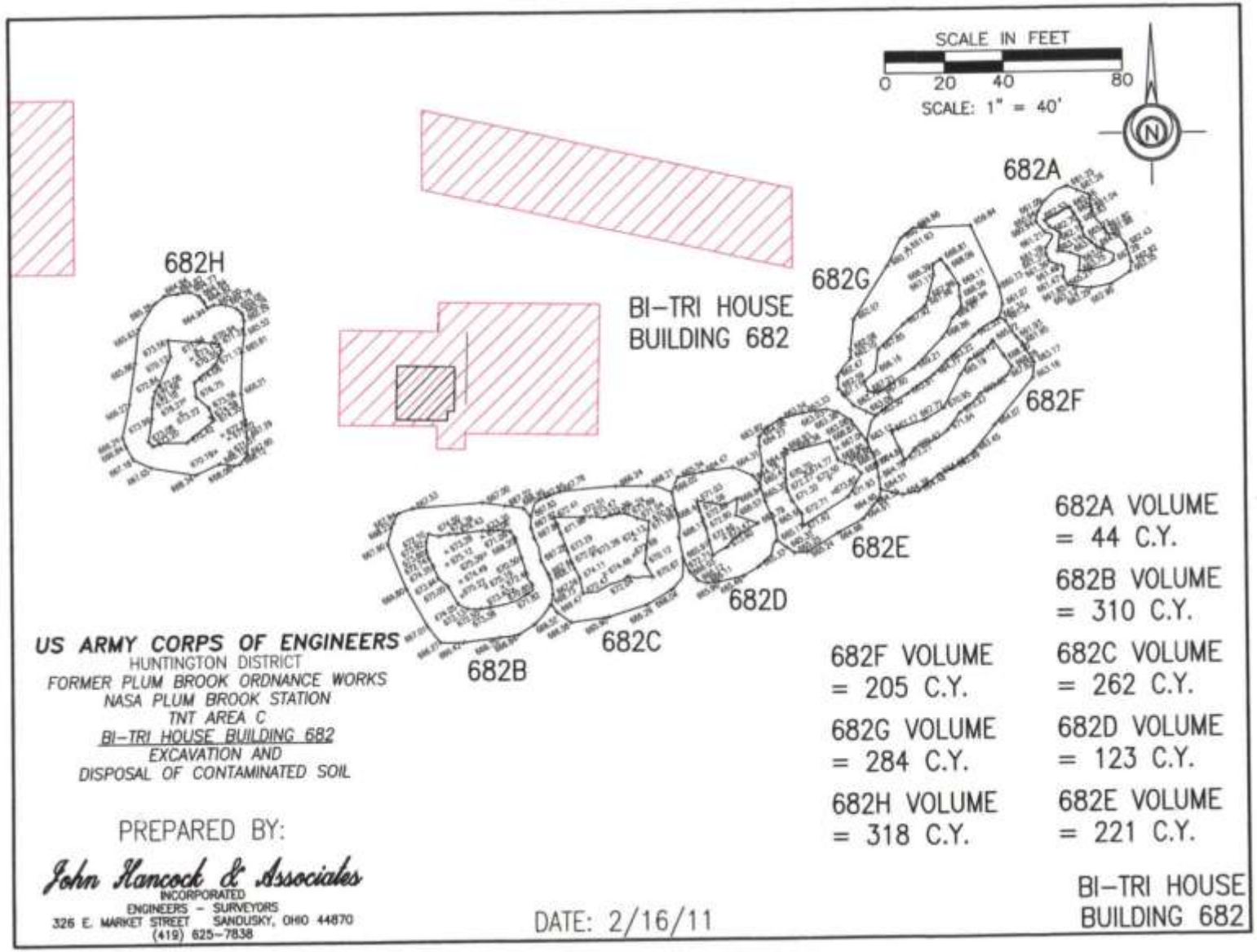


FIGURE 3-80. Building Area 682 Stockpile Diagram

TABLE 3-41. Building Area 682A Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-682A-C-001	0.249	0.249	0.249	0.249	0.249		0.0176	0.018		0.172	0.172	0.172	0.172	0.172		2.72
0922-682A-C-002	0.557	0.449	0.246	0.246	0.246		0.0181	0.018		0.177	0.177	0.177	0.177	0.177		8.47
0922-682A-C-003	1.66	5.19	24.6	5.16	108		0.0175	0.018		0.168	0.168	0.168	0.168	0.168		2.71
0922-682A-C-004	0.901	1.13	0.333	0.247	5.58		0.018	0.105		0.18	0.18	0.18	0.18	0.18		62.2
0922-682A-C-005	0.575	0.58	0.302	0.247	1.02		0.0182	0.018		0.183	0.183	0.183	0.183	0.183		10.1
0922-682A-C-006	0.246	0.246	0.246	0.246	0.246		0.0174	0.017		0.173	0.173	0.173	0.173	0.173		3.9
0922-682A-C-007	0.248	0.248	0.248	0.248	0.248		0.0178	0.018		0.175	0.175	0.175	0.175	0.175		4.7
0922-682A-C-008	0.247	0.247	0.247	0.247	0.247		0.0173	0.017		0.174	0.174	0.174	0.174	0.174		5.59
0922-682A-C-009	0.251	0.251	0.251	0.251	0.251		0.0179	1.55		0.173	0.173	0.173	0.173	0.173		233
0922-682A-C-010	0.245	0.245	0.245	0.245	0.245		0.0173	0.023		0.173	0.173	0.173	0.173	0.173		19.3
0922-682A-C-011	0.246	0.263	0.246	0.246	0.246		0.0176	0.112		0.175	0.175	0.175	0.175	0.175		41.9
0922-682A-C-012	0.392	0.379	0.247	0.247	0.38		0.0172	0.832		0.172	0.172	0.172	0.172	0.172		298
0922-682A-C-013	0.248	0.248	0.248	0.248	0.248		0.0179	0.024		0.173	0.173	0.173	0.173	0.173		14.2
0922-682A-C-014	0.247	0.39	0.247	0.247	1.97		0.0176	0.025		0.171	0.171	0.171	0.171	0.171		3.8
0922-682A-C-015	0.246	0.246	0.246	0.246	0.246		0.0176	0.018		0.172	0.172	0.172	0.172	0.172		3.2
0922-682A-C-016	0.248	0.248	0.248	0.248	0.248		0.018	0.018		0.173	0.173	0.173	0.173	0.173		2.2
0922-682A-C-017	0.247	0.247	0.247	0.247	0.247		0.0173	0.017		0.172	0.172	0.172	0.172	0.172		3.4
0922-682A-C-018	0.249	0.249	0.249	0.249	0.249		0.0173	0.017		0.172	0.172	0.172	0.172	0.172		1.7
0922-682A-C-019	0.247	0.247	3.07	0.645	3.57		0.0178	0.018		0.174	0.174	0.174	0.174	0.174		2.8
0922-682A-C-020	0.245	0.245	0.245	0.245	0.245		0.0173	0.017		0.174	0.174	0.174	0.174	0.174		3.1
0922-682A-C-021	0.248	0.248	0.248	0.248	0.248		0.0176	0.018		0.203	0.203	0.203	0.203	0.203		2.5
0922-682A-C-022	0.246	0.299	0.246	0.246	0.315		0.0176	0.018		0.2	0.2	0.2	0.2	0.2		4.7

Minimum Detection (mg/kg)	0.392	0.379	0.30	0.645	0.315		ND	0.023		ND	ND	ND	ND	ND		1.72
Mean (mg/kg)	0.3	0.5	0.8	0.4	5.6		ND	0.1		ND	ND	ND	ND	ND		33
Maximum Detection (mg/kg)	1.66	5.19	3.07	5.16	108		ND	1.55		ND	ND	ND	ND	ND		298
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	ND		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	ND		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.07	0.11	0.005	0.004	0.139		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	1E-06	4E-07	4E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.3					Sum mean	0.1		Sum mean	ND					lead mean	33
Nitroaromatic ILCR	2.E-06					less than RG?	Yes		less than RG?	No					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-42. Building Area 682B Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-682B-C-001	0.599	0.243	0.243	0.243	0.406		0.022	0.022		0.32	1.37	1.56	0.229	0.605		2.04
0922-682B-C-002	3.49	2.2	0.246	0.246	6.51		0.020	0.020		0.209	0.209	0.209	0.209	0.209		3.38
0922-682B-C-003	0.241	0.241	0.241	0.241	0.241		0.019	0.019		0.203	0.203	0.203	0.203	0.203		3.72
0922-682B-C-004	0.243	0.243	0.243	0.243	0.243		0.019	0.019		0.184	0.184	0.184	0.184	0.184		3.78
0922-682B-C-005	0.249	0.249	0.249	0.249	0.369		0.019	0.032		0.195	0.195	0.195	0.195	0.195		13.5
0922-682B-C-006	0.25	0.25	0.25	0.25	0.25		0.018	0.018		0.162	0.162	0.162	0.162	0.162		2.76
0922-682B-C-007	0.241	0.241	0.241	0.241	0.241		0.018	0.018		0.181	0.181	0.181	0.181	0.181		2.87
0922-682B-C-008	0.56	1.05	0.248	0.248	5.44		0.018	0.018		0.175	0.175	0.175	0.175	0.175		2.58
0922-682B-C-009	0.389	0.504	0.24	0.24	0.24		0.019	0.019		0.201	0.201	0.201	0.201	0.201		2.57
0922-682B-C-010	0.862	0.537	0.25	0.25	0.25		0.021	0.021		0.203	0.203	0.203	0.203	0.203		7.02
0922-682B-C-011	0.422	0.25	0.25	0.25	0.277		0.02	0.02		0.216	0.216	0.216	0.216	0.216		1.88
0922-682B-C-012	0.247	4.08	1.73	0.247	10.4		0.02	0.02		0.228	0.228	0.228	0.228	0.228		1.75
0922-682B-C-013	1.05	0.447	0.461	0.249	1.66		0.027	0.027		0.246	0.246	0.246	0.246	0.246		2.99
0922-682B-C-014	0.241	0.241	0.241	0.241	0.241		0.023	0.023		0.211	0.211	0.211	0.211	0.211		2.93
Minimum Detection (mg/kg)	0.389	0.447	0.46	ND	0.277		ND	0.032		0.32	1.37	1.56	0.229	0.605		1.75
Mean (mg/kg)	0.6	0.7	0.3	ND	1.9		ND	0.012		0.12	0.19	0.20	0.11	0.14		3.8
Maximum Detection (mg/kg)	3.49	4.08	1.73	ND	10.4		ND	0.032		0.32	1.37	1.56	0.229	0.605		13.5
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	ND		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	ND		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.14	0.16	0.002	ND	0.046		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	4E-07	ND	1E-07		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	0.3					Sum mean	0.01		Sum mean	0.8					lead mean	4
Nitroaromatic ILCR	5.E-07					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
						total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-43. Building Area 682A TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-682A-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.344	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-43. Building Area 682A TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-682A-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.272	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-43. Building Area 682A TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-682A-D-003	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.483	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-43. Building Area 682A TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/l)	TCLP Results (mg/L)	Classification
			0922-682A-D-004	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.335	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-44. Building Area 682B TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-682B-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.295	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-44. Building Area 682B TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-682B-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.184	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-44. Building Area 682B TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-682B-D-003	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.187	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-44. Building Area 682B TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-682B-D-004	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.17	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended For:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-81. Excavation at Building 682

FIGURE 3-82. The Backfilled Excavation at Building 682

3.4.16. Building 696 – Wash House, Process Line 9

TNT C RA-C

Based on the RI, excavation in this AOC consisted of excavating two areas designated as Area I and Area II. The estimated of volume Area I was 1,740 cy and with an excavation depth of 12 ft. The primary contaminants in Area I included an area with primarily nitroaromatics and an area co-contaminated with nitroaromatics, lead and PAHs. Area II was had an estimated volume of 273 cy with a depth of 5 ft. The primary contaminants were nitroaromatics.

Clearing in this AOC was initiated on January 10, 2011 with erecting silt fence and putting down plastic for the stockpiles. Excavation began on January 12, 2011. This excavation was a complex area with two different depths and multiple walls inside the area of the excavation. There were 8 stockpiles for this AOC which were located adjacent to the excavations. As with previous excavations, there was concrete debris from building foundations uncovered during the excavation, which was set aside.

A total of thirty-eight confirmation samples were collected from this AOC, which included twenty-eight wall samples and ten floor samples (Figure 3-83). The stockpiles were sampled the same day (Figures 3-84 and 3-85). The confirmation samples and stockpile samples were submitted to Microbac Laboratories in Marietta, Ohio for analysis.

The confirmation parameters included PAHs, PCBs, TAL metals, and nitroaromatics. Based on the laboratory data, Building 696 had a nitroaromatic HI ≤1, an ILCR <1E-5, and the sum mean of the PCBs and PAHs was <1 mg/kg for both. The lead mean was <400 mg/kg (Table 3-45). This AOC did not require additional excavation and was backfilled.

The stockpile characterization parameter was TCLP (Table 3-46). There were eight stockpiles from this excavation and all were non-hazardous and transported to the landfill for use as daily cover.

The laboratory data for Building 696 is included in electronic format in Appendix C.2.

Building 696 was one of the most complex excavations encountered due to multiple depths and co-contaminated soil. Figure 3-86 shows the multiple floor levels during the excavation and Figure 3-87 shows a portion of the open excavation. Figure 3-88 shows a vertical pipe that was encountered during excavation. The pipe was not removed.

Remedial Investigation Notes:

- Scoped volume 1,740 cy (total) from two designated areas
- Area I – estimated volume 1,467 cy (total) (red border)
- Excavation depth is 12'
- Primary contaminants are nitroaromatics (498 cy) and nitroaromatics, lead and PAHs (969 cy)
- Area II – estimated volume 273 cy (green fill)
- Excavation depth is 5'
- Primary contaminant is lead

RA-C Notes:

Surveyed stockpile volume for lead 207 cy

Surveyed stockpile volume for nitroaromatics 1,667 cy

Sample Locations:

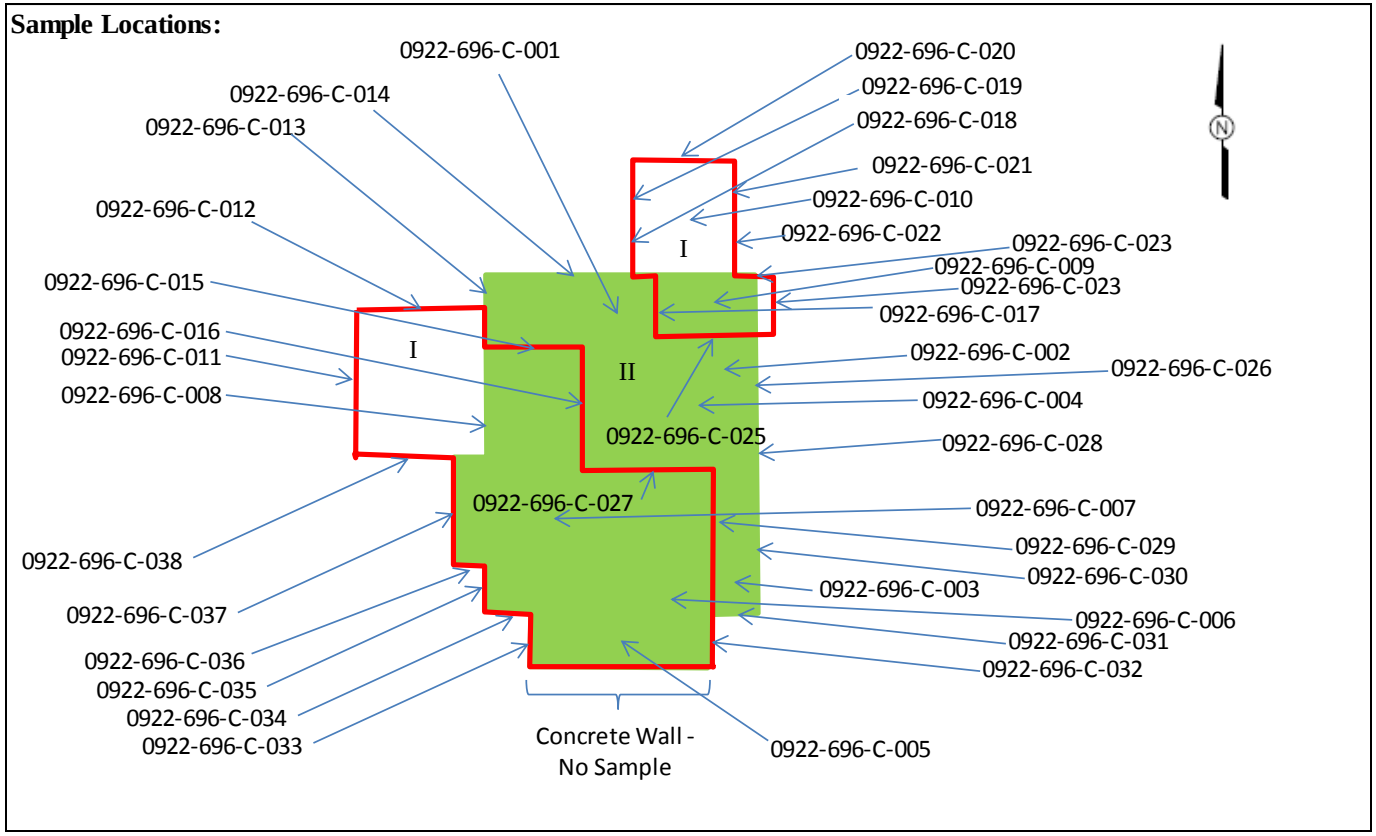


FIGURE 3-83. Building Area 696 Wash House – Process Line 9 Confirmation Diagram

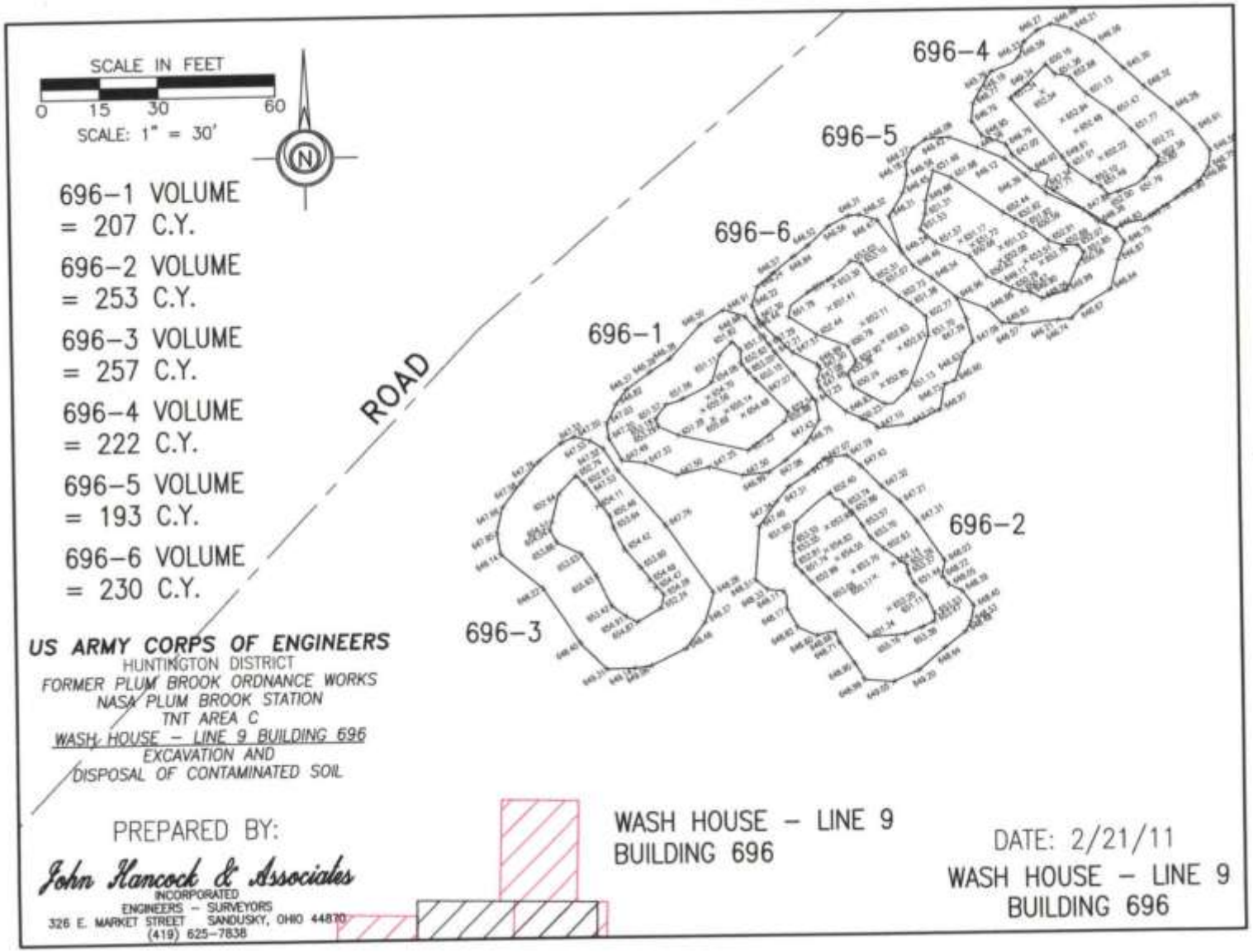


FIGURE 3-84. Building Area 696A Stockpile Diagram

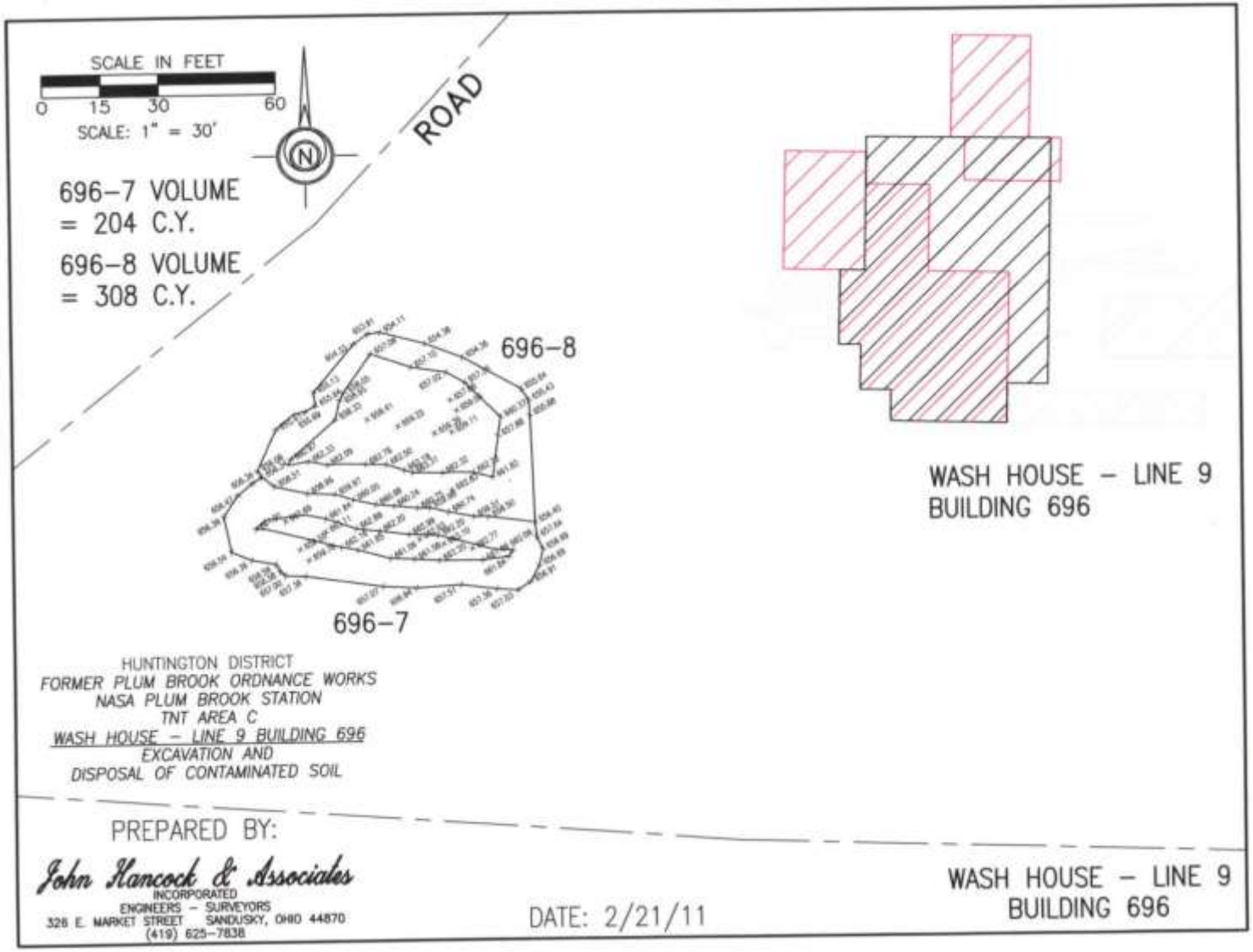


FIGURE 3-85. Building Area 696B Stockpile Diagram

TABLE 3-45. Building Area 696 Risk Calculations

Sample	COC Analytical Results (mg/kg)															
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
0922-696-C-001	0.795	0.503	0.248	0.248	5.49		0.02	0.02		0.186	0.186	0.186	0.186	0.186		16.4
0922-696-C-002	1.81	2.65	0.265	0.244	118		0.02	0.02		0.208	0.208	0.208	0.208	0.208		9.6
0922-696-C-003	2.67	2.83	0.987	0.249	237		0.022	0.022		0.189	0.189	0.189	0.189	0.189		11.9
0922-696-C-004	0.25	0.25	0.25	0.25	0.25		0.021	0.021		0.19	0.19	0.19	0.19	0.19		3.85
0922-696-C-005	0.578	0.547	0.247	0.247	3.25		0.02	0.02		0.215	0.215	0.215	0.215	0.215		11.5
0922-696-C-006	0.274	0.248	0.248	0.248	0.764		0.019	0.019		0.178	0.178	0.178	0.178	0.178		6.7
0922-696-C-007	0.244	0.244	0.244	0.244	0.244		0.02	0.02		0.222	0.222	0.222	0.222	0.222		5.97
0922-696-C-008	0.245	0.245	0.245	0.245	0.245		0.022	0.022		0.181	0.181	0.181	0.181	0.181		12
0922-696-C-009	0.246	0.246	0.246	0.246	0.246		0.018	0.018		0.203	0.203	0.203	0.203	0.203		11.9
0922-696-C-010	0.246	0.246	0.246	0.246	0.246		0.019	0.019		0.192	0.192	0.192	0.192	0.192		7.11
0922-696-C-011	0.244	0.244	0.244	0.244	0.748		0.02	0.02		0.222	0.222	0.222	0.222	0.222		3.61
0922-696-C-012	0.249	0.249	0.249	0.249	0.249		0.019	0.019		0.232	0.232	0.232	0.232	0.232		8.56
0922-696-C-013	0.265	0.248	0.248	0.248	0.288		0.021	0.021		0.203	0.203	0.203	0.203	0.203		29
0922-696-C-014	0.582	0.833	0.25	0.25	64.8		0.021	0.021		0.242	0.242	0.242	0.242	0.242		20.5
0922-696-C-015	0.249	0.249	0.249	0.249	4.78		0.02	0.02		0.201	0.201	0.201	0.201	0.201		11.3
0922-696-C-016	0.247	0.247	0.247	0.247	1.3		0.019	0.019		0.201	0.201	0.201	0.201	0.201		21.3
0922-696-C-017	2.05	1.22	0.248	0.248	38.2		0.02	0.02		0.228	0.228	0.228	0.228	0.228		7.81
0922-696-C-018	0.25	0.25	0.25	0.25	0.25		0.02	0.02		0.225	0.225	0.225	0.225	0.225		10.4
0922-696-C-019	0.245	0.245	0.245	0.245	15.8		0.02	0.02		0.192	0.192	0.192	0.192	0.192		21.7
0922-696-C-020	3.05	4.16	0.578	0.243	384		0.02	0.02		0.222	0.222	0.222	0.222	0.222		24.6
0922-696-C-021	0.25	0.25	0.25	0.25	2.58		0.018	0.018		0.182	0.182	0.182	0.182	0.182		10.1
0922-696-C-022	0.351	0.243	0.243	0.243	1.48		0.019	0.019		0.209	0.209	0.209	0.209	0.209		12
0922-696-C-023	0.892	0.425	0.243	0.243	0.95		0.018	0.018		0.217	0.217	0.217	0.217	0.217		10.8
0922-696-C-024	0.249	0.249	0.249	0.249	1.14		0.019	0.019		0.175	0.175	0.175	0.175	0.175		11.5
0922-696-C-025	1.27	2.02	0.25	0.25	38.1		0.02	0.02		0.199	0.199	0.199	0.199	0.199		8.65
0922-696-C-026	1.04	1.13	0.247	0.247	54.2		0.025	0.025		0.244	0.244	0.244	0.244	0.244		13
0922-696-C-027	0.249	0.249	0.249	0.249	18.3		0.022	0.022		0.229	0.229	0.229	0.229	0.229		21.7
0922-696-C-028	3.6	3.03	0.632	0.244	440		0.022	0.022		0.222	0.222	0.222	0.222	0.222		35.8
0922-696-C-029	0.763	0.248	0.248	0.248	282		0.021	0.021		0.189	0.189	0.189	0.189	0.189		9.01
0922-696-C-030	0.243	0.243	0.243	0.243	2.33		0.019	0.019		0.176	0.176	0.176	0.176	0.176		7.18
0922-696-C-031	0.257	0.255	0.249	0.249	6.67		0.022	0.022		0.196	0.196	0.196	0.196	0.196		7.7
0922-696-C-032	0.246	0.246	0.246	0.246	0.246		0.022	0.022		0.197	0.197	0.197	0.197	0.197		11.4
0922-696-C-033	0.247	0.247	0.247	0.247	0.334		0.02	0.02		0.191	0.191	0.191	0.191	0.191		11.8
0922-696-C-034	0.249	0.249	0.249	0.249	1.87		0.019	0.019		0.21	0.21	0.21	0.21	0.21		10.8
0922-696-C-035	0.268	0.244	0.244	0.244	4.94		0.025	0.025		0.205	0.205	0.205	0.205	0.205		16.7
0922-696-C-036	0.462	0.246	0.246	0.246	13.8		0.022	0.023		0.287	0.193	0.18	0.18	0.18		16.2
0922-696-C-037	0.684	0.685	0.241	0.241	13.2		0.021	0.16		0.487	0.394	0.318	0.195	0.219		543
0922-696-C-038	0.249	0.249	0.249	0.249	0.563		0.019	0.028		1	0.727	0.654	0.205	0.452		36
Minimum Detection (mg/kg)	0.257	0.255	0.265	ND	0.334		ND	0.023		0.287	0.193	0.318	ND	0.219		3.6
Mean (mg/kg)	0.63	0.62	0.18	ND	46		ND	0.024		0.14	0.13	0.12	ND	0.11		27.61
Maximum Detection (mg/kg)	3.05	4.16	0.987	ND	440		ND	0.028		1	0.727	0.654	ND	0.452		543
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ	0.15	0.14	0.001	ND	1.156		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR	NA	NA	2E-07	ND	3E-06		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI	1				Sum mean		0.02	Sum mean		0.5				lead mean		28
Nitroaromatic ILCR	4.E-06				less than RG?		Yes	less than RG?		Yes				less than RG?		Yes
					total 1 mg/kg			total 1 mg/kg						total 400 mg/kg		

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result exceeds RG - additional excavation required at samples location.

NA - Not Applicable

ND - Not detected above LOQ

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 3-46. Building Area 696 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-001	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.568	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-002	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.319	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	0.00642	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-003	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.280	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-004	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.210	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-005	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.299	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-006	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.630	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-007	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.587	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

TABLE 3-46. Building Area 696 TCLP Summary cont.

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	Classification
			0922-696-D-008	
D004	Arsenic (As)	5	ND	Non-Hazardous
D005	Barium (Ba)	100	0.319	Non-Hazardous
D018	Benzene	0.5	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	Non-Hazardous
D020	Chlordane	0.03	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	Non-Hazardous
D022	Chloroform	6	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	Non-Hazardous
D023	o-Cresol	200	ND	Non-Hazardous
D024	m-Cresol	200	ND	Non-Hazardous
D025	p-Cresol	200	ND	Non-Hazardous
D016	2,4-D	10	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	Non-Hazardous
D012	Endrin	0.02	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	Non-Hazardous
D013	Lindane	0.4	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	Non-Hazardous
D014	Methoxychlor	10	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	Non-Hazardous
D038	Pyridine	5	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	Non-Hazardous
			Stockpile Category:	**Non-Hazardous**
			Stockpile Recommended for:	**Disposal @ Erie County Landfill**

ND -Not detected above LOQ.

FIGURE 3-86. Multiple Depths in the Excavation at Building 696

FIGURE 3-87. The Open Excavation at Building 696

FIGURE 3-88. Vertical Pipe Encountered at Building 696

3.5. Sampling, Analysis and Management of Stockpiled Soils

3.5.1. TNT C RA-C

Upon completion of the excavation at each AOC, a 10-point composite sample was collected from each of the stockpiles adjacent to the completed excavation. The samples were collected and analyzed for full TCLP to determine if the soil was hazardous or non-hazardous. Based on the analytical data if the stockpile was hazardous, it was transported to the remediation pad for subsequent treatment using a patented AH process.

The total volume of soil excavated from the AOCs was 9,217 cy. Of the total quantity, 2,254 cy of soil was hazardous and required AH remediation to reduce the nitroaromatics to below hazardous levels. Approximately 11,000 tons of soil was transported to and disposed at the Erie County Landfill. The non-hazardous soil transported to the landfill was used by the landfill as daily cover.

The hazardous soil was transported to the remediation pad and configured into windrows for AH remediation. Prior to applying the AH chemicals, baseline samples were collected from each windrow. The baseline samples consisted of one 10-part composite collected from each windrow and submitted to the laboratory for PAHs, PCBs, nitroaromatics, and TAL metals. Analyzing the pH of the windrowed soil was not performed.

3.5.2. Follow-on

Under the follow-on effort, for the AOCs that were not closed under the original effort because the soil exceeded the RG or risk, the soil was excavated and transported directly to the

remediation pad for AH remediation. The soil was not characterized prior to transporting it to the pad because it was all intended to be treated using AH. However, once the soil was configured into windrows, baseline samples were collected and analyzed for PAHs, PCBs, nitroaromatics, TAL metals, and pH. The laboratory data for the TNT C follow-on effort are included in Appendix C.2.

3.6. Disposal of Stockpiled Soil and Sediment

There were a total of 44 individual stockpiles generated from the excavation activities in TNT C. The quantity of stockpiles and the corresponding volume of each are summarized below in Table 3-47. The hazardous stockpiled soil and sediment were transported to the remediation pad for AH remediation.

During the follow-on effort, the soil and sediment was transported directly from the excavation to the remediation pad without stockpiling. The total surveyed volume of soil and sediment from the follow-on effort was 2,657 cy. Diagrams of the surveyed stockpiles and the surveyed windrows from the follow-on effort are provided in Section 3.4.

TABLE 3-47. Summary of Stockpile Volumes

AOC	Volume of Stockpiles (cy)							
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
602	98	-	-	-	-	-	-	-
603	**113**	-	-	-	-	-	-	-
606	105	-	-	-	-	-	-	-
616	177	297	-	-	-	-	-	-
626	127	-	-	-	-	-	-	-
Sediment (618)	36	-	-	-	-	-	-	-
629	**279**	**225**	**211**	**299**	**340**	-	-	-
657	64	-	-	-	-	-	-	-
682	44	310	262	123	221	205	284	318
683	**196**	**174**	344	-	-	-	-	-
686	69	261	326	341	287	-	-	-
689	61	51	-	-	-	-	-	-
692	274	233	**199**	256	-	-	-	-
693	108	-	-	-	-	-	-	-
696A	207	253	257	222	193	230	-	-
696B	204	308	-	-	-	-	-	-
Follow-on	Total volume – 2657 cy							
The cubic yardages presented in bold font were hazardous and required AH remediation and were transported to the remediation pad for treatment.								

The non-hazardous soil and sediment was transported to the landfill for disposal. Prior to disposal the soil was profiled and the laboratory reports were summarized and a data package was submitted to the landfill for review and subsequent approval. The data package included the TCLP data summary and the TCLP laboratory report (including the chain of custody. Upon

review of the analytical data by Erie County Landfill personnel, all of the non-hazardous soil and sediment was accepted for disposal. In an earlier project, in cooperation with Erie County Landfill, USACE obtained approval from Ohio EPA to use the non-hazardous soil and sediment as daily cover. Based on the weigh tickets and the non-hazardous manifests, approximately 11,000 tons of soil and sediment and sediment were transported to Erie County Landfill.

Soil and sediment from AOC 657 was transported to the landfill on October 21, 2010 due to the proximity of a NASA project. The stockpiled soil and sediment was in the direct path of the construction of a water line and had to be moved. The remaining transportation and disposal at the landfill took place from February 14, 2010 through April 7, 2011. Due to the size of the file, the manifests and landfill weight tickets are summarized on a spreadsheet in Appendix D.2. Also included in Appendix D is a disc containing all of the manifests in portable document format (pdf).

4. ALKALINE HYDROLYSIS REMEDIATION

Based on the analysis of remedial alternatives presented in the *Final Decision Document for TNT Area C, Former Plum Brook Ordnance Works* (Shaw, 2009b) the selected remedy for the 9,205 cy of soil and sediment was Alternative 5. This alternative included excavation, AH, windrow composting (if necessary), *ex situ* chemical stabilization (if necessary), and on-site/off-site disposal. Tetra Tech has patented the AH process that was implemented for remediation of the TNT C soil and sediment excavated as part of the TNT C RA-C and the follow-on efforts.

Tetra Tech provided process oversight and assisted TMG with the implementation of the process by conducting a pilot study on the soils to determine chemical dosages and application strategies. Tetra Tech traveled to the PBOW site and collected soil samples from several of the AOCs within TNT C. Tetra Tech conducted a pilot study to determine the appropriate dosages of the chemicals used for AH on the TNT C soil and sediment (Tetra Tech, 2011). The remediation activities were performed in accordance with the findings of the pilot study and the recommendations of Tetra Tech. During the remediation, Tetra Tech provided field oversight of the process and data collection and process evaluation. A summary of the Tetra Tech remediation process implemented at PBOW is presented in Appendix E.

Configuring the soil in windrows for AH required consistent management of the soil, from the construction of the windrows to disposal sampling and pH adjustment. Once the windrows were constructed on the remediation pad, the soil had to be "turned" or mixed to break up the hard clumps of clay, achieve a better mix of soil that would maintain the windrow integrity, and to break apart rocks and other hard materials present in the soil.

With the initial mixing of the soil completed, samples of the soil were collected to determine the baseline concentrations of the COCs within each windrow. A 10 part composite was collected from each windrow and submitted to the laboratory for analysis of the COCs (nitroaromatics, PAHs, metals, and PCBs). These samples and results were presented earlier and are included in Section 4.2.

The next step was to add the alkaline material to each windrow and "turn" the chemical into the soil. The windrow turner made several passes through the windrow for a thorough mix of the soil/alkaline material into the deepest depths of the windrow.

Moisture and pH are critical to the success of the process. Following the addition of the alkaline material, water was pumped from a water truck into a trench knuckled out on the top of the windrow and allowed to soak into the soil, increasing the moisture content. The pH of the soil was measured in the field to ensure the optimum pH for the AH process was maintained.

Monitoring the process was critical to ensure the AH was effectively reducing the nitroaromatic and PAH concentrations. At least three rounds of process monitoring were conducted on each windrow to confirm the COC concentrations were reducing. The process monitoring was used only as a screening tool on the process therefore the laboratory was able to provide minimum turnaround time on the samples, usually with a Level I QC.

When the process samples were consistently less than the RG, three rounds of disposal samples were collected and submitted to the laboratory for confirmation analysis and TCLP. When the disposal confirmation samples indicated the remediated soil and sediment was acceptable for on-site placement, the pH of the soil was adjusted to approximately 10 standard units (S.U.). Approximately 13,000 gallons of an environmentally-safe acid was used to reduce the pH in the remediated soil.

With the COCs reduced to below hazardous levels and below the risk criteria in three of the seven windrows, the soil could be placed back into the excavations.

TMG entered into a confidentiality agreement with Tetra Tech prior to the remediation. In accordance with the agreement, process specifics are not presented or discussed in this report.

Figure 4-1 shows the windrows constructed on the remediation pad. Figures 4-2 and 4-3 show the application of alkaline material packaged in 50 pound (lb) bags and 2,000 lb supersacs, respectively. Figure 4-4 shows the windrow turner equipment used to "turn" the alkaline material into the soil and the tank truck used to add water to the windrows.

FIGURE 4-1. Windrows Constructed on the Remediation Pad

FIGURE 4-2. Adding Alkaline Material Packaged in 50 lb Bags

FIGURE 4-3. Adding Alkaline Material Packaged in 2,000 lb Supersacs

FIGURE 4-4. Windrow Turner Used to Mix the Soil, Alkaline and Water and the Tank Truck for Adding Water

4.1. Process Summary

4.1.1. Remediation Pad Preparation

USACE constructed the remediation pad in April 2008 for the Pentolite Road Red Water Ponds Non-time Critical Removal Action composting project. The remediation pad is approximately 2 acres. The field work on that project was completed in late 2008 and the remediation pad remained in stand-by mode until the TNT C RA-C project in 2010. The windrow area was laid out to effectively and efficiently manage the soils needed to be composted and the associated amendments. The configuration of the windrows was designed to facilitate and manage run-off from precipitation or snow melt with the construction of two water collection sumps along the northwest corner of the pad. The sumps had a combined capacity of approximately 80,000 gallons. The layout of the pad allowed access to the sump areas for water removal, easy access around the pad perimeter, and easy access between each of the windrows for composting/ windrow turning equipment. The perimeter and interior roadways were prepared with filter fabric and layered with stone. A total of 5,465 tons of stone was used as a base. A security/access gate was erected along the main access point to the pad. There were ten windrows on the pad, nine of which were approximately 275 (L) × 12 ft (W) and the tenth windrow was approximately 125 ft in length. The pad was segregated from the surrounding areas by the berms constructed during the initial clearing of the site.

Upgrades to the remediation pad were necessary prior to the introduction of hazardous soil and sediment from the excavations in TNT C. The upgrades included the following:

- Replaced straw bales along perimeter of pad and around the sumps
- Pumped the accumulated storm water from the sumps and disposed at West Area Red Water Ponds
- Removed sediment from the sumps and placed back onto pad
- Hauled in additional stone for the pad base
- Placed straw base under each windrow

In addition to the general maintenance, prior to the introduction of the TNT C soil and sediment, an access road to the pad was constructed between Taylor Road and NASA Building 8133. The access road was built to reduce the impact of the heavy trucks on the driveway around Building 8133 and provided a more direct route to and from the pad for the project vehicles moving soil and sediment, fueling equipment, etc. The access road also kept the heavy trucks away from pedestrian traffic around the NASA building and the TMG office trailer. The access road is outside other USACE project areas.

Additional improvements were implemented on the remediation pad after the remediated soil and sediment from the initial TNT C RA-C effort was removed from the pad and before the soil and sediment from the follow-on effort was excavated and transported to the remediation pad. These improvements included:

- General repair areas impacted by the heavy traffic
- Placing additional stone
- Clearing and grubbing the available area to the north of the original pad
- Expanding the pad capacity to 13 windrows
- Extending the existing windrow lengths to approximately 300 ft in length
- Grading the pad to a slope of at least 4% to the sump area
- Pumping out sumps, removing old liner and excavating the sumps to increase capacity
- Increased the capacity of the sumps to a total volume of approximately 280,000 gallons.
- Improving drainage on the south end of the west sump to prevent standing water

Figures 4-5 and 4-6 show the expansion of the north sump.

FIGURE 4-5. Excavating the North Sump to Increase Capacity

FIGURE 4-6. The New Liner in Place in the North Sump

4.1.2. Trucking and Windrow Construction

Beginning in February 2011, TMG began transporting the hazardous stockpiles to the remediation pad and constructing the windrows. A total of nine windrows were constructed at approximately 12 ft wide, 4.5 ft tall, and of varying lengths averaging 240 ft long. The transportation and windrow construction continued through mid-June 2010. The windrowed soil schematics for TNT C RA-C and Follow-on are Figures 4-7 and 4-8, respectively.

4.2. Soil and Sediment Remediation Preparations

With the composting area prepared, storm water management structures in place, and the contaminated soil and sediment arranged in to the nine windrows TMG and Tetra Tech were ready to begin the AH. Preparation of the windrowed soil and sediment began by mixing the soil to "break up" clumps of soil and sediment to enhance contact with the alkaline material. A Wildcat Windrow Turner was used to prepare the soil and break up rocks and pieces of debris not removed at the excavation.

Following the soil and sediment preparation, baseline samples of each windrow were collected. The baseline samples consisted of one 10-part composite per windrow. The samples were submitted to Microbac Laboratories for PAHs, PCB, TAL metals, nitroaromatics and pH. The laboratory results are summarized in Tables 4-1 through 4-9 for TNT C RA-C and Tables 4-10 through 4-16 for Follow-on.

4.3. Water

Water was added to the windrows based on moisture content of soil. The moisture content monitored by observation and confirmed by laboratory analysis. Water from the sumps as well as from a freshwater pond adjacent to the remediation pad was the source of the water applied to the windrows. The water was applied using a water truck equipped with a 2,000 gallon tank. The water was pumped through a nozzle on the front of the truck that was directed onto the windrow. Alternatively, water was added by "knuckling" a ditch on the top of the windrow and pumping water into the ditch at the higher elevation of the windrow and allowing the water to run the length of the row. Care was taken to add the water slow enough so as not to overflow the water from the ditch at the low end of the row. This method of adding the water was an improvement over spraying the rows because it allowed all of the water to be contained in the row and not run-off down the side. Also, this method prevented water from ponding on the access road between each row.

4.4. Laboratory Analysis

TMG utilized Test America in the early part of the project and later changed to Microbac Laboratories, located in Marietta, Ohio to perform the analytical testing for the AH process samples, confirmation, and waste characterization samples associated with this project. Both laboratories are Department of Defense Quality Systems Manual certified laboratory. The laboratory's detection and quantitation limits are based upon their minimum detection limit studies and are specific for each media and the instrumentation that is being used. The laboratory followed the most currently promulgated EPA methods.

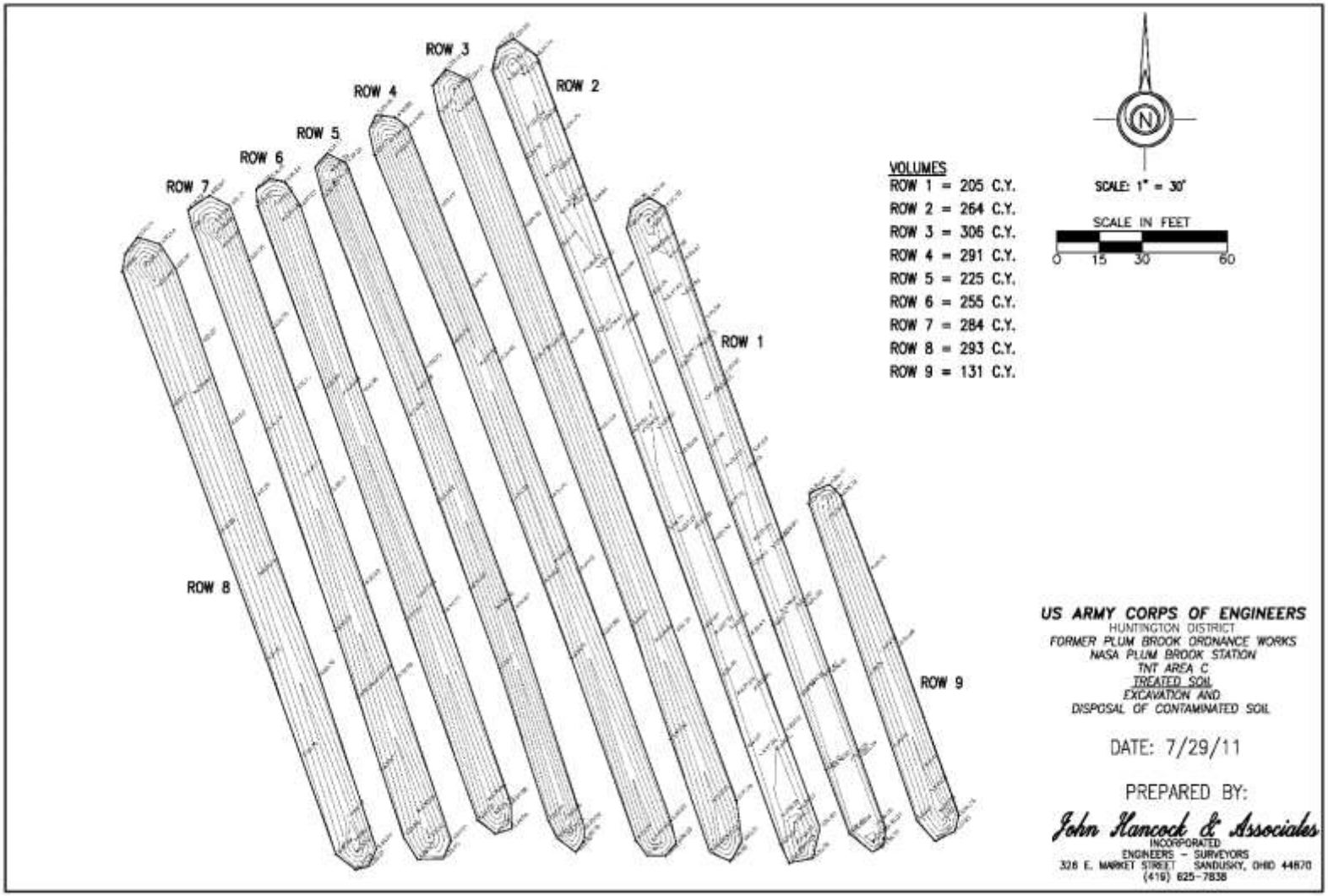


FIGURE 4-7. Windrow Soil Schematic

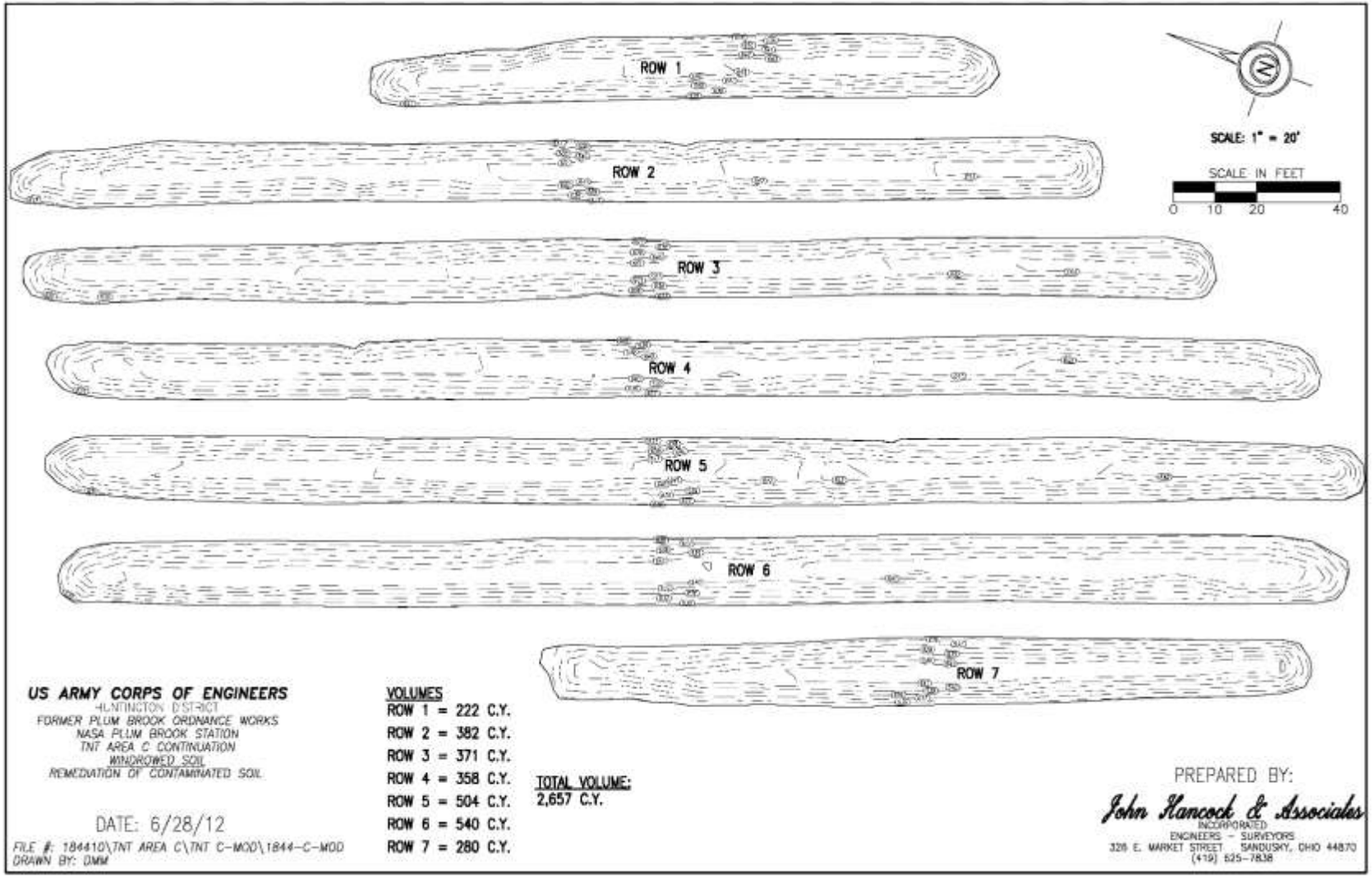


FIGURE 4-8. Follow-on Windrow Soil Schematic

TABLE 4-1. Windrow 1 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)													TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals		
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W1-BL	4/28/2011	8.21	ND	ND	3.25	0.854	ND	ND	0.0301	ND	ND	ND	ND	ND	33.8	---	---
0922-W1-D	7/5/2011	---	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	21.4	ND	ND
0922-W1-D	8/31/2011	---	---	---	---	---	---	ND	0.086	0.009	0.008	---	0.002	0.006	37.6	ND	ND
0922-W1-D	9/6/2011	12.0	ND	ND	ND	ND	ND	ND	0.064	0.0135	0.012	0.0164	0.0036	0.008	27.5	ND	ND
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.

TABLE 4-2. Windrow 2 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)														
			Nitroaromatics					PCBs		PAHs					Metals	TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W2-BL	5/2/2011	8.56	ND	ND	0.442	ND	0.320	ND	0.0942	ND	ND	ND	ND	ND	27.4	---	---
0922-W2-D	7/5/2011	---	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	28.6	ND	ND
0922-W2-D	8/31/2011	---	---	---	---	---	---	ND	0.077	0.008	0.008	---	0.003	0.006	30.4	ND	ND
0922-W2-D	9/6/2011	11.4	ND	ND	ND	ND	ND	ND	0.0503	0.0115	0.0097	0.0133	0.0115	0.003	19.4	ND	ND
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.

TABLE 4-3. Windrow 3 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)														
			Nitroaromatics					PCBs		PAHs					Metals	TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W3-BL	5/2/2011	8.27	ND	ND	2.01	0.607	ND	ND	0.136	ND	ND	ND	ND	ND	34.7	---	---
0922-W3-D	7/5/2011	---	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	36.3	ND	ND
0922-W3-D	8/31/2011	---	ND	ND	ND	ND	ND	ND	0.23	0.042	0.038	---	0.011	0.027	40.2	ND	ND
0922-W3-D	9/6/2011	10.8	ND	ND	ND	ND	ND	ND	0.0597	0.0324	0.027	0.0278	0.0064	0.019	40.3	ND	ND
	Remedial Goal (mg/kg)		1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
	RCRA TCLP Limit (mg/L)		---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.

TABLE 4-4. Windrow 4 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)													TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals		
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W4-BL	5/2/2011	8.21	ND	ND	1.28	4.52	5.34	ND	0.0661	ND	ND	ND	ND	ND	22.8	---	---
0922-W4-D	7/5/2011	---	ND	ND	0.278	0.504	ND	---	---	---	---	---	---	---	29.5	ND	ND
0922-W4-D	8/31/2011	---	ND	ND	ND	ND	ND	ND	0.227	0.013	0.011	---	0.004	0.008	48.3	ND	ND
0922-W4-D	9/6/2011	10.8	ND	ND	0.426	ND	ND	ND	0.095	0.131	0.061	0.0825	0.013	0.035	19.9	ND	ND
	Remedial Goal (mg/kg)		1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
	RCRA TCLP Limit (mg/L)		---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-5. Windrow 5 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)														TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals			
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead			
0922-W5-BL	5/2/2011	8.03	1.15	1.73	9.45	1.10	30	ND	0.0858	ND	ND	ND	ND	ND	22.8	---	---
0922-W5-D	7/5/2011	---	ND	ND	0.706	ND	ND	---	---	---	---	---	---	---	20.1	0.225	ND
0922-W5-D	7/28/2011	---	ND	ND	ND	ND	ND	---	---	---	---	---	---	---	19.2	0.058	ND
0922-W5-D	8/31/2011	---	---	---	---	---	---	ND	0.072	0.177	0.117	---	0.032	0.068	31.9	ND	ND
0922-W5-D	9/6/2011	11.5	ND	ND	0.356	ND	ND	ND	0.032	0.107	0.064	0.1	0.016	0.045	12.8	ND	ND
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.
- Result exceeds RG.

TABLE 4-6. Windrow 6 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)													TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals		
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W6-BL	5/11/2011	8.33	1.27	1.82	151	13.3	67.2	ND	0.0488	ND	ND	ND	ND	ND	21.6	---	---
0922-W6-D	7/28/2011	---	ND	0.554	1.35	3.36	ND	---	---	---	---	---	---	---	40.8	0.16	ND
0922-W6-D	8/30/2011	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	ND	---
0922-W6-D	8/31/2011	---	ND	ND	ND	ND	ND	ND	0.048	0.209	0.109	---	0.027	0.061	40.3	ND	ND
0922-W6-D	9/6/2011	12.3	ND	ND	0.363	0.511	ND	ND	0.0208	0.234	0.114	0.151	0.0256	0.067	36.9	ND	ND
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-7. Windrow 7 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)														TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals			
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead			
0922-W7-BL	5/11/2011	8.44	1.16	4.94	18	28.5	122	ND	0.144	ND	ND	ND	ND	ND	4650	---	---
0922-W7-D	8/24/2011	---	ND	0.407	0.316	3.16	ND	---	---	---	---	---	---	---	83.6	ND	ND
0922-W7-D	8/31/2011	---	ND	ND	ND	0.531	ND	ND	0.139	0.087	0.068	---	0.017	0.044	96.8	ND	ND
0922-W7-D	9/6/2011	11.9	ND	ND	ND	0.321	ND	ND	0.144	0.332	0.252	0.229	0.061	0.164	55.3	ND	ND
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-8. Windrow 8 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)													TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals		
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W8-BL	5/11/2011	8.26	0.434	ND	5.04	1.73	0.466	ND	0.512	ND	ND	ND	ND	ND	73.6	---	---
0922-W8-D	7/5/2011	---	ND	ND	0.320	0.826	ND	---	---	---	---	---	---	---	60.3	ND	ND
0922-W8-D	8/31/2011	---	ND	ND	ND	ND	ND	---	0.087	0.009	0.007	---	0.002	0.005	66.3	ND	ND
0922-W8-D	9/6/2011	10.7	ND	ND	ND	ND	ND	ND	0.0942	0.0131	0.012	0.0128	0.0026	0.006	43.2	ND	ND
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-9. Windrow 9 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)													TCLP 2,4-DNT (mg/L)	TCLP Lead (mg/L)
			Nitroaromatics					PCBs		PAHs					Metals		
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead		
0922-W9-BL	5/11/2011	9.16	0.518	0.411	12.1	4.83	0.853	ND	0.71	ND	ND	ND	ND	ND	44.6	---	---
0922-W9-D	7/5/2011	---	ND	0.245	0.481	0.787	ND	---	---	---	---	---	---	---	38.6	ND	ND
0922-W9-D	8/31/2011	---	ND	ND	0.181	0.147	ND	ND	0.281	0.008	0.007	---	ND	0.005	45.3	ND	ND
0922-W9-D	9/6/2011	10.7	ND	ND	0.478	0.623	ND	ND	0.177	0.0259	0.013	0.0168	0.0029	0.006	26.4	ND	ND
	Remedial Goal (mg/kg)		1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400	---	---
	RCRA TCLP Limit (mg/L)		---	---	---	---	---	---	---	---	---	---	---	---	---	0.13	5.0
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---	---	0.75
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---	---	7.5

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-10. Follow-on Windrow 1 Baseline and Disposal Summary

Sample	Date Collected	pH*	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W1-B	7/4/2012	9.23	1.14	1.23	0.252	0.252	75.0	0.0217	0.0217	4.81	3.73	3.38	0.651	1.76	55.8
1115-W1-D-01	8/14/2012	---	0.243	0.26	0.347	0.243	0.243	0.0206	0.0206	1.35	1.38	1.07	0.204	0.787	383
1115-W1-D-02	8/28/2012	---	0.244	0.365	0.252	0.244	0.326	0.0210	0.0210	2.84	2.46	1.81	0.501	1.20	120
1115-W1-D-03	8/30/2012	---	0.242	0.32	0.242	0.242	0.242	0.0199	0.0199	1.08	1.10	0.793	0.195	0.502	198
1115-pH-W1-01	10/25/2012	11.0	---	---	---	---	---	---	---	---	---	---	---	---	---
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-11. Follow-on Windrow 2 Baseline and Disposal Summary

Sample	Date Collected	pH*	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W2-B	7/4/2012	8.67	0.791	1.72	62.3	0.349	109	0.0197	0.0208	1.13	0.875	0.846	0.213	0.498	13.8
1115-W2-D-01	8/14/2012	---	0.243	0.243	0.243	0.243	0.243	0.0205	0.0205	0.302	0.259	0.245	0.211	0.211	21.5
1115-W2-D-02	8/28/2012	---	0.241	0.241	0.241	0.241	0.241	0.0186	0.0186	0.496	0.382	0.320	0.184	0.211	25.9
1115-W2-D-03	8/30/2012	---	0.249	0.249	0.249	0.249	0.249	0.0187	0.0187	1.76	1.65	1.21	0.217	0.685	30.4
1115-pH-W2-01	10/25/2012	11.1	---	---	---	---	---	---	---	---	---	---	---	---	---
		Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
		RCRA TCLP Limit (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions		UTS (mg/kg)	---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
		ATS (mg/kg)	---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-12. Follow-on Windrow 3 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W3-B	7/4/2012	9.18	2.50	3.08	0.600	0.251	209	0.0212	0.0212	1.28	0.601	1.36	0.214	0.483	42.3
1115-W3-D-01	8/14/2012	---	0.248	0.248	0.248	0.248	0.248	0.0194	0.0194	0.265	0.237	0.233	0.176	0.176	35.1
1115-W3-D-02	8/28/2012	---	0.251	0.455	0.251	0.251	0.251	0.0190	0.0190	0.657	0.317	0.329	0.194	0.194	29.5
1115-W3-D-03	8/30/2012	---	0.246	0.474	0.246	0.246	0.246	0.0198	0.0198	0.227	0.186	0.189	0.193	0.193	42.6
1115-pH-W3-01	10/8/2012	10.3	---	---	---	---	---	---	---	---	---	---	---	---	---
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-13. Follow-on Windrow 4 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W4-B	7/4/2012	8.81	0.475	0.782	0.595	0.244	7.51	0.0210	0.0210	1.44	1.39	1.28	0.269	0.715	11.4
1115-W4-D-01	8/14/2012	---	0.233	0.233	0.233	0.233	0.233	0.0168	0.0168	0.414	0.361	0.310	0.198	0.198	28.3
1115-W4-D-02	8/28/2012	---	0.242	0.242	0.242	0.242	0.242	0.0187	0.0187	0.415	0.409	0.295	0.185	0.195	27.3
1115-W4-D-03	8/30/2012	---	0.250	0.250	0.250	0.250	0.250	0.0187	0.0187	0.514	0.578	0.485	0.187	0.257	31.3
1115-pH-W4-01	10/9/2012	9.59	---	---	---	---	---	---	---	---	---	---	---	---	---
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-14. Follow-on Windrow 5 Baseline and Disposal Summary

Sample	Date Collected	pH*	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W5-B	7/4/2012	8.90	0.258	0.250	0.243	0.243	1.99	0.0216	0.0216	1.81	1.67	1.49	0.292	0.834	6.38
1115-W5-D-01	8/30/2012	---	0.238	0.238	0.238	0.238	0.238	0.0186	0.0186	1.35	1.43	1.29	0.248	0.649	8.98
1115-W5-D-02	9/4/2012	---	0.248	0.248	0.248	0.248	0.248	0.0184	0.0184	1.11	0.977	0.976	0.189	0.350	8.07
1115-W5-D-03	9/6/2012	12.3	0.249	0.249	0.249	0.249	0.249	0.0184	0.0184	1.91	1.63	1.26	0.250	0.886	9.19
Remedial Goal (mg/kg)			1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
RCRA TCLP Limit (mg/L)			---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions	UTS (mg/kg)		---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
	ATS (mg/kg)		---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
- Result exceeds RG.

TABLE 4-15. Follow-on Windrow 6 Baseline and Disposal Summary

Sample	Date Collected	pH*	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W6-B	7/4/2012	8.75	1.79	1.60	0.248	0.248	59.8	0.0203	0.0203	0.596	0.631	0.617	0.181	0.385	20.4
1115-W6-D-01	8/30/2012	---	0.249	0.276	0.249	0.249	0.249	0.0194	0.0194	0.834	0.722	0.611	0.191	0.364	85.7
1115-W6-D-02	9/4/2012	---	0.247	0.247	0.247	0.247	0.247	0.0194	0.0194	1.28	1.12	1.16	0.198	0.415	115
1115-W6-D-03	9/6/2012	11.4	0.248	0.343	0.248	0.248	0.248	0.0197	0.0197	0.576	0.420	0.376	0.198	0.226	122

Remedial Goal (mg/kg)		1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
RCRA TCLP Limit (mg/L)		---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions	UTS (mg/kg)	---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
	ATS (mg/kg)	---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
-Result exceeds RG

TABLE 4-16. Follow-on Windrow 7 Baseline and Disposal Summary

Sample	Date Collected	pH	COC Analytical Results (mg/kg)												
			Nitroaromatics					PCBs		PAHs					Metals
			2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT	Aroclor 1254	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Lead
1115-W7-B	7/4/2012	8.76	4.01	5.07	0.376	0.250	305	0.0215	0.0215	2.60	1.79	1.88	0.357	0.934	19.4
1115-W7-D-01	8/15/2012	---	0.242	0.363	0.242	0.242	0.242	0.0190	0.0190	0.604	0.414	0.429	0.215	0.215	18.0
1115-W7-D-02	8/28/2012	---	0.246	0.586	0.246	0.246	0.246	0.148	0.0201	0.473	0.354	0.340	0.200	0.200	30.6
1115-W7-D-03	8/30/2012	---	0.250	0.578	0.250	0.250	0.250	0.0195	0.0195	1.00	0.863	0.792	0.193	0.354	28.5
1115-pH-W7-03	10/11/2012	9.91	---	---	---	---	---	---	---	---	---	---	---	---	---

Remedial Goal (mg/kg)		1.7	1.3	6.5	1.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	400
RCRA TCLP Limit (mg/L)		---	---	---	---	---	---	---	---	---	---	---	---	---
Land Disposal Restrictions	UTS (mg/kg)	---	---	140	28	---	10	10	3.4	3.4	6.8	8.2	3.4	---
	ATS (mg/kg)	---	---	1400	280	---	100	100	34	34	68	82	34	---

- Not detected above LOQ.
-Result exceeds RG

All sampling was done in accordance with EPA protocol. For the soil and sediment remediation process, 10-point composite samples were collected at regular intervals from equal distances along each of the windrows. All samples were labeled in the field and care was taken to assure that each sample container was properly labeled. The labels contained the information:

- Description of the sample
- Time and date sample was taken
- Notation of whether preservatives were added to the sample and type of preservative
- Type of sample (such as a grab or composite)
- Analysis requested

Sample numbers were assigned sequentially and include the project number, windrow number, and week number. For example: 0922-W1-D would be a sample from this project from Windrow Number 1 for disposal confirmation.

Chain of custody procedures provided documentation of the handling of each sample from the time it was collected until analysis was completed. Chain of custody procedures were implemented so that a record of sample collection, transfer of samples between personnel, sample shipping, and receipt by laboratory that analyzed the sample was maintained. The chain of custody was filled out on site and included the following information:

- Project number
- Project manager
- Site location
- Client contact
- Description of the sample
- Time and date sample was taken
- Notation of whether preservatives were added to the sample
- Type of preservative
- Type of sample such as a grab or composite
- Matrix of sample
- Sample number or ID assigned in the field
- The appropriate analytical parameters to be tested

The sampler signed the chain-of-custody and all sample containers were transported with a chain-of-custody form. The samples were then prepared and shipped using the following procedure.

- Each sample container was placed in a separate plastic bag and sealed. As much air, as possible will be squeezed from the bag prior to sealing. Sample containers and bags were sealed with evidence tape or custody seals.
- A picnic cooler was used as the shipping container. In preparation for shipping samples, the drain plug on the cooler was taped shut from the inside and outside, and a large plastic bag was used as a liner for the cooler. Inert packing material was placed in the bottom of the liner.
- The sample containers were placed upright in the lined picnic cooler in such a way that they would not touch and would not touch during shipping.
- All samples were shipped to the laboratory on ice and chilled to 4ºC.

- Plastic ice packs or ice placed in double plastic bags were placed around, among, and on top of the sample containers.
- The paperwork going to the laboratory was placed inside a sealed plastic bag, which was taped to the inside lid of the cooler.
- The cooler was taped shut with strapping tape.
- At least two signed custody seals were placed on the cooler lid (one in front, the other on the side).

The laboratory analysis results are included in Appendix C.2. The laboratory summary tables for the TNT C RA-C and follow-on are presented in Chapter 3.

4.5. Run-Off Management and Erosion Control

Throughout the soil remediation process, precipitation runoff from rain or snow events, or water additions to the windrows was managed through the use of the two constructed sumps. The sumps have a total capacity of approximately 280,000 gallons and with additional storage capacity in two 21,000 gallon frac tanks. As the sumps filled, water was pumped from the west sump into the east sump and also into the tanks. During TNT C RA-C, the water in the frac tanks was sampled on June 1, 2011 (Tables 4-17 and 4-18). On the follow-on effort the water was sampled and analyzed on August 13, 2011 (Tables 4-19 and 4-20). Sampled water was never mixed with unsampled water to ensure proper characterization prior to disposal. The laboratory results are included in Appendix C.2.

As in previous operations at the site, the water results were compared to previously existing results for the West Area Red Water Ponds. Upon approval from NASA and the Ohio EPA, the collected water was transported and disposed of in the West Area Red Water Ponds. A total of approximately 200,000 gallons were transported and discharged. Discharge to the pond was done slowly to ensure that no erosion occurred or that pond sediment was not disturbed.

4.6. Windrow Characterization

4.6.1. TNT C RA-C

Following treatment, samples were collected from each of the nine windrows to confirm the soil and sediment were not hazardous and each row was below the RG. Three sets of confirmation samples were collected from all nine windrows when it was determined that the AH process was finished. The samples were collected and submitted to the laboratory for analysis for nitroaromatics, PCBs, PAHs, TAL metals and full TCLP.

One additional round of disposal samples were collected from Rows 5, 6 and 7 due to an exceedance of TCLP for 2,4-DNT. Additional turning of the row was required to continue the AH process. Subsequent confirmation samples indicated the soils from these rows was non-hazardous and below the RG (see Tables 4-1 through 4-9). The laboratory results for the disposal confirmation are provided in Appendix C.2.

Following the disposal confirmation sampling, the soil and sediment were transported to an area in TNT C where it was stockpiled for subsequent use as backfill on Follow-on.

TABLE 4-17. Frac Tank TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)	
			0922-FT1-01	0922-FT2-01
D004	Arsenic (As)	5	ND	ND
D005	Barium (Ba)	100	0.168	0.074
D018	Benzene	0.5	ND	ND
D006	Cadmium (Cd)	1	ND	ND
D019	Carbon Tetrachloride	0.5	ND	ND
D020	Chlordane	0.03	ND	ND
D021	Chlorobenzene	100	ND	ND
D022	Chloroform	6	ND	ND
D007	Chromium (Cr)	5	ND	ND
D023	o-Cresol	200	ND	ND
D024	m-Cresol	200	ND	ND
D025	p-Cresol	200	ND	ND
D016	2,4-D	10	ND	ND
D027	1,4-Dichlorobenzene	7.5	ND	ND
D028	1,2-Dichloroethane	0.5	ND	ND
D029	1,1-Dichloroethene	0.7	ND	ND
D030	2,4-Dinitrotoluene	0.13	ND	ND
D012	Endrin	0.02	ND	ND
D031	Heptachlor	0.008	ND	ND
D031	Heptachlor Epoxide	0.008	ND	ND
D032	Hexachlorobenzene	0.13	ND	ND
D033	Hexachlorobutadiene	0.5	ND	ND
D034	Hexachloroethane	3	ND	ND
D008	Lead (Pb)	5	ND	ND
D013	Lindane	0.4	ND	ND
D009	Mercury (Hg)	0.2	ND	ND
D014	Methoxychlor	10	ND	ND
D035	Methyl ethyl ketone	200	ND	ND
D036	Nitrobenzene	2	ND	ND
D037	Pentachlorophenol	100	ND	ND
D038	Pyridine	5	ND	ND
D010	Selenium (Se)	1	ND	ND
D011	Silver (Ag)	5	ND	ND
D039	Tetrachloroethene	0.7	ND	0.0835
D015	Toxaphene	0.5	ND	ND
D040	Trichloroethene	0.5	ND	ND
D041	2,4, 5-Trichlorophenol	400	ND	ND
D042	2,4,6-Trichlorophenol	2	ND	ND
D017	2,4,5-TP (Silvex)	1	ND	ND
D043	Vinyl Chloride	0.2	ND	ND

ND -Not detected above LOQ.

TABLE 4-18. Frac Tank TCLP Comparison to TNT B Results

Comparison of TNTC Frack Tank sampling to WARRP data and water added from TNT B pits and sump area on last composting effort

Explosives	0922-FT1-01 water (mg/L)	0922-FT2-01 water (mg/L)	Previously approved pit water from TNT B (highest concentration shown from 4 areas)	Previously approved pit water TNT B (May 03)	RBC Region III / ORL values (residential - soil - none shown for water)	WARRP Direct Push Inv for sediment Table 7-2
1,3,5-Trinitrobenzene	ND	ND	0.078	0.326	1800	0.6
1,3-Dinitrobenzene	ND	ND	0.036	0.0918	6.1	0.3
2,4,6-Trinitrotoluene	ND	ND	2.48	2.21	16	-
2,4-Dinitrotoluene	ND	ND	ND	ND	120	0.3
2,6-Dinitrotoluene	0.00495	0.00139	ND	0.142	61	0.4
2-Amino-4,6-dinitrotoluene	ND	ND	0.0409	ND	120	0.3
2-Nitrotoluene	ND	ND	ND	ND	30	-
3-Nitrotoluene	ND	ND	ND	ND	30	-
4-Amino-2,6-dinitrotoluene	0.00176	0.00238	0.204	ND	120	-
4-Nitrotoluene	ND	ND	ND	ND	30	-
HMX (octogen)	ND	ND	ND	ND	none shown	-
Nitrobenzene	ND	ND	ND	ND	31	-
RDX (cyclotrimethlenetrinitramine)	ND	ND	ND	0.191	none shown	-
Tetryl	ND	ND	ND	ND	240	-

Notes:
pH Results: 0922-FT1-01 - 12.3, 0922-Ft2-01 - 9.18
See attached lab report for additional detections.
Per RI/FS, low levels of DNT and TNT are present in water and sediment with 1,3,5-TNT and 2,4-DNT @ 5.5 and 5.1 ppm

TABLE 4-19. Follow-on Frac Tank TCLP Summary

TNTC Frac Tank TCLP Summary					
EPA Hazardous Waste Code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L)		
			1115-FT1-01	0922-FT1-01	0922-FT2-01
D004	Arsenic (As)	5	ND	ND	ND
D005	Barium (Ba)	100	0.193	0.168	0.074
D018	Benzene	0.5	ND	ND	ND
D006	Cadmium (Cd)	1	ND	ND	ND
D019	Carbon Tetrachloride	0.5	ND	ND	ND
D020	Chlordane	0.03	ND	ND	ND
D021	Chlorobenzene	100	ND	ND	ND
D022	Chloroform	6	ND	ND	ND
D007	Chromium (Cr)	5	ND	ND	ND
D023	o-Cresol	200	ND	ND	ND
D024	m-Cresol	200	ND	ND	ND
D025	p-Cresol	200	ND	ND	ND
D016	2,4-D	10	ND	ND	ND
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND
D028	1,2-Dichloroethane	0.5	ND	ND	ND
D029	1,1-Dichloroethene	0.7	ND	ND	ND
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND
D012	Endrin	0.02	ND	ND	ND
D031	Heptachlor	0.008	ND	ND	ND
D031	Heptachlor Epoxide	0.008	ND	ND	ND
D032	Hexachlorobenzene	0.13	ND	ND	ND
D033	Hexachlorobutadiene	0.5	ND	ND	ND
D034	Hexachloroethane	3	ND	ND	ND
D008	Lead (Pb)	5	ND	ND	ND
D013	Lindane	0.4	ND	ND	ND
D009	Mercury (Hg)	0.2	0.00116	ND	ND
D014	Methoxychlor	10	ND	ND	ND
D035	Methyl ethyl ketone	200	ND	ND	ND
D036	Nitrobenzene	2	ND	ND	ND
D037	Pentachlorophenol	100	ND	ND	ND
D038	Pyridine	5	ND	ND	ND
D010	Selenium (Se)	1	ND	ND	ND
D011	Silver (Ag)	5	ND	ND	ND
D039	Tetrachloroethene	0.7	ND	ND	0.0835
D015	Toxaphene	0.5	ND	ND	ND
D040	Trichloroethene	0.5	ND	ND	ND
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND
D042	2,4,6-Trichlorophenol	2	ND	ND	ND
D017	2,4,5-TP (Silvex)	1	ND	ND	ND
D043	Vinyl Chloride	0.2	ND	ND	ND

ND = not detected above the LOQ

TABLE 4-20. Follow-on Frac Tank TCLP Comparison to TNT B Results

Comparison of TNTC Frac Tank sampling to WARRP data and water added from TNTB pits and sump area on last composting effort							
Explosives	1115-FT1-01 water (mg/L)	0922-FT1-01 water (mg/L)	0922-FT2-01 water (mg/L)	Previously approved pit water from TNTB (highest concentration shown from 4 areas)	Previously approved pit water TNTB (May 03)	RBC Region III/ ORL values (residential - soil - none shown for water)	WARRP Direct Push Inv for sediment Table 7-2
1,3,5-Trinitrobenzene	ND	ND	ND	0.078	0.326	1800	0.6
1,3-Dinitrobenzene	ND	ND	ND	0.036	0.0918	6.1	0.3
2,4,6-Trinitrotoluene	ND	ND	ND	2.48	2.21	16	–
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	120	0.3
2,6-Dinitrotoluene	ND	0.00495	0.00139	ND	0.142	61	0.4
2-Amino-4,6-dinitrotoluene	ND	ND	ND	0.0409	ND	120	0.3
2-Nitrotoluene	ND	ND	ND	ND	ND	30	–
3-Nitrotoluene	ND	ND	ND	ND	ND	30	–
4-Amino-2,6-dinitrotoluene	ND	0.00176	0.00238	0.204	ND	120	–
4-Nitrotoluene	ND	ND	ND	ND	ND	30	–
HMX (octogen)	ND	ND	ND	ND	ND	none shown	–
Nitrobenzene	ND	ND	ND	ND	ND	31	–
RDX (cyclotrimethlenetrinitramine)	ND	ND	ND	ND	0.191	none shown	–
Tetryl	ND	ND	ND	ND	ND	240	–

Notes:
ND = not detected above the LOQ.
pH Results: 1115-FT1-01 - 12.0, 0922-FT1-01 - 12.3, 0922-FT2-01 - 9.18.
1115 sampling completed under TNTC Continuation effort in 2012, 0922 sampling completed under TNTC Original effort in 2011.
See attached lab report for addditional detections.
years report.

4.6.2. Follow-on

Samples were collected from each of the seven windrows to confirm the soil and sediment were not hazardous and each row was below the RG. Three sets of confirmation samples were collected from all seven windrows when it was determined that the AH process was finished. The samples were collected and submitted to the laboratory for analysis for nitroaromatics, PCBs, PAHs, TAL metals and full TCLP.

At the end of the remediation process, Rows 1, 2, 5 and 6 exceeded the RG for PAHs. The source of the consistent elevated level of PAHs may have been attributed to the asphalt material removed from the AOCs during excavation. The asphalt material was the remains of a former access driveway into the AOC, and was excavated along with the soil below the driveway. Since the soil from these rows exceeded the RG for the PAHs but was non-hazardous, it was approved for disposal at the Erie County Landfill.

The three sets of disposal confirmation samples from Rows 3, 4 and 7 indicated the remediated soil was non-hazardous and below the RG for nitroaromatics, PAHs, PCBs, and lead. Once the disposal confirmation samples indicated the remediated soil and sediment were acceptable for on-site placement, acid was added to adjust the pH to approximately 10 S.U. Windrows 3, 4 and 7 had soil pH of 10.3, 9.6 and 9.9 respectively. The soil in windrows 1, 2, 5, and 6 was disposed at the landfill and did not require pH adjustment for the off-site disposal.

Following pH adjustment, Windrows 3, 4, and 7 were transported back into TNT C and used as backfill for the 6 AOCs that were excavated under the follow-on effort. As stated above, Windrows 1, 2, 5 and 6 were disposed off-site. The results for the disposal confirmation samples are presented in Appendix C.2. See Tables 4-10 through 4-16 for summary of confirmation results and Tables 4-21 through 4-27 for summary of TCLP results. The manifests for the off-site disposal are provided in Appendix D.3.

4.7. Disposal

4.7.1. Stock Pile Areas

When the stockpiles from the TNT C RA-C were removed, the footprint area that was once covered by plastic and the contaminated soil was sampled to confirm the underlying soil had not been contaminated by the remediation activities at the AOCs. The locations of the stockpiles are presented in Chapter 3. Five-point composite samples were obtained from the four corners and from the center of each footprint area. Samples were collected and submitted to Microbac Laboratories for nitroaromatics, PCBs, PAHs, and TAL metals. The data showing the sample results and subsequent risk calculations is presented in Table 4-28.

The results indicated the nitroaromatics were below the risk criteria. However, at the footprints at AOCs 616 and 696 had elevated levels of PAHs. The areas were scraped and resampled. The results of the resampling indicated that there is no contamination from the stockpile.

There were no stockpiles generated from the follow-on effort. All excavated soil was transported directly to the remediation pad for AH remediation.

TABLE 4-21. Follow-on Windrow 1 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.329	0.317	0.351	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	0.00186	ND	0.000563	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-22. Follow-on Windrow 2 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.636	0.734	0.745	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	ND	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-23. Follow-on Windrow 3 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Diposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.205	0.673	0.596	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	ND	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-24. Follow-on Windrow 4 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.499	0.517	0.486	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	0.000731	ND	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-25. Follow-on Windrow 5 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.433	0.437	0.457	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	ND	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-26. Follow-on Windrow 6 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.419	0.461	0.494	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	ND	ND	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-27. Follow-on Windrow 7 TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Round 1	TCLP Results (mg/L) Disposal Round 2	TCLP Results (mg/L) Disposal Round 3	Classification
D004	Arsenic (As)	5	ND	ND	ND	Non-Hazardous
D005	Barium (Ba)	100	0.451	0.448	0.442	Non-Hazardous
D018	Benzene	0.5	ND	ND	ND	Non-Hazardous
D006	Cadmium (Cd)	1	ND	ND	ND	Non-Hazardous
D019	Carbon Tetrachloride	0.5	ND	ND	ND	Non-Hazardous
D020	Chlordane	0.03	ND	ND	ND	Non-Hazardous
D021	Chlorobenzene	100	ND	ND	ND	Non-Hazardous
D022	Chloroform	6	ND	ND	ND	Non-Hazardous
D007	Chromium (Cr)	5	ND	ND	ND	Non-Hazardous
D023	o-Cresol	200	ND	ND	ND	Non-Hazardous
D024	m-Cresol	200	ND	ND	ND	Non-Hazardous
D025	p-Cresol	200	ND	ND	ND	Non-Hazardous
D016	2,4-D	10	ND	ND	ND	Non-Hazardous
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND	Non-Hazardous
D028	1,2-Dichloroethane	0.5	ND	ND	ND	Non-Hazardous
D029	1,1-Dichloroethene	0.7	ND	ND	ND	Non-Hazardous
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND	Non-Hazardous
D012	Endrin	0.02	ND	ND	ND	Non-Hazardous
D031	Heptachlor	0.008	ND	ND	ND	Non-Hazardous
D031	Heptachlor Epoxide	0.008	ND	ND	ND	Non-Hazardous
D032	Hexachlorobenzene	0.13	ND	ND	ND	Non-Hazardous
D033	Hexachlorobutadiene	0.5	ND	ND	ND	Non-Hazardous
D034	Hexachloroethane	3	ND	ND	ND	Non-Hazardous
D008	Lead (Pb)	5	ND	ND	ND	Non-Hazardous
D013	Lindane	0.4	ND	ND	ND	Non-Hazardous
D009	Mercury (Hg)	0.2	ND	ND	ND	Non-Hazardous
D014	Methoxychlor	10	ND	ND	ND	Non-Hazardous
D035	Methyl ethyl ketone	200	ND	ND	ND	Non-Hazardous
D036	Nitrobenzene	2	ND	ND	ND	Non-Hazardous
D037	Pentachlorophenol	100	ND	ND	ND	Non-Hazardous
D038	Pyridine	5	ND	ND	ND	Non-Hazardous
D010	Selenium (Se)	1	ND	ND	ND	Non-Hazardous
D011	Silver (Ag)	5	ND	ND	ND	Non-Hazardous
D039	Tetrachloroethene	0.7	ND	ND	ND	Non-Hazardous
D015	Toxaphene	0.5	ND	ND	ND	Non-Hazardous
D040	Trichloroethene	0.5	ND	ND	ND	Non-Hazardous
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND	Non-Hazardous
D042	2,4,6-Trichlorophenol	2	ND	ND	ND	Non-Hazardous
D017	2,4,5-TP (Silvex)	1	0.00132	ND	ND	Non-Hazardous
D043	Vinyl Chloride	0.2	ND	ND	ND	Non-Hazardous
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Use as backfill**	**Use as backfill**	**Use as backfill**	**Use as backfill**

ND -Not detected above LOQ.

TABLE 4-28. Stockpile Footprint Summary

Sample	COC Analytical Results (mg/kg)																Lead TCLP (mg/L)	2,4-DNT TCLP (mg/L)
	2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead		
0922-626	1.24	1.72	0.25	0.25	21.8		0.022	0.022		0.221	0.221	0.221	0.221	0.221		33.6	NR	NR
0922-686-1	4.54	6.55	0.246	0.246	106		0.019	0.069		0.361	0.379	0.33	0.204	0.234		42.0	NR	NR
0922-686-2	1.86	4.35	0.244	0.244	96.5		0.022	0.0221		0.223	0.223	0.223	0.223	0.223		15.2	NR	NR
0922-689	0.246	0.246	0.246	0.246	0.304		0.019	0.397		0.215	0.242	0.21	0.21	0.21		28.6	NR	NR
0922-683	0.246	0.622	0.246	0.246	4.41		0.019	0.0471		0.256	0.264	0.231	0.203	0.203		15.3	ND (<1)	ND (<0.05)
0922-606	0.66	0.739	0.249	0.513	9.79		0.018	0.0529		0.314	0.346	0.298	0.17	0.226		19.2	NR	NR
0922-657	0.247	0.247	0.247	0.247	1.44		0.02	0.0264		0.358	0.419	0.372	0.221	0.245		51.5	NR	NR
0922-602	0.245	0.245	0.245	0.245	0.601		0.019	0.257		0.339	0.449	0.402	0.193	0.208		152	NR	NR
0922-603	0.25	0.25	0.25	0.25	0.263		0.018	0.0181		4.94	4.49	4.00	0.49	1.41		38.8	ND (<1)	ND (<0.05)
0922-616	2.37	2.34	0.246	0.246	25.3		0.017	0.0436		0.837	0.999	0.949	0.169	0.42		39.8	NR	NR
0922-629-1	0.247	0.247	0.247	0.247	0.247		0.018	0.0444		0.2	0.2	0.2	0.2	0.2		41.2	ND (<1)	ND (<0.05)
0922-629-2	0.249	0.249	0.249	0.249	0.249		0.016	0.016		0.183	0.183	0.183	0.183	0.183		20	ND (<1)	ND (<0.05)
0922-629-3	0.248	0.248	0.248	0.248	0.248		0.018	0.0175		0.177	0.177	0.177	0.177	0.177		8.28	ND (<1)	ND (<0.05)
0922-682-1	0.742	0.974	0.246	0.246	5.7		0.018	0.0283		0.175	0.175	0.175	0.175	0.175		42	NR	NR
0922-682-2	1.4	2.6	0.247	0.247	28.5		0.02	0.0197		1.21	1.18	1.06	0.176	0.413		18.8	NR	NR
0922-692-1	1.76	2.52	0.848	0.546	5.49		0.019	0.0376		0.225	0.232	0.222	0.182	0.182		24.5	ND (<1)	ND (<0.05)
0922-692-2	0.313	0.378	0.247	0.247	33.4		0.018	0.0175		0.905	0.905	0.905	0.905	0.905		45.7	NR	NR
0922-693	0.25	0.254	0.25	0.25	0.362		0.018	0.0179		0.197	0.197	0.197	0.197	0.197		13.8	NR	NR
0922-696-1	1.33	1.3	0.248	0.248	2.92		0.021	0.0214		0.872	0.994	1.02	0.225	0.373		23.2	NR	NR
0922-696-2	0.247	0.247	0.247	0.247	0.247		0.021	0.0207		0.256	0.222	0.219	0.219	0.219		6.58	NR	NR
0922-FP-SP-603	NR	NR	NR	NR	NR		NR	NR		0.0896	0.100	0.0935	NR	0.063		NR	NR	NR
0922-682SPFP2	0.248	0.248	0.248	0.248	0.248		NR	0.0181		2.2	1.56	1.83	0.969	0.969		6.54	NR	NR
0922-696SPFP1	0.251	0.251	0.251	0.251	0.251		NR	0.0204		0.921	0.921	0.921	0.921	0.921		17.5	NR	NR
0922-682SPFP2-02	NR	NR	NR	NR	NR		NR	NR		0.327	0.297	0.248	0.203	0.203		NR	NR	NR
0922-696SPFP1-02	NR	NR	NR	NR	NR		NR	NR		0.200	0.200	0.200	0.200	0.200		NR	NR	NR
0922-6922-02	NR	NR	NR	NR	NR		NR	NR		0.190	0.190	0.190	0.190	0.190		NR	NR	NR
Minimum Detection (mg/kg)	0.313	0.254	0.848	0.513	0.263		ND	0.0264		0.0896	0.100	0.0935	0.49	0.063		6.54	Regulatory Limit (mg/L)	
Mean (mg/kg)	0.77	1.1	0.16	0.16	15.6		ND	0.055		0.22	0.24	0.21	0.12	0.14		33		
Maximum Detection (mg/kg)	4.54	6.55	0.848	0.546	106		ND	0.257		0.921	0.921	0.92	0.49	0.245		152	5	0.13
Remedial Goal (mg/kg)	1.7	1.3	6.5	1.0	8.0		ND	1.0		1.0	1.0	1.0	1.0	1.0		400		
Remedial HQ*	0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA		
Remedial ILCR*	NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA		
Excavation COC HQ	0.2	0.3	0.001	0.002	0.4		NA	NA		NA	NA	NA	NA	NA		NA		
Excavation COC ILCR	NA	NA	2E-07	2E-07	1E-06		NA	NA		NA	NA	NA	NA	NA		NA		
Nitroaromatic HI	0.8						Sum mean	0.055		Sum mean	0.9					lead mean	33	
Nitroaromatic ILCR	2.E-06						less than RG?	Yes		less than RG?	Yes					less than RG?	Yes	
							total 1 mg/kg			total 1 mg/kg						total 400 mg/kg		

- Not detected above LOQ, 0.5x the LOQ used in calculation.
- Result exceeds RG, additional excavation not required at sample location.
- Result meets RG, however additional excavation is recommended.
- Not included in risk calculations. Replacement value in sample below.

NA - Not Applicable
ND - Not detected above LOQ
NR - Not Requested
*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study
Risk calculations based on the mean detection.

4.7.2. Remediation Pad

After all soil and sediment had been removed from the pad at the conclusion of follow-on, the footprint soils under the windrows were sampled and analyzed to determine if there was residual contamination. Sampling was performed in October, November and December 2012. The sampling was completed as soon as a windrow was removed from the pad. One 10-point composite sample was obtained from beneath each of the former windrows. The samples were submitted to Microbac Laboratories for analysis. The laboratory reports of the windrow footprint sampling are presented in Appendix C.2 and see Tables 4-29 and 4-30 for summary. Windrow footprint sampling was not conducted following the TNT C RA-C original effort since the remediation pad would be used for the continuation effort. The results of the windrow sampling indicated there was no residual contamination on the remediation pad.

4.7.3. Investigative Derived Wastes (IDW)

The IDW generated form the TNT C RA-C and Follow-on effort were kept to a minimum. The waste generated during this effort included used personal protective equipment (PPE), chemical packaging, chemical totes and drums, decontamination water and wastes from sampling activities. The PPE included nitrile gloves, Tychem® suits, and boots that were decontaminated at the end of use as the workers came off the pad. The decontamination water generated from the process was approximately <50 gallons of water and was applied onto the windrows at the end of the daily chemical application. The PPE was then disposed as solid waste to the Erie County Landfill. The chemical packaging (bags and supersacs) were transported to the landfill. Waste from other sites was not mixed with the wastes from this project. Due to the minimal IDW expected to be generated, an IDW Plan was not a separate plan but rather was included as a distinct section within the Plan of Operations (TMG, 2010b). The non-hazardous waste manifests are included in Appendix D.3.

4.8. Photographs

Photographic documentation was taken throughout the entire project from initial surveying and borrow area material sampling to final demobilization and site clearance. Due to the extreme number of photographs obtained, selected typical photographs have been included in the text of the report. All other photographs are included in Appendix B in electronic format and organized by Contract, AOC, and specific activity (remediation, sampling, road repair, etc.)

TABLE 4-29. Follow-on Windrow Footprint Summary

Date Collected	Sample	COC Analytical Results (mg/kg)															
		2-ADNT	4-ADNT	2,4-DNT	2,6-DNT	2,4,6-TNT		Aroclor 1254	Aroclor 1260		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene		Lead
12/10/2012	1115-FTW1-01	0.250	0.250	0.250	0.250	0.250		0.0191	0.0191		0.188	0.188	0.188	0.188	0.188		5.92
12/10/2012	1115-FTW2-01	0.248	0.248	4.63	0.248	0.248		0.0190	0.0190		0.188	0.188	0.188	0.188	0.188		6.38
10/25/2012	1115-FTW3-01	0.238	0.238	0.238	0.238	0.238		0.0185	0.0185		0.180	0.180	0.180	0.180	0.180		4.80
10/25/2012	1115-FTW4-01	0.239	0.239	0.239	0.239	0.239		0.0182	0.0182		0.181	0.181	0.181	0.181	0.181		4.76
11/27/2012	1115-FTW5-01	0.245	0.245	0.245	0.245	0.245		0.0190	0.0190		0.179	0.179	0.179	0.179	0.179		4.46
11/27/2012	1115-FTW6-01	0.245	0.245	0.245	0.245	0.245		0.0198	0.0198		0.181	0.181	0.181	0.181	0.181		4.27
10/25/2012	1115-FTW7-01	0.245	0.245	0.245	0.245	0.245		0.0181	0.0181		0.179	0.179	0.179	0.179	0.179		3.75
Minimum Detection (mg/kg)		ND	ND	0.2	ND	ND		ND	ND		ND	ND	ND	ND	ND		3.8
Mean (mg/kg)		ND	ND	0.77	ND	ND		ND	ND		ND	ND	ND	ND	ND		5
Maximum Detection (mg/kg)		ND	ND	4.6	ND	ND		ND	ND		ND	ND	ND	ND	ND		6.38
Remedial Goal (mg/kg)		1.7	1.3	6.5	1.0	8.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		400
Remedial HQ*		0.4	0.3	0.04	0.01	0.2		0.6	NA		NA	NA	NA	NA	NA		NA
Remedial ILCR*		NA	NA	9.E-06	1.E-06	6.E-07		3.E-06	3.E-06		NA	NA	NA	NA	NA		NA
Excavation COC HQ		NA	NA	0.005	NA	NA		NA	NA		NA	NA	NA	NA	NA		NA
Excavation COC ILCR		NA	NA	1E-06	NA	NA		NA	NA		NA	NA	NA	NA	NA		NA
Nitroaromatic HI		0.0					Sum mean	0.000		Sum mean	0.00					lead mean	5
Nitroaromatic ILCR		1.E-06					less than RG?	Yes		less than RG?	Yes					less than RG?	Yes
							total 1 mg/kg			total 1 mg/kg						total 400 mg/kg	

- Not detected above LOQ, 0.5x the LOQ used in calculation.

NA - Not Applicable

ND - Not detected above LOQ

NR - Analysis not requested

*Remedial HQs and ILCRs taken from Table 2-2 of the TNT Area A and C Focused Feasiblity Study

Risk calculations based on the mean detection.

TABLE 4-30. Follow-on Windrow TCLP Summary

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP Results (mg/L) Disposal Windrow 3	TCLP Results (mg/L) Disposal Windrow 4	TCLP Results (mg/L) Disposal Windrow 7
D004	Arsenic (As)	5	ND	ND	ND
D005	Barium (Ba)	100	0.265	0.240	0.148
D018	Benzene	0.5	ND	ND	ND
D006	Cadmium (Cd)	1	ND	ND	ND
D019	Carbon Tetrachloride	0.5	ND	ND	ND
D020	Chlordane	0.03	ND	ND	ND
D021	Chlorobenzene	100	ND	ND	ND
D022	Chloroform	6	ND	ND	ND
D007	Chromium (Cr)	5	ND	ND	ND
D023	o-Cresol	200	ND	ND	ND
D024	m-Cresol	200	ND	ND	ND
D025	p-Cresol	200	ND	ND	ND
D016	2,4-D	10	ND	ND	ND
D027	1,4-Dichlorobenzene	7.5	ND	ND	ND
D028	1,2-Dichloroethane	0.5	ND	ND	ND
D029	1,1-Dichloroethene	0.7	ND	ND	ND
D030	2,4-Dinitrotoluene	0.13	ND	ND	ND
D012	Endrin	0.02	ND	ND	ND
D031	Heptachlor	0.008	ND	ND	ND
D031	Heptachlor Epoxide	0.008	ND	ND	ND
D032	Hexachlorobenzene	0.13	ND	ND	ND
D033	Hexachlorobutadiene	0.5	ND	ND	ND
D034	Hexachloroethane	3	ND	ND	ND
D008	Lead (Pb)	5	ND	ND	ND
D013	Lindane	0.4	ND	ND	ND
D009	Mercury (Hg)	0.2	ND	ND	ND
D014	Methoxychlor	10	ND	ND	ND
D035	Methyl ethyl ketone	200	ND	ND	ND
D036	Nitrobenzene	2	ND	ND	ND
D037	Pentachlorophenol	100	ND	ND	ND
D038	Pyridine	5	ND	ND	ND
D010	Selenium (Se)	1	ND	ND	ND
D011	Silver (Ag)	5	ND	ND	ND
D039	Tetrachloroethene	0.7	ND	ND	ND
D015	Toxaphene	0.5	ND	ND	ND
D040	Trichloroethene	0.5	ND	ND	ND
D041	2,4, 5-Trichlorophenol	400	ND	ND	ND
D042	2,4,6-Trichlorophenol	2	ND	ND	ND
D017	2,4,5-TP (Silvex)	1	ND	ND	ND
D043	Vinyl Chloride	0.2	ND	ND	ND
		Category:	**Non-Hazardous**	**Non-Hazardous**	**Non-Hazardous**
		Recommended For:	**Ready for TNTA Soil**	**Ready for TNTA Soil**	**Ready for TNTA Soil**

ND -Not detected above LOQ.

5. SITE RESTORATION

Site restoration of the AOCs, stockpile areas, composting area, storm water management areas, and staging and office areas has been completed. TMG backfilled the excavations with a combination of clean material obtained from Barnes Nursery and remediated soil and sediment. All of the remediated soil and sediment has been removed from the pad and used as backfill in the AOCs, or transported to the landfill for use as daily cover. The remediation pad was restored to its pre-TNT C RA-C condition or better. Maintenance of the sumps maintenance will be performed through the end of this contract period then will be maintained by USACE. As presented in Figure 5-1, all of the building areas disturbed by the remediation have been reseeded with Indiangrass (*Sorghastrum nutans*), a prairie grass native to the PBOW area. Road ways in and around the area of TNT C that was impacted during the execution of this contract have been repaired. Figures 5-2 and 5-3 show the road repair being implemented along Fox Road.

The remediation pad will remain for future soil remediation efforts at PBOW. The USACE will provide on-site maintenance of the area as needed at the end of the TMG contract period.

FIGURE 5-1. Seeding in an AOC

FIGURE 5-2. Local Contractor Provided Road Repair Services

FIGURE 5-3. Road Repair Completed

6. CONCLUSIONS AND RECOMMENDATIONS

The Decision Document for TNT C called for the excavation, AH, windrow composting, *ex situ* chemical stabilization, and/or on-site/off-site disposal of an estimated 9,205 cy of nitroaromatic contaminated soil and sediment. Based on the results of an initial excavation under TNT C RA-C, there were 15 AOCs identified for excavation and remediation. Six of the fifteen AOCs could not be closed due to contamination, the wall or floors were not "clean." These six AOCs were the subject of the Follow-on, in which the extent of contamination was defined through a series of test pitting. The continuation effort identified an additional 2,657 cy for excavation and remediation.

The original effort of soil excavation began in July, 2010 and was designed to excavate and remediate 9,205 cy on nitro-aromatic contaminated soil and sediment. A total of 9,192 cy were excavated from the 15 AOCs. Of that total 2,254 cy were hazardous and remediated on-site using the Tetra Tech patented AH process. The remediated soil and sediment was used as backfill for the open AOCs. The remainder of the soil and sediment was non-hazardous and disposed off-site at the Erie County Landfill for use as daily cover in the landfill operation.

Under the follow-on at the six AOCs that remained open from the original effort, test pitting and confirmation sampling identified the boundaries of the clean soil and an additional 2,657 cy of contaminated soil and sediment was excavated from the six AOCs. This soil and sediment was excavated and transported directly to the remediation pad for AH remediation.

The AH process was directed by Tetra Tech and implemented according to the pilot study conducted by Tetra Tech on the TNT C soils as part of this effort. Tetra Tech owns the patent on the AH process utilized during these projects. TMG entered into a confidentiality agreement with Tetra Tech and which prohibits detailed discussion of process specifics. The soil and sediment remediation efforts were conducted over an approximate 6-week-period under the original effort from May to July 2011. Under the follow-on, the AH process was initiated in early July 2012 and the AH process and disposal confirmation sampling was completed in late August 2012. Four windrows remained on the pad due to PAHs exceeding the RGs but were ultimately disposed off-site at the landfill.

At the conclusion of the AH process the remediated soil and sediment was characterized as discussed in earlier text. The windrow AH of hazardous nitroaromatic contaminated soil from the PBOW TNT C has been proven to be an effective and efficient bioremediation tool. As a result, the contamination in the soil and sediment has been reduced sufficiently to permit the material to be reused on-site as backfill, eliminating the need for further disposal actions.

A portion of the soils under the continuation effort had to be disposed off-site at the landfill due to the PAHs exceeding the RG. One scenario that may have contributed to this was the aged asphalt material that was removed during the excavation at AOC 686.

This soil and sediment remediation was conducted as required in Alternative 5 of the Decision Document. The objectives of the soil and sediment remediation were met based on the requirements to remediate the site and meet the RGs of the COCs as identified in the *TNT Areas*

A and C Focused Feasibility Study Former Plum Brook Ordnance Works, Sandusky, Ohio (Shaw Environmental, 2003).

Over the course of the TNT C RA-C project, two rounds of soil and sediment remediation using AH were completed. There were "lessons learned" in the implementation of the AH using the windrow configuration, use of specialized equipment for mixing the soil and complete mixing of the chemical with the soil, chemical addition, application of the chemical to the soil and effect of AH process in different soil types. A few of the lessons learned are presented below:

- Height of the windrows is critical to ease of moving the turner through the soil, the higher rows tended to "bog down" the turner and restrict ease of movement through the soil. To fix this the height of the windrows was reduced.
- The windrows were constructed with a bed of straw between the windrowed soil and the underlying soil. This prevented contamination of the underlying soil as well as it provided an indicator the windrow turner was turning the entire volume of soil. When straw was visible during the turning process, the operator was assured the turner was reaching the entire depth of the windrow for complete mixing of the soil with the chemical.
- Alkaline material is applied more easily using the 2,000 lb supersacs. Plus it is safer for the personnel since most of the handling is performed with heavy equipment. During the first round of AH, the material was added to the windrows using 50 lb bags which was very inefficient.
- Provide sufficient lead time to chemical supplier to obtain the 2,000 lb supersacs in the necessary quantity. They are not an "off-the-shelf" commodity.
- Maintaining windrow moisture content is critical to the success of the AH process. A water truck was used to pump water into "troughs" knuckled into the top of the windrow. This allowed for the water to soak into the soil being treated rather than run-off the sides of the windrow, resulting in the inability and not effectively maintain the moisture content.
- Integrity of the windrows containing high sand content was difficult to maintain. In high moisture conditions (lots of rain), the windrows tended to collapse. This took additional maintenance to maintain the integrity of the row to allow for contact time with the AH chemicals. Recommend pilot studies for varying soil conditions.
- Asphalt material should be segregated from the soil during excavation and not included in the windrow process. This material should be processed separately from the soil.
- Equipment sized adequately to allow mobility in the restricted space on the pad and between windrows.

It is further concluded that windrow AH remediation should be considered as a viable alternative to render any of the nitroaromatic contaminated materials which exist throughout the PBOW site into clean available fill material as opposed to off-site transportation and disposal.

7. REFERENCES

The following reference materials were used in compiling the information contained in this report and/or were used in other documents associated with this project.

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This version of the TNT C RA-C Construction Completion Report document does not include an Appendix. For more information email PBOW@USACE.ARMY.MIL