N00164.AR.002147
NSA CRANE
5090.3a

DRAFT FINAL INTERIM MEASURES WORK PLAN FOR SETTLING BASIN REMOVALS/EXCAVATIONS AT SOLID WASTE MANAGEMENT UNIT 27 (SWMU 27) BUILDING 126 AND PYROTECHNICS PRODUCTION AREA NSA CRANE (DRAFT FINAL ACTING AS FINAL)
03/01/2013
TETRA TECH

DRAFT-FINAL
Interim Measures Work Plan
for
Settling Basin Removals/Excavations
at
SWMU 27 – Building 126 and Pyrotechnics Production Area

Naval Support Activity Crane
Crane, Indiana

Naval Facilities Engineering Command
Midwest

Contract Number N624670-08-D-1001
Contract Task Order F276

March 2013

011308/P

DRAFT-FINAL
INTERIM MEASURES WORK PLAN
FOR SETTLING BASIN REMOVALS/EXCAVATIONS
AT
SWMU 27 – BUILDING 126 AND
PYROTECHNICS PRODUCTION AREA

NAVAL SUPPORT ACTIVITY CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Midwest
201 Decatur Ave., Building 1A
Great Lakes, Illinois 60088

Submitted by:
Tetra Tech
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania 19406

CONTRACT NUMBER N624670-08-D-1001
CONTRACT TASK ORDER F276

MARCH 2013

PREPARED UNDER THE DIRECTION OF:

RALPH BASINSKI
PROJECT MANAGER
TETRA TECH
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMISSION BY:

JOHN TREPANOWSKI
PROGRAM MANAGER
TETRA TECH
KING OF PRUSSIA, PENNSYLVANIA

TABLE OF CONTENTS

SECTION **PAGE NO.**

ACRONYMS ..... **v**

EXECUTIVE SUMMARY **ES-1**

1.0 INTRODUCTION **1-1**
1.1 PURPOSE AND SCOPE OF IMWP 1-1
1.2 SWMU 27 DESCRIPTION 1-1
1.3 ENVIRONMENTAL HISTORY AND REGULATORY SUMMARY 1-2
1.3.1 Previous Investigations 1-4
1.3.2 SWMU 27 RCRA Facility Investigation 1-4
1.4 IMWP ORGANIZATION 1-5

2.0 GENERAL SITE CONDITIONS **2-1**
2.1 PHYSIOGRAPHY AND TOPOGRAPHY 2-1
2.2 SURFACE WATER HYDROLOGY 2-1
2.3 GEOLOGY 2-1
2.4 SOILS 2-2
2.5 HYDROGEOLOGY 2-2

3.0 ENVIRONMENTAL REMEDIATION AND INVESTIGATION SUMMARY **3-1**
3.1 PREVIOUS ENVIRONMENTAL INVESTIGATIONS AND REMEDIATION 3-1
3.2 RFI SAMPLING AND ANALYSIS 3-1
3.3 REGULATORY APPROACH 3-2

4.0 SETTLING BASIN AND SUMP RESIDUE AND CONCRETE DEBRIS REMOVAL INTERIM MEASURES **4-1**
4.1 PLANNING AND PERMITTING 4-1
4.2 SITE PREPARATION AND SUPPORT ACTIVITIES 4-2
4.3 SETTLING BASIN/SUMP RESIDUE REMOVAL AND BASIN STRUCTURE REMOVAL 4-3
4.4 TRANSPORTATION/OFF-SITE DISPOSAL OF SETTLING BASIN/SUMP RESIDUE 4-4
4.5 BACKFILL AND RESTORATION 4-4
4.6 CONSTRUCTION COMPLETION REPORT 4-6

5.0 REFERENCES **5-1**

APPENDICES

A SITE PHOTOGRAPHS
B ANALYTICAL RESULTS
C EMAC SUPPLEMENTAL SPECIFICATIONS

TABLES

NUMBER

3-1 Interior Pit/Sump Residue Sample Analysis Summary
3-2 Summary of Receptor-Specific Health Risks and Hazards for Settling Basin Samples
4-1 Summary of Settling Basin/Sump Dimensions to Support Residue and Concrete Basin Interim Removal Actions

FIGURES

NUMBER

ES-1 SWMU 27 Site Location Map
ES-2 Pyrotechnics Production Area Site Layout
ES-3 Locations of Pits, Sumps, and Settling Basins and Surface Flow Directions
1-1 SWMU 27 Site Location Map
1-2 Pyrotechnics Production Area Site Layout
3-1 Locations of Pits, Sumps, and Settling Basins and Surface Flow Directions
3-2 Pit/Sump Sample Human Health and Ecological Exceedances - SWMU 27
4-1 Settling Basin for Building 133
4-2 Settling Basin for Building 122
4-3 Concrete Drainage Ditches, Settling Tank & Apron, Asphalt Curb for Bldgs. 1885-1886, Sh. 1 of 2
4-4 Concrete Drainage Ditches, Settling Tank & Apron, Asphalt Curb for Bldgs. 1885-1886, Sh. 2 of 2
4-5 Traffic Control Plan

ACRONYMS

AHA	Activity Hazard Analysis
ASTM	American Society for Testing and Materials
CCR	Current Conditions Report
CLEAN	Comprehensive Long-term Environmental Action Navy
CMS	Corrective Measures Study
CTO	Contract Task Order
DRMO	Defense Reutilization and Marketing Office
DRO	diesel-range organics
EMAC	Environmental Multiple Award Contract
GRO	gasoline-range organics
HERO	Hazards of Electromagnetic Radiation to Ordnance
IDEM	Indiana Department of Environmental Management
IM	Interim Measures
IMWP	Interim Measures Work Plan
IR	Installation Restoration
mg/kg	milligrams per kilogram
msl	mean sea level
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
NSA	Navy Support Activity
OICC	Officer in Charge of Construction
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PPA	Pyrotechnics Production Area
PR/VSI	Preliminary Review / Visual Site Inspection
QCP	Quality Control Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SAP	Sampling and Analysis Plan
SSHSP	Site-Specific Health and Safety Plan
SWMU	Solid Waste Management Unit
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
UXO	Unexploded ordnance

WWTP	Waste Water Treatment Plant
µg/kg	micrograms per kilogram

EXECUTIVE SUMMARY

This Interim Measures (IM) Work Plan (IMWP) presents a plan to perform IM removals and restoration of concrete settling basins and sumps, and the liquids and residues contained within the basins and sumps at Solid Waste Management Unit (SWMU) 27 – Illuminant Building 126 and Pyrotechnics Production Area, Naval Support Activity (NSA) Crane in Crane, Indiana (ES-1). These settling basin and sump structures are no longer needed to support mission-critical operations and will therefore be removed from service. After completion of the IM excavation described herein, the Navy expects to obtain regulatory concurrence for no further action (NFA) for the site.

This IM will be performed to remove residues from sampled settling basins and sumps at SWMU 27 that contain manganese or lead at concentrations exceeding human health risk levels for construction worker exposures. Additionally, the concrete settling basin and sump structures will be removed from service after residue removal and cleaning has been completed.

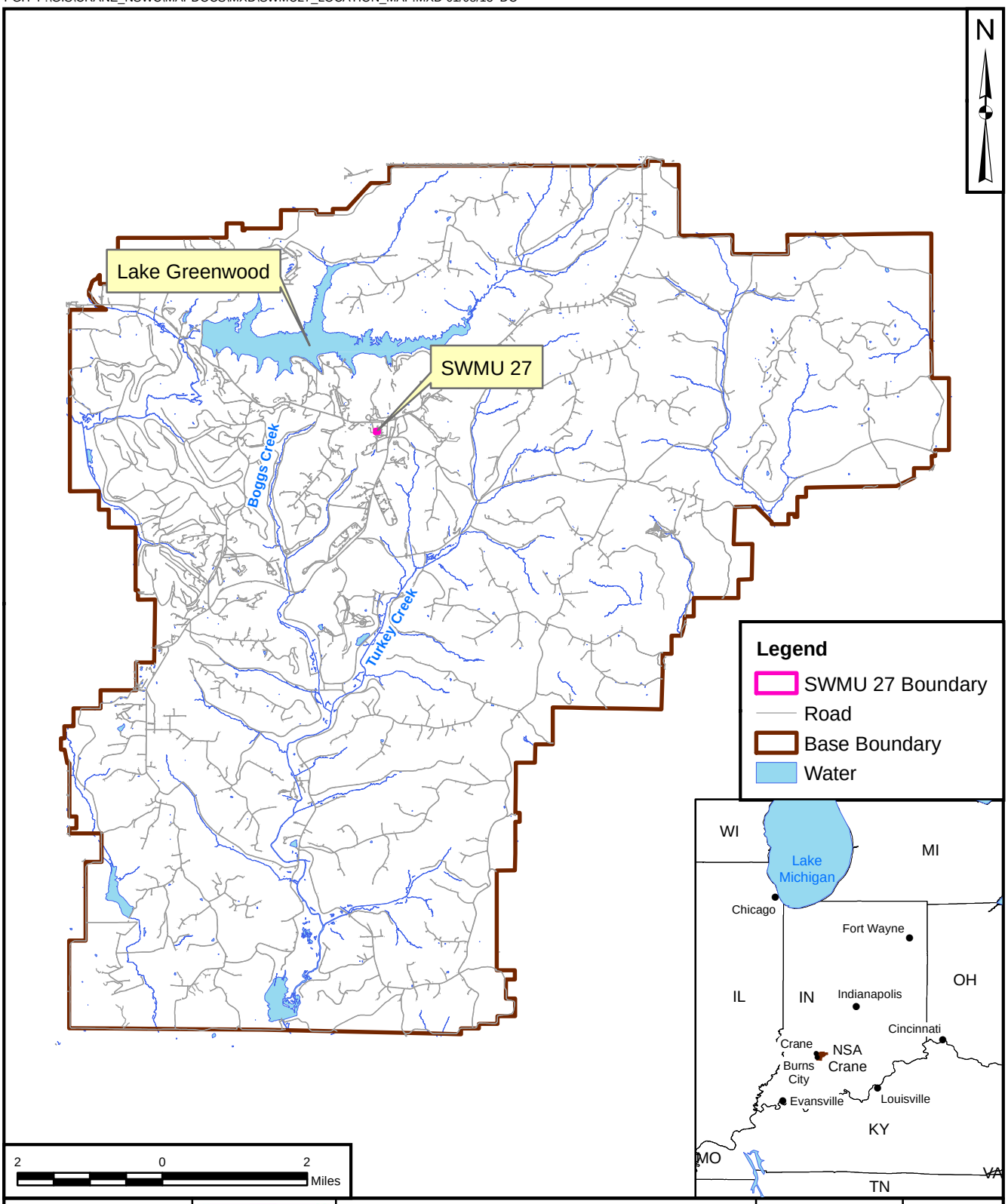
SWMU 27 consists of a portion of the area around the Illuminant Building 126, as well as part of that physical structure, which is also known as Building 126 (Figure ES-2). SWMU 27 and Building 126 are part of a larger complex of buildings known as the Pyrotechnics Production Area (PPA). The PPA includes the SWMU 27 area and consists of an industrialized complex of buildings that comprise an active pyrotechnics device manufacturing and assembly facility that produces signal, smoke, and illumination flares for the Department of Defense. In addition to Building 126 (Illuminant Building), the majority of the other structures within the PPA were designed and built during World War II for the exclusive purpose of loading, assembling, and packing out star shell ammunition to supply both the Atlantic and Pacific U.S. Naval fleets with a variety of pyrotechnic devices including illuminating projectiles, parachute flares, and star shells. Figure ES-3 presents the locations of the settling basins and sumps to be addressed as part of the IM.

Tetra Tech prepared a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Sampling and Analysis Plan (SAP) for SWMU 27 that was approved by the Indiana Department of Environmental Management (IDEM) in 2011. The work described in the SAP was subsequently implemented and included surface soil, subsurface soil, and settling basin and sump residue sampling. Based on the analytical data, Tetra Tech performed ecological and human health risk assessments and prepared an RFI Report that proposed no further action (NFA) for most of SWMU 27. However, the RFI Report (Tetra Tech, 2012) identified several inactive settling basins and sumps within the SWMU 27 area that contained residues with concentrations of manganese or lead associated with unacceptable human health risk for construction worker exposures.

Based on review of the SWMU 27 RFI Report, IDEM agreed with the recommendation to perform an IM to address the concrete settling basins, concrete sumps, and any remaining residues to achieve NFA for the entire SWMU 27 site. The proposed IM will also include site restoration.

This IMWP describes the proposed settling basin and sump residue removals, basin and sump structure excavation and removal activities. In addition, the proposed post-remedial Site restoration activities are presented. After completion of the IM, a description of Current Conditions Report (CCR) will be prepared summarizing the work, and the information will be incorporated into a supplement to the SWMU 27 RFI Report to support an NFA recommendation for the entire site.

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_LOCATION_MAP.MXD 01/08/13 DC



DRAWN BY	DATE	CONTRACT NUMBER	CTO NUMBER
D. COUCH	01/08/13	2126	F276
CHECKED BY	DATE	APPROVED BY	DATE
R. BARRINGER	01/03/13		
REVISED BY	DATE	APPROVED BY	DATE
SCALE AS NOTED		FIGURE NO. FIGURE ES-1	REV 0

SITE LOCATION MAP
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\AOC01_SITE_MAP.MXD 03/12/13 KM

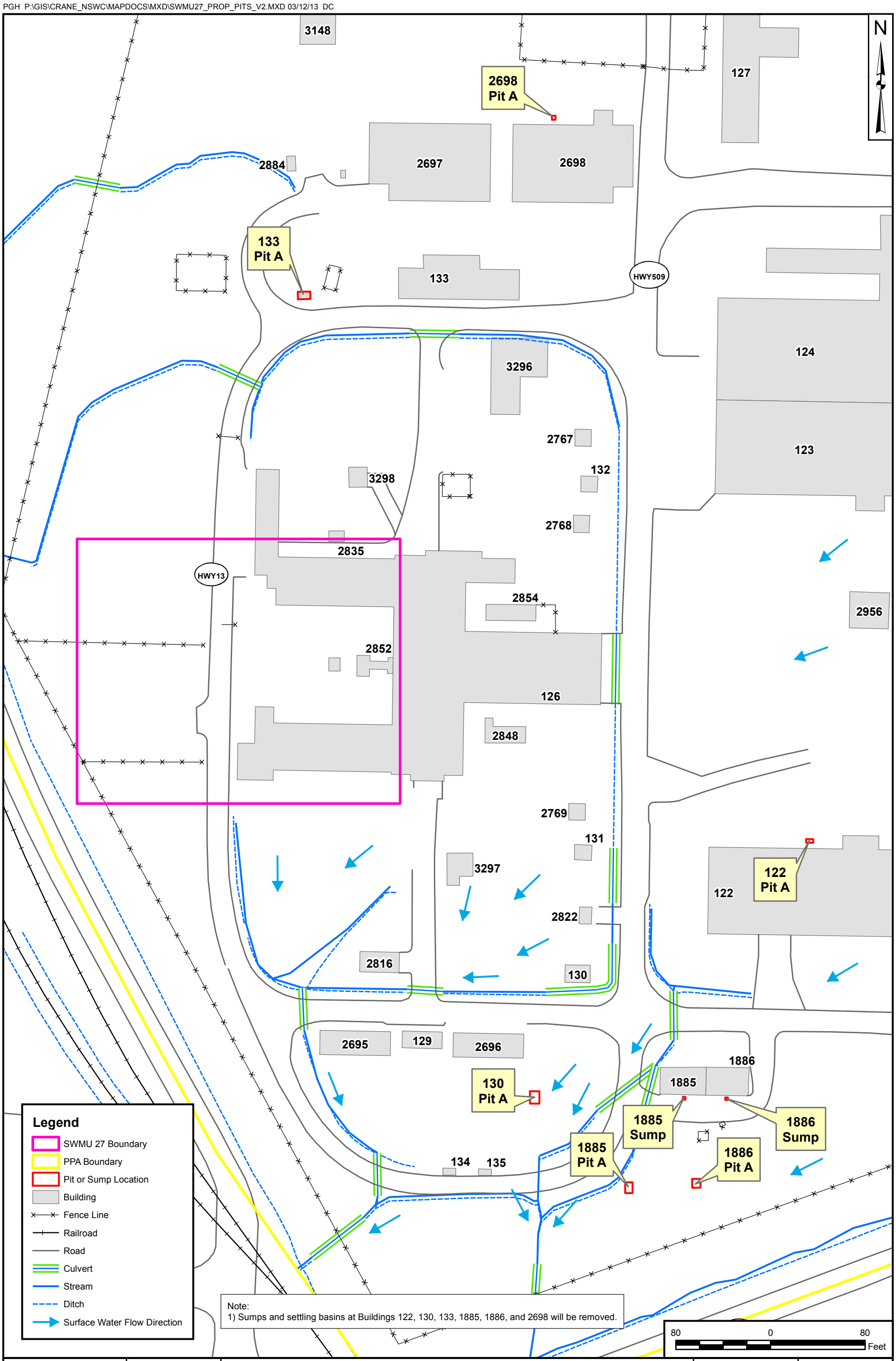
DRAWN BY	DATE
T. WHEATON	10/16/09
CHECKED BY	DATE
R. BARRINGER	3/12/13
REVISED BY	DATE
D. COUCH	01/14/13
SCALE	
AS NOTED	

NAVFAC

PYROTECHNICS PRODUCTION AREA SITE LAYOUT
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
2126	F276
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE ES-2	0

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_PROP_PITS_V2.MXD 03/12/13 DC



DRAWN BY	DATE
S. STROZ	06/29/10
CHECKED BY	DATE
R. BARRINGER	01/04/13
REVISED BY	DATE
D. COUCH	03/12/13
SCALE	
AS NOTED	

NAVFAC

LOCATIONS OF SUMPS, SETTLING BASINS (PITS)
AND SURFACE FLOW DIRECTION
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
2126	F276
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE ES-3	0

1.0 INTRODUCTION

This Interim Measures (IM) Work Plan (IMWP) for Solid Waste Management Unit (SWMU) 27 – Illuminant Building 126 and Pyrotechnics Production Area (PPA) was prepared for the United States Navy, Naval Facilities Engineering Command Midwest by Tetra Tech, Inc. under Contract Task Order (CTO) F276 of the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N624670-08-D-1001. The IMWP presents a plan to perform IM removals and restoration of locations at SWMU 27 with contaminated settling basins and sumps at SWMU 27 Illuminant Building 126 and the PPA at Naval Support Activity (NSA) Crane in Crane, Indiana (Figure 1-1).

The IM will be performed to remove solid and liquid residues from sampled settling basins and sumps at SWMU 27 and the PPA that contained manganese or lead at concentrations exceeding acceptable human health risk levels for construction worker exposures. Additionally, the concrete settling basin and sump structures will be removed from service, and physically removed from the site after residue removal and cleaning has been completed because they are no longer needed to support mission-critical operations. After completion of the IM excavation described herein, the Navy expects to obtain regulatory concurrence for no further action (NFA) for the entire SWMU 27 site.

1.1 PURPOSE AND SCOPE OF IMWP

The purpose of this IMWP is to present background information about SWMU 27 and the subject settling basins and sumps, and describes the scope of work that will be performed to clean and remove specific settling basins from the site that contained manganese or lead in excess of acceptable human health risk levels for construction worker exposures. The IMWP also presents the data used to determine which structures were required to be addressed as part of the IM, and the activities that will be implemented to perform the work.

1.2 SWMU 27 DESCRIPTION

SWMU 27 is located in the north-central portion of NSA Crane (Figure 1-1) and consists of a portion of the area around the Illuminant Building as well as part of that physical structure, which is also known as Building 126 (Figure 1-2). SWMU 27 is a part of a larger complex of buildings known as the Pyrotechnics Production Area (PPA). The PPA includes the SWMU 27 area and consists of an industrialized complex of buildings that comprise an active pyrotechnics device manufacturing and assembly facility that produces signal, smoke, and illumination flares for the Department of Defense. The concrete settling basin and sump structures to be cleaned, removed from service, and physically removed from the site under this IM are located within the PPA.

The PPA is trapezoid shaped area covering approximately 31 acres (Figure 1-2) that is bounded by Highway 5 on the north and Highway 99 on the south. The southern, western, and northwestern portions of the PPA are grassland (Figure ES-2). The majority of the PPA is located within a chain-link fence bordering the area, with access controlled by two locked gates; one on the north and the other on the east end of the site.

Physical structures at the PPA are shown on Figure 1-2, and include pyrotechnic production buildings (Buildings 122, 123, 126, 130, and 2697), a red phosphorous pressing house (Building 133), laboratory (Building 127), plating and maintenance buildings (Building 1884), phosphorous mixing buildings (Buildings 1885 and 1886), wastewater treatment plant (Building 3064), numerous storage magazines/buildings, curing buildings, and miscellaneous inactive buildings.

1.3 ENVIRONMENTAL HISTORY AND REGULATORY SUMMARY

The PPA consists of a complex of buildings, the majority of which were designed and built during World War II for the purpose of loading, assembling, and packing star shell ammunition to supply both the Atlantic and Pacific U.S. Naval fleets with a variety of pyrotechnic devices including illuminating projectiles and parachute flares. The star shell, primarily a 5-inch illuminating round with a parachute, required significant support facilities. The PPA buildings associated with the star shell production process were as follows:

- Building 121 (second floor) was used for parachute fabrication.
- Buildings 123, 124, and 125 were used for metal part generation (machining and assembly).
- Building 126 (Illuminant Building) was used for preparation of the illumination composition and its pressing into “candles.”
- Building 122 was the final assembly building where the candle (pyrotechnic package) was inserted into the projectile, the parachute was attached and packed, and the whole round was packed out for rail shipment from the plant.
- Several smaller buildings that surround Building 126 were used for chemical storage, candle curing, ready magazines, and inert support warehouses necessary to maintain the process.

Additional buildings were constructed in the PPA after 1942 to support the war effort and later operations, including production of the following:

- Marker flares, rescue flares, and parachute flares
- Illuminating projectiles and incendiaries
- Smoke signals and spotting charges
- Ground and aircraft signals and submarine signals
- Aircraft signal cartridges and depth charge markers.

The majority of Navy experimental work associated with pyrotechnic devices was conducted at the NSA Crane PPA.

Illuminant Building 126 was classified as an Installation Restoration (IR) Program site by the Navy in 1983 during an initial assessment study. According to descriptions of this IR site, red phosphorus was discharged to sump basins that reportedly overflowed to tributaries of Boggs Creek. Heavy metal contamination from zinc and cadmium was also identified in open ditches in the PPA that eventually drain into Boggs Creek. The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) report evaluated potential soil contamination in the open ditches, in areas surrounding settling basins and sumps, in areas of suspected pyrotechnic testing/burning, and in areas near electrical transformer equipment. The RFI report identified specific settling basins and sumps with manganese or lead concentrations above acceptable exposure risk levels for construction workers in the basin and sump residues (Tetra Tech, 2012).

A metal-plating shop using metals, caustics, acids, and cyanides operates on the eastern edge of the PPA (Building 1884). Process wastewaters and rinsates from operations in this building were at one time discharged to open ditches and later to building sumps that may have overflowed into ditches that drain to the south and west into the Boggs Creek watershed. Heavy metal contamination (zinc and cadmium) has been detected in wastewater that was previously discharged into open ditches. Currently, the treated wastewater from metal-plating operations is discharged to the sanitary sewer system under a National Pollutant Discharge Elimination System (NPDES) permit. The RFI (Tetra Tech, 2012), did not identify soil contamination in the area near the metal-plating operation (Building 1884).

The following summarizes the site-specific information in the Navy's NORM (normalized) database and other relevant SWMU 27 and PPA information from NAVFAC:

- Contamination at this site included red phosphorus, chlorate, dyes, oxidizers, and fuels for flares and smoke munitions. Although red phosphorus is probably the most significant contaminant (in terms of

relative amounts), it was not regarded as a major environmental concern because red phosphorus is not persistent and rapidly degrades in the environment. Red phosphorus was assigned in the NORM database to the unproblematic environmental category.

- Building 126 used settling basins and sump pits that were pumped out by trucks, and the pumped materials were taken to the ammunition burning grounds at NSA Crane for treatment.

- All sump overflows drained into the Boggs Creek watershed.

- A metal-plating shop that used heavy metals, caustics, acids, and cyanide-based processes is present at the site, and significant heavy metal contamination (zinc and calcium) had been detected in wastewater being discharged into open ditches. However, since November 1992 the plating shop has not used cyanide.

1.3.1 Previous Investigations

In 1987, a Preliminary Review/Visual Site Inspection (PR/VSI) Report by A.T. Kearney stated that potential releases to the soil for SWMU 27 may: (1) present complete exposure pathways to human receptors; and/or (2) serve as a source of contamination to groundwater and present complete exposure pathways to human receptors. However, the PR/VSI Report concluded that there are low release potentials to surface water because of the sanitary sewer system discharge (A.T. Kearney, 1987).

1.3.2 SWMU 27 RCRA Facility Investigation

Tetra Tech prepared an RFI Sampling and Analysis Plan (SAP) for SWMU 27 (Tetra Tech, 2011) that was approved by the Indiana Department of Environmental Management (IDEM). The SWMU 27 RFI was conducted in accordance with applicable RCRA corrective action requirements at NSA Crane. Investigation requirements are specified in the NSA Crane RCRA hazardous waste management permit, originally issued by the United States Environmental Protection Agency (USEPA) on December 29, 1989 and renewed in September 2009 (USEPA, 2009). Following SAP approval, RFI environmental sampling was performed at SWMU 27 and the PPA during April and August 2011. The sampling provided data on select organic and inorganic chemical concentrations in surface and subsurface soils, and in settling basin and sump residues.

Based on analytical data from those sampling events, Tetra Tech prepared an RFI Report, which included ecological and human health risk assessments (Tetra Tech, 2012). The SWMU 27 RFI Report proposed NFA for the majority of the areas evaluated within the PPA, but identified several settling basins and sumps with basin residues containing manganese or lead at concentrations that posed unacceptable

health risks to construction workers based on incidental ingestion. The RFI Report recommended that basin/sump residues with chemicals of concern (lead and manganese) at concentrations associated with unacceptable human health risks be addressed under a Corrective Measures Study (CMS) or IM.

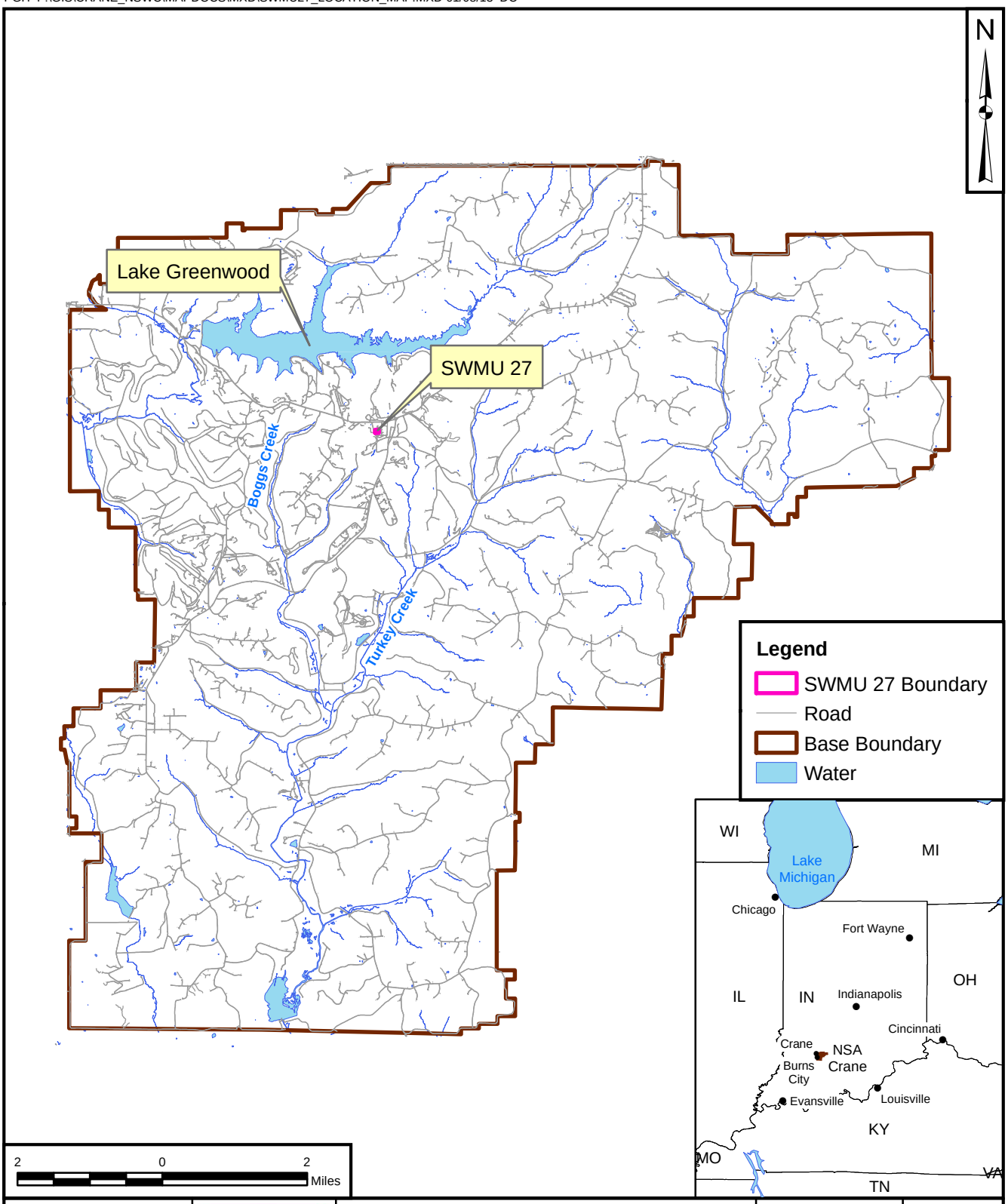
IDEM reviewed and accepted the draft final RFI Report, and agreed with the recommended IM to address the settling basins and sumps with residues containing lead and manganese at concentrations that pose unacceptable construction worker exposure risks to achieve NFA for those settling basin and sump locations. In response to the approved recommendations, the Navy will implement an IM removal action that will include the removal of liquids and residues from the settling basins and sumps, disconnection of the settling basins and sumps and plugging of the associated piping, and excavation and removal of the concrete basin and sump structures, with off-site disposal of the residues and concrete structures.

1.4 IMWP ORGANIZATION

The remainder of this IMWP presents general information about the site (Section 2), historical environmental investigation sampling and analysis results (Section 3), and a description of the proposed IM (Section 4). The following appendices also present additional site information:

- Appendix A – Site Photographs
- Appendix B – Analytical Results
- Appendix C – EMAC Supplemental Specifications

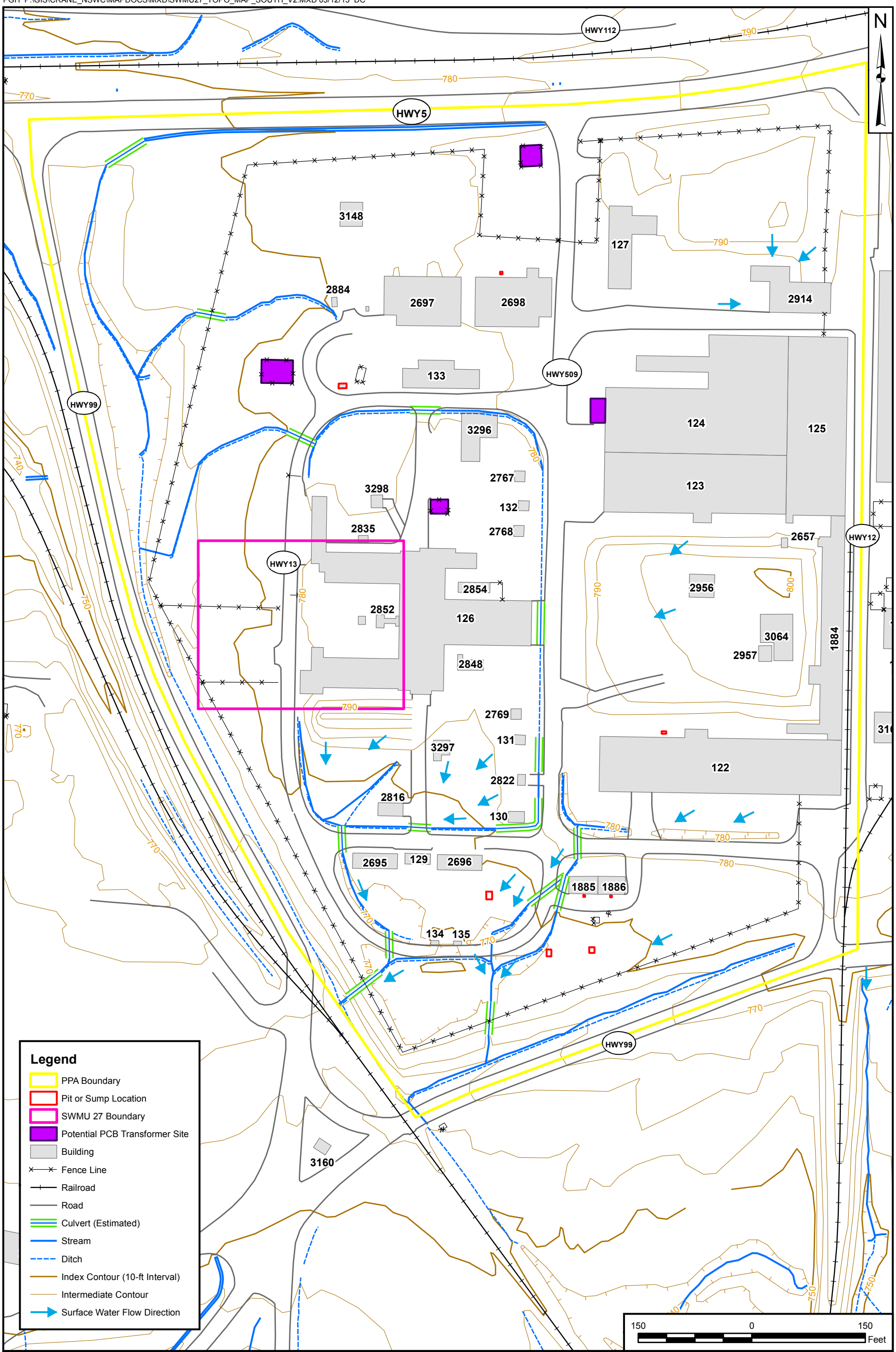
PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_LOCATION_MAP.MXD 01/08/13 DC



DRAWN BY	DATE	CONTRACT NUMBER	CTO NUMBER
D. COUCH	01/08/13	2126	F276
CHECKED BY	DATE	APPROVED BY	DATE
R. BARRINGER	01/03/13		
REVISED BY	DATE	APPROVED BY	DATE
SCALE AS NOTED		FIGURE NO. FIGURE 1-1	REV 0

SITE LOCATION MAP
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_TOPO_MAP_SOUTH_V2.MXD 03/12/13 DC



DRAWN BY	DATE
J. ENGLISH	09/29/09
CHECKED BY	DATE
R. BARRINGER	01/04/13
REVISED BY	DATE
D. COUCH	03/12/13
SCALE	
AS NOTED	

NAVFAC

PYROTECHNICS PRODUCTION AREA SITE LAYOUT
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
2126	F276
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 1-2	0

2.0 GENERAL SITE CONDITIONS

SWMU 27 and the PPA are located on the north-central portion of NSA Crane, as shown on Figure 1-1. Photographs of the various settling basins and sumps in the PPA are presented in Appendix A. General site conditions of the PPA and SWMU 27 are described in this section.

2.1 PHYSIOGRAPHY AND TOPOGRAPHY

The PPA is located on a promontory of land south of Highway 5, as shown on Figure 1-2. This area was flattened and regraded in the 1940s to develop the site for the various pyrotechnics production buildings, including Building 126 (SWMU 27). As shown on Figure 1-2, highest elevation within the PPA, 800 feet msl, is the manmade mound for the PPA WWTP (Building 3064).

2.2 SURFACE WATER HYDROLOGY

The nearest streams are the tributaries that drain west into Boggs Creek and surface water in the PPA and SWMU 27 flow south towards Highway 99 and then flow west into the Boggs Creek Watershed (Figure 1-1). Turkey Creek is east of the PPA, but drainage swales and local topography convey surface flow in the PPA to the south and west (near the point where the railroad track crosses Highway 99). Throughout the PPA are various concrete basins and pits (Figure 1-2) that flowed to surface water drainage channels or swales in the past.

2.3 GEOLOGY

The NSA Crane region is underlain by sedimentary rocks of lower Pennsylvania and upper Mississippian age that dip gently to the west-southwest, reflecting the location of the facility on the eastern flank of the Illinois Basin. This section of the basin is composed of Pennsylvanian and Mississippian shale, sandstone, limestone, and coal (Pennsylvanian) beds. The Pennsylvanian Mansfield Formation (Raccoon Creek Group) unconformably overlies the Mississippian Stephensport and West Baden Groups at NSA Crane.

There are no wells located within, on, or in the immediate vicinity of SWMU 27; therefore, specific site bedrock geology is unknown. However, other nearby bedrock wells at NSA Crane confirm that the local bedrock consists of discontinuous layers of Pennsylvanian and Mississippian siltstones, sandstones, shales, and coal seams. With the exception of minor outwash and lacustral deposits in the northwestern corner of the facility, there are no Pleistocene glacial deposits present at the installation. Surface deposits at NSA Crane consist of Holocene and Pleistocene unconsolidated alluvial silt, sand, and gravel, and residual soils developed from the underlying bedrock.

2.4 SOILS

The hilltop plateau comprising the PPA and SWMU 27 is covered with a thin veneer of residual and reworked soils.

2.5 HYDROGEOLOGY

No temporary or permanent wells were installed at SWMU 27, or the PPA, during the RFI. A single well installation was attempted but could not be completed because competent bedrock was encountered at a depth of 5 feet below ground surface. It is presumed that groundwater flow generally mimics site topography, and it is assumed that groundwater in SWMU 27 and the PPA flows to the west and southwest towards a branch of Boggs Creek (Figure 1-1).

3.0 ENVIRONMENTAL REMEDIATION AND INVESTIGATION SUMMARY

Prior to the SWMU 27 RFI Report (Tetra Tech, 2012), standard environmental remediation activities performed at SWMU 27 and the PPA facilities were generally to address process releases such as minor spills, leaks, or drain and sump overflows during PPA operations. This IMWP is part of the RCRA process. The environmental investigation and remediation history of the site is summarized in this section.

3.1 PREVIOUS ENVIRONMENTAL INVESTIGATIONS AND REMEDIATION

As presented in Section 1.3.1, a Preliminary Review/Visual Site Inspection (PR/VSI) Report was prepared by A.T. Kearney in 1987, and stated that potential releases to the soil for SWMU 27 may: (1) present complete exposure pathways to human receptors; and/or (2) serve as a source of contamination to groundwater and present complete exposure pathways to human receptors. The PR/VSI Report concluded that there are low release potentials to surface water because the sanitary sewer system managed process discharges (A.T. Kearney, 1987). A more detailed history of the site and previous environmental assessments and activities are presented in the SWMU 27 RFI report (Tetra Tech, 2012).

3.2 RFI SAMPLING AND ANALYSIS

The SWMU 27 RFI preparation was initiated in 2009 to investigate the SWMU 27 site. The SWMU 27 RFI was expanded to include the PPA and was performed in accordance with IDEM-approved SAP (Tetra Tech, 2011). The SWMU 27 RFI field work was conducted in April 2011 and August 2011, and included collection of surface and subsurface soil, and residue samples from settling basins and sumps within the PPA.

The settling basins and sumps within the PPA are regarded as likely collection points for potential environmental contaminants, so the SWMU 27 RFI included the sampling of the residues in the bottom of these structures. Each settling basin composite sample consisted of four to six aliquots collected from individual chambers within the basin, if possible. Otherwise, the aliquots were collected from areas representative of the entire structure. Six composite residue samples were collected from the following settling basins in the PPA:

- Building 122 Pit A (27SS029C0002)
- Building 130 Pit A (27SS031C0002)
- Building 133 Pit A (27SS032C0002)
- Building 1885 Pit A (27SS033C0002)

- Building 1886 Pit A (27SS034C0002)
- Building 2698 Pit A (27SS066C0002)

Two grab samples were also collected from the interior of two small sumps immediately south of the following buildings:

- Building 1885 Sump (27SS056G0002)
- Building 1886 Sump (27SS057G0002)

The locations of these sampled settling basins and sumps are shown on Figure 3-1. The residue samples were submitted to Empirical Laboratories, Inc. for analysis of volatile organic compounds, select metals (aluminum, barium, cadmium, chromium, copper, lead, magnesium, manganese, potassium, sodium, strontium, and zinc), and perchlorate. In addition, specific samples were analyzed for cyanide to evaluate potential discharges from metal plating activities. The full, validated, analytical data for settling basin and sump residue samples are presented in Appendix B. Concentrations of analytes with positive detections were compared to relevant human health and ecological exposure screening levels as presented in Table 3-1.

The SWMU 27 RFI Report evaluated the collected analytical data, and presented exposure assessments for human receptors inside the PPA, and also for ecological receptors at the perimeter of the PPA (Tetra Tech, 2012). Unacceptable human health risks were associated with concentrations of manganese or lead in samples from six of the settling basins/sumps in the PPA as presented in Table 3-2 and as shown on Figure 3-2. The residues sampled in settling basin at Building 1886 (Pit A) contained metals contaminants above human health risk levels, so this basin will be similarly cleaned, disconnected, and removed as it is no longer in use. The sampled residues in the settling basin at Building 122, while not identified as having unacceptable human health risks from exposure to lead or manganese concentrations, did contain total xylene concentrations in excess of acceptable worker exposure levels. Therefore settling basin Building 122 Pit A will also be cleaned, disconnected, and removed along with the other listed basins/sumps at SWMU 27. A total of eight sumps/settling basins will be removed from SWMU 27.

3.3 REGULATORY APPROACH

IDEM reviewed and accepted the draft final SWMU 27 RFI Report and agreed with the recommended IM to address sump and basins with residues containing lead and/or manganese (or other compounds) at concentrations that pose unacceptable human health risks to construction workers to achieve NFA for those basin and sump locations.

In response to those recommendations, the Navy is planning to implement an IM removal action that will include removal of liquids and residues from the settling basins and sumps noted on Figure 3-1. The IM will include disconnection of the settling basins and plugging of the associated basin/sump piping, excavation, demolition, removal of the concrete basin and sump structures, off-site disposal of the residues and concrete debris, and backfill to grade the following settling basins and sumps:

- Building 122 Pit A
- Building 130 Pit A
- Building 133 Pit A
- Building 1885 Pit A
- Building 1886 Pit A
- Building 1885 Sump
- Building 1886 Sump
- Building 2698 Pit A

TABLE 3-1

INTERIOR SETTLING BASIN/PIT/SUMP RESIDUE SAMPLE ANALYSIS SUMMARY
SWMU 27 AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

LOCATION AREA SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SUBMATRIX TOP DEPTH BOTTOM DEPTH	HUMAN HEALTH SCREENING LEVEL	METALS BACK-GROUND	ECOLOGICAL SCREENING LEVEL	**27SB029** **Building 122 Pit A** **27SS029C0002** **20110408** **NORMAL** **SO** **SS** **0** **2**	**27SB031** **Building 130 Pit A** **27SS031C0002** **20110408** **NORMAL** **SO** **SS** **0** **2**	**27SB032** **Building 133 Pit A** **27SS032C0002** **20110408** **NORMAL** **SO** **SS** **0** **2**	**27SB033** **Building 1885 Pit A** **27SS033C0002** **20110408** **NORMAL** **SO** **SS** **0** **2**
METALS (MG/KG)							
ALUMINUM	7700	19900	---	3190	**10600 J**	1500	3690
BARIUM	1500	211	1.04	**76.5 J**	**779 J**	**102 J**	**257 J**
CADMIUM	7	6.05	0.36	**11.9**	**14.3 J**	12.8 U	18.1 U
CHROMIUM	0.0118	28.7	26	**240 J**	**56.7 J**	63.9 U	36.3 U
COPPER	310	17.6	28	**277**	**1200 J**	**2420**	**154**
LEAD	81	27	11	**597**	**738 J**	**1570**	**396**
MAGNESIUM	---	2800	---	6970 J	13600 UJ	45300 J	29100 J
MANGANESE	180	5700	220	**640**	**120000 J**	**208000**	**125000**
POTASSIUM	---	1970	---	179 J	935 J	305 J	657 J
SODIUM	---	28	---	270 U	1380 J	149 J	262 J
STRONTIUM	4700	46.4	---	36.6	221 J	18.1	128
ZINC	2300	65.6	46	**4580 J**	**6410 J**	**18900 J**	**12400 J**
MISCELLANEOUS PARAMETERS (MG/KG)							
CYANIDE	0.94	---	1.3	0.491 J	--	--	--
VOLATILES (MG/KG)							
1,2-DICHLOROBENZENE	5.4	---	2.96	5.49 U	0.0123 UJ	0.0092 J	0.00277 J
1,4-DICHLOROBENZENE	0.0082	---	0.546	5.49 U	0.0123 UJ	**0.0241 J**	0.00604 J
2-BUTANONE	20	---	89.6	11 UJ	0.153 J	0.00554 UJ	0.00924 U
ACETONE	28	---	2.5	22 U	0.399 J	0.0111 UJ	0.0185 U
BENZENE	0.0042	---	0.255	5.49 U	0.0123 UJ	0.00331 J	0.00359 J
CARBON DISULFIDE	4.2	---	0.094	5.49 U	0.00888 J	0.00277 UJ	0.00462 U
CHLOROBENZENE	0.98	---	13.1	5.49 U	0.0123 UJ	0.00779 J	0.00876 J
CIS-1,2-DICHLOROETHENE	0.4	---	0.784	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U
CYCLOHEXANE	260	---	---	27.9	0.0416 J	0.00277 UJ	0.00462 U
ETHYLBENZENE	0.034	---	5.16	**297**	**1.85 J**	0.00277 UJ	0.00397 J
ISOPROPYLBENZENE	11	---	---	**20.1**	0.442 J	0.00277 UJ	0.00462 U
METHYL CYCLOHEXANE	---	---	---	349	0.918 J	0.00277 UJ	0.00462 U
METHYLENE CHLORIDE	0.023	---	4.05	11 U	0.0246 UJ	0.00554 UJ	0.00924 U
TOLUENE	12	---	5.45	5.49 U	0.0123 UJ	0.0136 J	0.0129
TOTAL XYLENES	3.8	---	10	**829**	3.3 J	0.0083 UJ	0.0171 J
TRICHLOROETHENE	0.0032	---	12.4	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U
VINYL CHLORIDE	0.000112	---	0.646	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U

TABLE 3-1

INTERIOR SETTLING BASIN/PIT/SUMP RESIDUE SAMPLE ANALYSIS SUMMARY
SWMU 27 AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

LOCATION AREA SAMPLE ID SAMPLE DATE SAMPLE CODE MATRIX SUBMATRIX TOP DEPTH BOTTOM DEPTH	HUMAN HEALTH SCREENING LEVEL	METALS BACK-GROUND	ECOLOGICAL SCREENING LEVEL	**27SB034** **Building 1886 Pit A** **27SS034C0002** **20110408** **NORMAL** **SO** **SS** **0** **2**	**27SB056** **Building 1885 Sump** **27SS056G0002** **20110407** **NORMAL** **SO** **SS** **0** **2**	**27SB057** **Building 1886 Sump** **27SS057G0002** **20110407** **NORMAL** **SO** **SS** **0** **2**	**27SB066** **Building 2698 Pit A** **27SS066C0002** **20110826** **NORMAL** **SO** **SS** **0** **2**
METALS (MG/KG)							
ALUMINUM	7700	19900	---	**10900 J**	7230	5670	**18800 J**
BARIUM	1500	211	1.04	**239 J**	**373 J**	**491 J**	**1010 J**
CADMIUM	7	6.05	0.36	**7.63 J**	**7.97 J**	**10.2 J**	**138 J**
CHROMIUM	0.0118	28.7	26	**39.5 J**	29.3 U	94.6 U	**656 J**
COPPER	310	17.6	28	**168 J**	**233**	**515**	**765 J**
LEAD	81	27	11	**221 J**	**1270 J**	**840 J**	**6100 J**
MAGNESIUM	---	2800	---	11300 J	14500 J	27000 J	3280 J
MANGANESE	180	5700	220	**2400 J**	**67900 J**	**279000 J**	52 J
POTASSIUM	---	1970	---	1040 J	1320 J	921 J	2790 UJ
SODIUM	---	28	---	921 J	251 J	460 J	2790 UJ
STRONTIUM	4700	46.4	---	108 J	223 J	538 J	35.9 J
ZINC	2300	65.6	46	**2120 J**	**7240 J**	**3250 J**	**7010 J**
MISCELLANEOUS PARAMETERS (MG/KG)							
CYANIDE	0.94	---	1.3	--	--	--	--
VOLATILES (MG/KG)							
1,2-DICHLOROBENZENE	5.4	---	2.96	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,4-DICHLOROBENZENE	0.0082	---	0.546	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
2-BUTANONE	20	---	89.6	0.134 J	0.00794 U	0.00876 U	0.236 J
ACETONE	28	---	2.5	0.761 J	0.0159 U	0.0175 U	0.777 J
BENZENE	0.0042	---	0.255	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CARBON DISULFIDE	4.2	---	0.094	0.017 J	0.00397 U	0.00438 U	0.0315 J
CHLOROBENZENE	0.98	---	13.1	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CIS-1,2-DICHLOROETHENE	0.4	---	0.784	0.0113 UJ	0.00397 U	0.00438 U	0.00799 J
CYCLOHEXANE	260	---	---	0.891 J	0.00397 U	0.00438 U	0.0904 J
ETHYLBENZENE	0.034	---	5.16	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
ISOPROPYLBENZENE	11	---	---	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
METHYL CYCLOHEXANE	---	---	---	0.0113 UJ	0.00397 U	0.00438 U	0.989 J
METHYLENE CHLORIDE	0.023	---	4.05	0.0227 UJ	0.00794 U	0.00876 U	**0.173 J**
TOLUENE	12	---	5.45	0.0113 UJ	0.00397 U	0.00438 U	0.0415 J
TOTAL XYLENES	3.8	---	10	0.0171 J	0.0119 U	0.0131 U	0.051 J
TRICHLOROETHENE	0.0032	---	12.4	0.0113 UJ	0.00397 U	0.00438 U	**0.0564 J**
VINYL CHLORIDE	0.000112	---	0.646	0.0113 UJ	0.00397 U	0.00438 U	**0.00724 J**

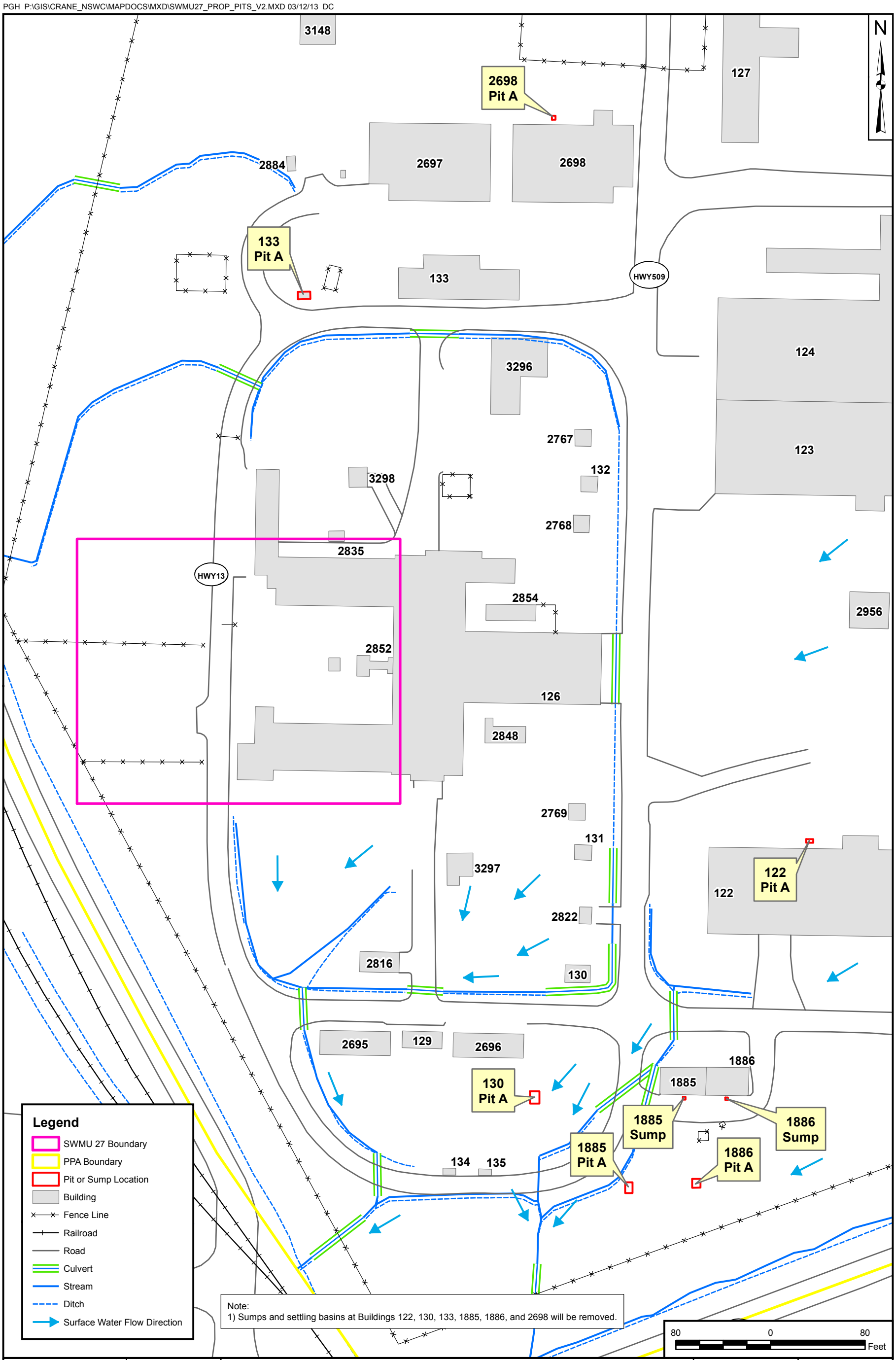
Exceeds both indicated Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) screening levels (SWMU 27 RFI Report, Tetra Tech 2012).
Exceeds ERA screening level only (SWMU 27 RFI Report, Tetra Tech 2012)
Exceeds HHRA screening level only (SWMU 27 RFI Report, Tetra Tech 2012)
J - Estimated value
U - Concentration is less then the laboratory detection limit
UJ - Indicates that the chemical was not detected. However, the indicated detection limit (sample-specific quantitation limit) is considered as estimated.
--- - Value not available

TABLE 3-2

SUMMARY OF RECEPTOR-SPECIFIC HUMAN-HEALTH RISKS FOR SWMU 27 SETTLING BASIN AND SUMP RESIDUES NSA CRANE, CRANE, INDIANA

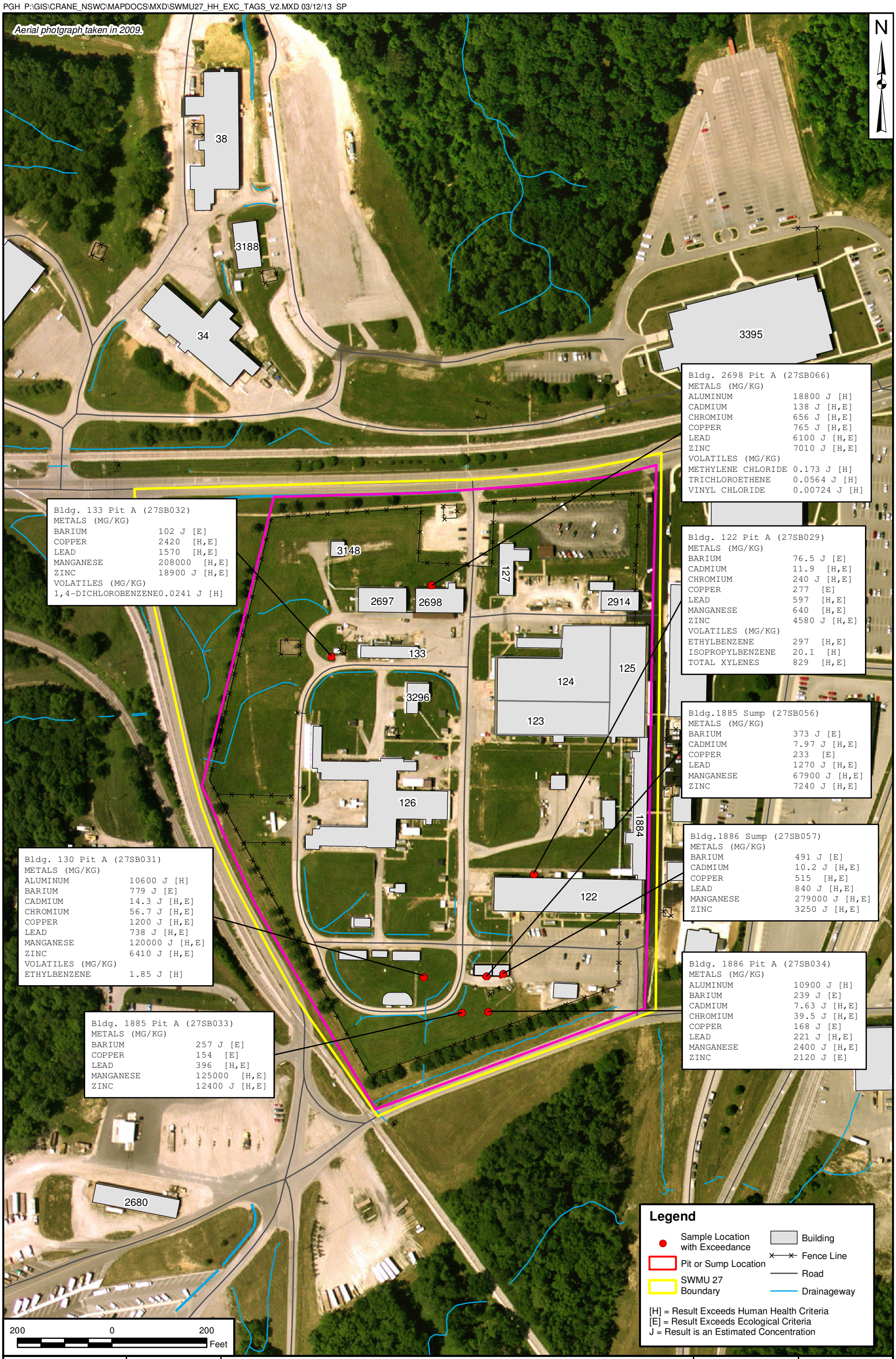
Settling Basin/Sump Location and Status	Sampling Location Point	Receptor Population	Overall Carcinogenic Risk	Overall Hazard Index	Lead Exposure	Critical Pathways and Chemicals of Concern	Recommendations
Building 122 (Pit A)	Sump/Pit - 27SB029	Construction Worker (future land use)	1E-06	0.08	No unacceptable exposures to lead.	***Worker exposure to Xylene***	Proceed to CMS or Interim Measures
Building 130 (Pit A) (Inactive)	Sump/Pit - 27SB031	Construction Worker (future land use)	2E-07	3	No unacceptable exposures to lead.	***Incidental ingestion of manganese***	Proceed to CMS or Interim Measures
Building 133 (Pit A) (Inactive)	Sump/Pit - 27SB032	Construction Worker (future land use)	No carcinogenic COPCs	5	***Unacceptable exposures to lead.***	***Incidental ingestion of manganese***	Proceed to CMS or Interim Measures
Building 1885 (Pit A) (Inactive)	Sump/Pit - 27SB033	Construction Worker (future land use)	4E-13	3	No unacceptable exposures to lead.	***Incidental ingestion of manganese***	Proceed to CMS or Interim Measures
Building 1886 (Pit A) (Inactive)	Sump/Pit - 27SB034	Construction Worker (future land use)	2E-07	0.08	No unacceptable exposures to lead.	NA	Remove settling basin from service, because it is no longer in use
Building 1885 (Sump) (Inactive)	Sump/Pit - 27SB056	Construction Worker (future land use)	6E-12	2	***Unacceptable exposures to lead.***	***Incidental ingestion of manganese***	Proceed to CMS or Interim Measures
Building 1886 (Sump) (Inactive)	Sump/Pit - 27SB057	Construction Worker (future land use)	8E-12	7	No unacceptable exposures to lead.	***Incidental ingestion of manganese***	Proceed to CMS or Interim Measures
Building 2698 (Pit A) (Inactive)	Sump/Pit - 27SB066	Construction Worker (future land use)	3E-06	0.2	***Unacceptable exposures to lead.***	***Incidental ingestion of lead***	Proceed to CMS or Interim Measures

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_PROP_PITS_V2.MXD 03/12/13 DC



DRAWN BY S. STROZ	DATE 06/29/10	LOCATIONS OF SUMPS, SETTLING BASINS (PITS) AND SURFACE FLOW DIRECTION SWMU 27 - ILLUMINANT BUILDING 126 AND PYROTECHNICS PRODUCTION AREA NSA CRANE CRANE, INDIANA	CONTRACT NUMBER 2126 / CTO NUMBER F276
CHECKED BY R. BARRINGER	DATE 01/04/13		APPROVED BY — / DATE —
REVISED BY D. COUCH	DATE 03/12/13		APPROVED BY — / DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 3-1 / REV 0

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_HH_EXC_TAGS_V2.MXD 03/12/13 SP



DRAWN BY	DATE
J. ENGLISH	04/27/12
CHECKED BY	DATE
R. BARRINGER	03/12/12
REVISED BY	DATE
S. PAXTON	03/12/13
SCALE	
AS NOTED	

NAVFAC

PIT/SUMP SAMPLE HUMAN HEALTH AND ECOLOGICAL EXCEEDANCES
SWMU 27 - ILLUMINANT BUILDING 126
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
2126	F276
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 3-2	0

4.0 SETTLING BASIN AND SUMP RESIDUE AND CONCRETE DEBRIS REMOVAL INTERIM MEASURES

The IM described in this IMWP will be performed through a Navy Environmental Multiple Award Contract (EMAC). IM activities are described below and in the Supplemental Specifications presented in Appendix C. Table 4-1 summarizes the dimensions of the settling basins and sumps to be pumped out and removed during this IM. Figures 4-1, 4-2, 4-3, and 4-4 show typical design drawings for the settling basin and sump structures. As shown in those documents and as summarized in this section, the work will be performed through the following major components:

- Planning and permitting
- Site preparation and support activities
- Liquid and residue characterization sampling
- Basin residue removal and basin excavation
- Transportation and off-site disposal of basin residues and concrete basin debris
- Backfill and restoration
- Preparation of a summary report

The EMAC contractor will be required to perform all IMWP implementation activities in accordance with the EMAC Basic Contract and Supplemental Specifications presented in Appendix C, and will be required to submit planning documents (including a detailed Work Plan) and obtain Navy approval before performing the work. The EMAC contractor will coordinate all field work through the Navy Officer in Charge of Construction (OICC), and the Navy will provide a full-time oversight representative during IMWP implementation. The EMAC contractor will provide a minimum of 14 days notification to the OICC and the Navy's oversight representative prior to mobilization. It will also be necessary to coordinate removal action schedules with production processes within the PPA, which may preclude access to certain locations during production operations.

4.1 PLANNING AND PERMITTING

The EMAC contractor will prepare planning documents prior to performing the work. Planning documents include the following:

- Work Plan
- Site-Specific Health and Safety Plan (SSHSP) and Activity Hazard Analysis (AHA)
- Project Quality Control Plan (QCP)

The EMAC contractor will obtain all required permits, including but not limited to the following:

- Safety and Building Availability Permit
- Digging Permit
- Hazards of Electromagnetic Radiation to Ordnance (HERO) (approval for portable radios)

4.2 SITE PREPARATION AND SUPPORT ACTIVITIES

Prior to, during, and after surface soil removal, the following site preparation and other support activities, as described below, will be performed:

- Erosion and sediment control
- Site support measures
- Traffic control

Erosion and Sediment Control. Before excavation activities begin, erosion and sediment controls will be established to prevent impacts to surface water downslope of the disturbed areas. This will include silt fence downslope of each disturbed area, temporary surface stabilization, and other measures. Erosion and sediment control measures will remain in place until soil excavation, backfilling, and restoration activities are completed. Completed restoration activities include establishment of permanent vegetation. The disturbed area to be vegetated will be regularly inspected and maintained until the area is stabilized. After the area has been restored and stabilized, the EMAC contractor will remove temporary erosion and sediment control structures such as silt fences. Erosion and sediment control measures will be installed and maintained in accordance with the Indiana Handbook for Erosion Control in Developing Areas (Indiana Handbook) (IDEM, 1992).

Site Support Measures. Site support measures will include installation of access controls such as fencing, a decontamination pad, and other measures to support the work. A temporary decontamination pad will be set up to clean equipment used to remove, excavate, and transport contaminated material. The pad will be sized to accommodate all the equipment to be used at the site, and will be constructed in a manner that contains all the contaminated materials removed from equipment and the liquids used to clean the equipment. Contaminated materials removed from the equipment will be disposed of with the other removed materials. Wash water will be managed as described in the approved water management plan. The EMAC contractor must keep equipment clean to minimize the spread of contaminated material to adjacent areas and roads.

Traffic Control. The EMAC contractor will submit a Traffic Control Plan as part of the Work Plan that will present details about travel routes within NSA Crane and describe compliance with security inspection requirements and stress the importance to minimize impacts/interruptions to facility operations. EMAC contractor vehicles must travel on the roads and use the weighing facilities shown on Figure 4-5. The Traffic Control Plan must function in accordance with the NSA Crane's Access and Security requirements and Traffic and Entry Plan. As shown on Figure 4-5, access to NSA Crane will be through the Crane Gate (Gate House No. 4) in the northwestern corner of the facility. The EMAC contractor is not permitted to travel within restricted areas of the facility. All waste hauling vehicles will be weighed upon arrival and at time of departure using the certified weight scale located at the Defense Reutilization and Marketing Office (DRMO) (Building 1940). The DRMO scale is operated between the hours of 7 am to 3 pm, Monday through Friday, and weight tickets are available.

4.3 SETTLING BASIN/SUMP RESIDUE REMOVAL AND BASIN STRUCTURE REMOVAL

The subject IM will consist of removal of liquids and residues from the settling basins and sumps, disconnection of the settling basins and sumps and plugging of the associated basin piping, and excavation and removal of the concrete basin structures, with off-site disposal of the residues and the concrete structure debris. The IM will address those settling basins and sumps that contained manganese or lead at concentrations that posed unacceptable risk to construction worker health based on incidental ingestion.

The basins and sumps to be removed, with estimated dimensions and volumes for contained residues and estimated concrete debris volumes, are presented in Table 4-1. Typical design drawings for multiple-chambered settling basins are shown on Figures 4-1, 4-2, and 4-4. The combined estimated volume of basin residues (sludges and liquids) to be removed from the basins and sumps and the concrete debris produced during basin demolition totals approximately 36 cubic yards (Table 4-1). Disposal approvals must be obtained from the waste facilities accepting the settling basin/sump residual materials before the IM removal and excavation operations are initiated.

The actual method implemented to remove the contaminated settling basin and sump liquids and residues will be determined by the EMAC contractor; however, concrete basin removal activities are expected to be performed with equipment such as an excavator or backhoe, with pneumatic attachments to break the concrete basins into manageable-sized pieces.

All work will be performed in accordance with the Work Plan, QCP, and the SSHSP. This will include dust control and compliance with Occupational Safety and Health Administration (OSHA) requirements.

4.4 TRANSPORTATION/OFF-SITE DISPOSAL OF SETTLING BASIN/SUMP RESIDUE

All on-site transportation will be performed on roads as shown on Figure 4-5.

The EMAC contractor will submit the name of the proposed disposal facility with the cost proposal to the Navy. The proposal will include the disposal facility name, contact information, permit number, and documentation/certification of its ability to accept the SWMU 27/PPA settling basin and sump wastes. After contract award, the EMAC contractor will provide transportation, treatment and disposal details in the Work Plan.

Disposal requirements vary by disposal facility; however, disposal facilities near Crane will accept used concrete for recycling purposes [as was done with the concrete basins from Unexploded Ordnance (UXO) Site 8]. The EMAC contractor will be responsible for notifying the selected disposal facility that the former concrete settling basin structures were managed appropriately to remove any contained residual contamination.

The EMAC contractor will be responsible for providing and carrying waste manifests, bills of lading, placards, labeling, markings, licensing, and any other transportation/disposal documentation as required by federal, state, and local regulations. The Navy will supply a USEPA Generator ID number for this documentation. The EMAC contractor will prepare all transportation documentation, including bills of lading, manifests, etc. for approval and signature by a representative of the Navy.

The EMAC contractor will provide the Navy a 14 day notice prior to mobilization to the site and a minimum of 48-hour notice (2 business days) prior to shipping materials from the site for disposal/recycling.

4.5 BACKFILL AND RESTORATION

The excavation areas required to remove the settling basins and sumps will be backfilled after the concrete structures are removed from the site. The settling basin and sump areas will be backfilled as necessary to match the surrounding surface grades. The backfill soil will have properties similar to native SWMU 27 and PPA soils, and will be obtained from an off-site borrow source where due diligence shows no evidence of a release of a regulated substance (i.e., clean fill). A certification must be provided regarding the origin of the clean fill, including a statement that, to the best of the provider's knowledge, the backfill soil has not been contaminated by a release of regulated substances. The backfill soil will be subject to analytical testing to ensure that it is not contaminated and that it meets the following requirements:

- Total Petroleum Hydrocarbons (TPH), diesel-range organics (DRO), USEPA Method SW-846 8015M DRO - less than 1 milligram per kilogram (mg/kg).

- TPH, gasoline-range organics (GRO), USEPA Method SW-846 8015M GRO - less than 1 mg/kg.

- Benzene, toluene, ethylbenzene, and xylenes, USEPA Method SW-846 5030 / 8021 – sum of less than 1 mg/kg.

- Total polychlorinated biphenyls (PCBs), USEPA Method SW-846 8082 – less than 1 mg/kg.

- 4,4'-DDD, USEPA Method SW-846 8081 – less than 3.2 micrograms per kilogram (µg/kg).

- 4,4'-DDE, USEPA Method SW-8468081 – less than 3.2 µg/kg.

- 4,4'-DDT, USEPA Method SW-846 8081 – less than 3.2 µg/kg.

- Dieldrin, USEPA EPA Method SW-846 8081 – less than 3.2 µg/kg.

- Heptachlor, USEPA Method SW-846 8081) – less than 1.5 µg/kg.

- Alpha-chlordane, USEPA Method SW-846 8081 – less than 1.5 µg/kg.

- Gamma-chlordane, USEPA Method SW-846 8081 – less than 1.5 µg/kg.

- Lead, USEPA Method SW-846 6010B or 6020 – less than 400 mg/kg (USEPA residential screening level and IDEM direct contact screening level).

Common Fill. Common fill will be used to backfill the excavations to a depth of 6 inches below final grade. This material will be placed into the excavation in maximum 6-inch-thick lifts and compacted to 90 percent of standard proctor density. Common fill will meet the following physical characteristics:

- American Society for Testing and Materials (ASTM) D 2487, Classifications GW, GP, GM, SW, SP, or SM.
- ASTM D 4318, liquid limit, 35 maximum.
- ASTM D 4318, plasticity index, 12 maximum.
- Maximum of 25 percent by weight passing ASTM D 1140, No. 200 sieve.
- Maximum particle size of 1 inch.

Topsoil. The uppermost 6 inches of backfill used to establish final grades will be medium-textured loam suitable for establishing vegetation.

The estimated backfill material requirements are 24.2 cubic yards of common fill and 3.2 cubic yards of topsoil.

Following backfilling, the disturbed areas will be restored using permanent seeding. Restoration will consist of surface preparation, fertilizing, seeding, and mulching. Activities to establish permanent seeding will be implemented as soon as possible following the construction of final grades.

Permanent vegetation activities include site/seed bed preparation, seeding, and mulching of the restored excavation areas.

The procedures and requirements for permanent seeding activities are presented in Section 3.12 of the Indiana Handbook (IDEM, 1992). The seed mixture recommended for use at SWMU 27 will be a standard Indiana seed mixture for open and disturbed areas that includes perennial ryegrass and tall fescue. Planting rates and optimum soil pH for this mixture are presented in the Indiana Handbook. Following seeding, the seeded areas will be covered with mulch and tack (e.g., coconut fiber matting) to provide additional stabilization until vegetation is established.

4.6 CONSTRUCTION COMPLETION REPORT

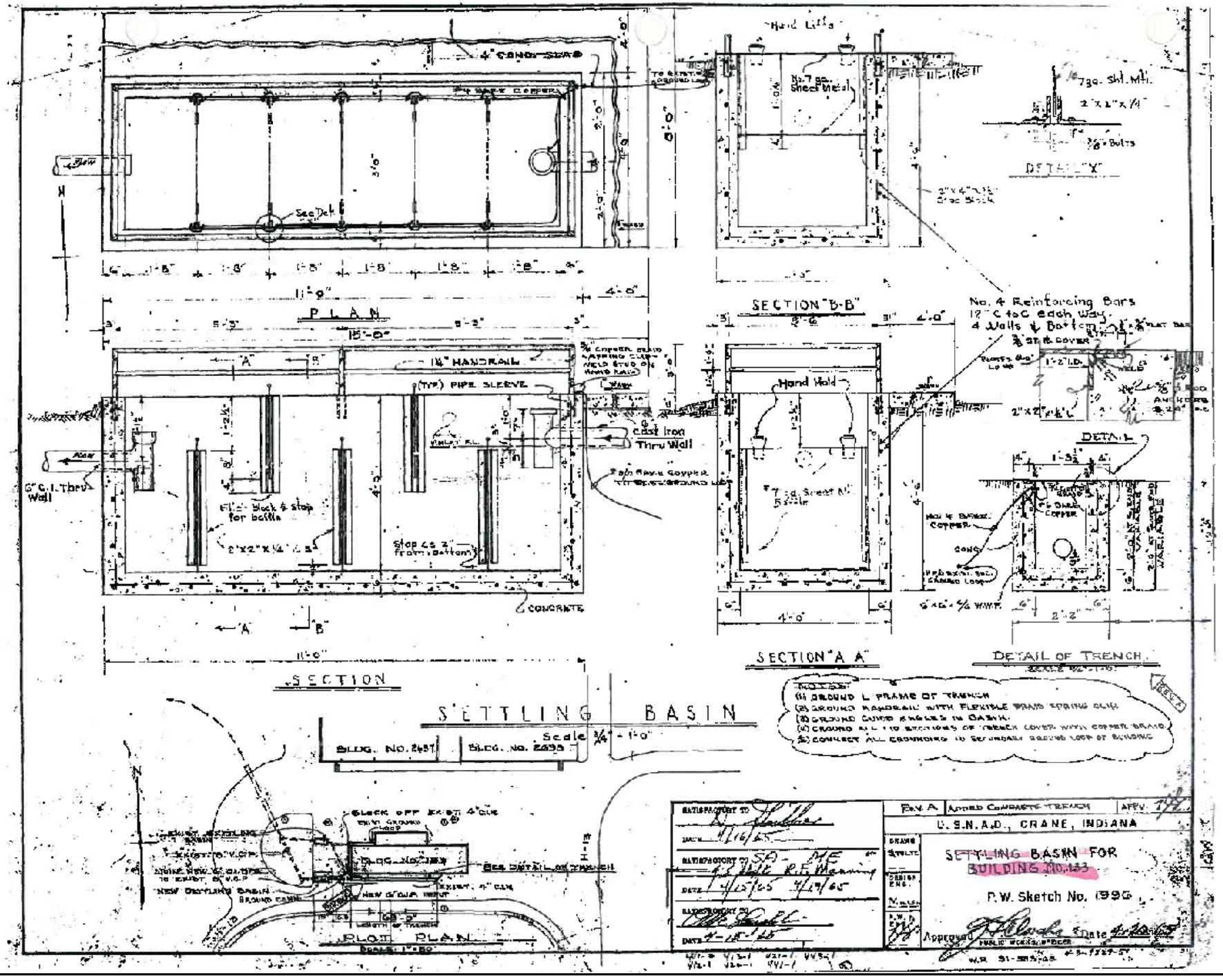
The EMAC contractor will prepare and submit a Construction Completion Report, and provide it to the Navy or their representative within 30 days of demobilization from NSA Crane. The Construction Completion Report will include all construction documentation for the project.

TABLE 4-1

SUMMARY OF SETTLING BASIN/SUMP DIMENSIONS TO SUPPORT RESIDUE AND CONCRETE BASIN INTERIM REMOVAL ACTIONS
SWMU 27 AND PYROTECHNIC PRODUCTION AREA
NSA CRANE, CRANE, INDIANA

Settling Basins to be Removed	Exterior Concrete Basin Dimensions (L x W x H in feet)	Maximum Interior Basin Volume Based on Dimensions (in cubic feet)	Volume of Residue (in cubic feet - assumes residue depth of 0.5 foot)	Volume of Liquid Residue (assumed depths indicated; in cubic feet)	Volume of Projected Concrete Rubble (in cubic feet)	Estimated Volume of Backfill (in cubic feet)
Building 122 (Pit A)	8.5 X 4 X 4.5	90	7.5 X 3 X 0.5 = 11.25	7.5 X 3 X 2 = 85	61.5	153
Building 130 (Pit A)	8.5 X 4 X 4.5	90	7.5 X 3 X 0.5 = 11.25	7.5 X 3 X 2 = 85	61.5	153
Building 133 (Pit A)*	11 X 4 X 6.5	180	10 X 3 X 0.5 = 15	10 X 3 X 4.5 = 135	106	198
Building 1885 (Pit A)**	11 X 4 X 4.5	120	10 X 3 X 0.5 = 15	10 X 3 X 2.0 = 60	95.5	198
Building 1886 (Pit A)	11 X 4 X 4.5	120	10 X 3 X 0.5 = 15	10 X 3 X 2.0 = 60	77	198
Building 1885 (Sump)***	2 X 2 X 2	3.9	1.5 X 1.5 X 0.5 = 1.1	1.5 X 1.5 X 0.5 = 1.1	4.2	8
Building 1886 (Sump)***	2 X 2 X 2	3.9	1.5 X 1.5 X 0.5 = 1.1	1.5 X 1.5 X 0.5 = 1.1	4.2	8
Building 2698 (Pit A)	4 X 4 X 4	43	3.5 X 3.5 X 0.5 = 6.1	3.5 X 3.5 X 2 = 24.5	33.5	64
		Totals in cubic feet	75.8	451.7	443.4	980
		Totals in cubic yards	2.8	16.7	16	36

Building 133 (Pit A) extends approximately 2 feet above grade.
*****Building 1885 (Pit A) includes a concrete apron that measures eleven feet long by four feet wide by 5 inches thick (11 ft. X 4 ft. X 0.42 ft = 18.5 cu. ft.)***
******Sumps for Buildings 1885 and 1886 have 3-inch thick walls (0.25 feet)***



CTO NUMBER

CONTRACT NUMBER

APPROVED BY — DATE

APPROVED BY — DATE

FIGURE NO. 4-1

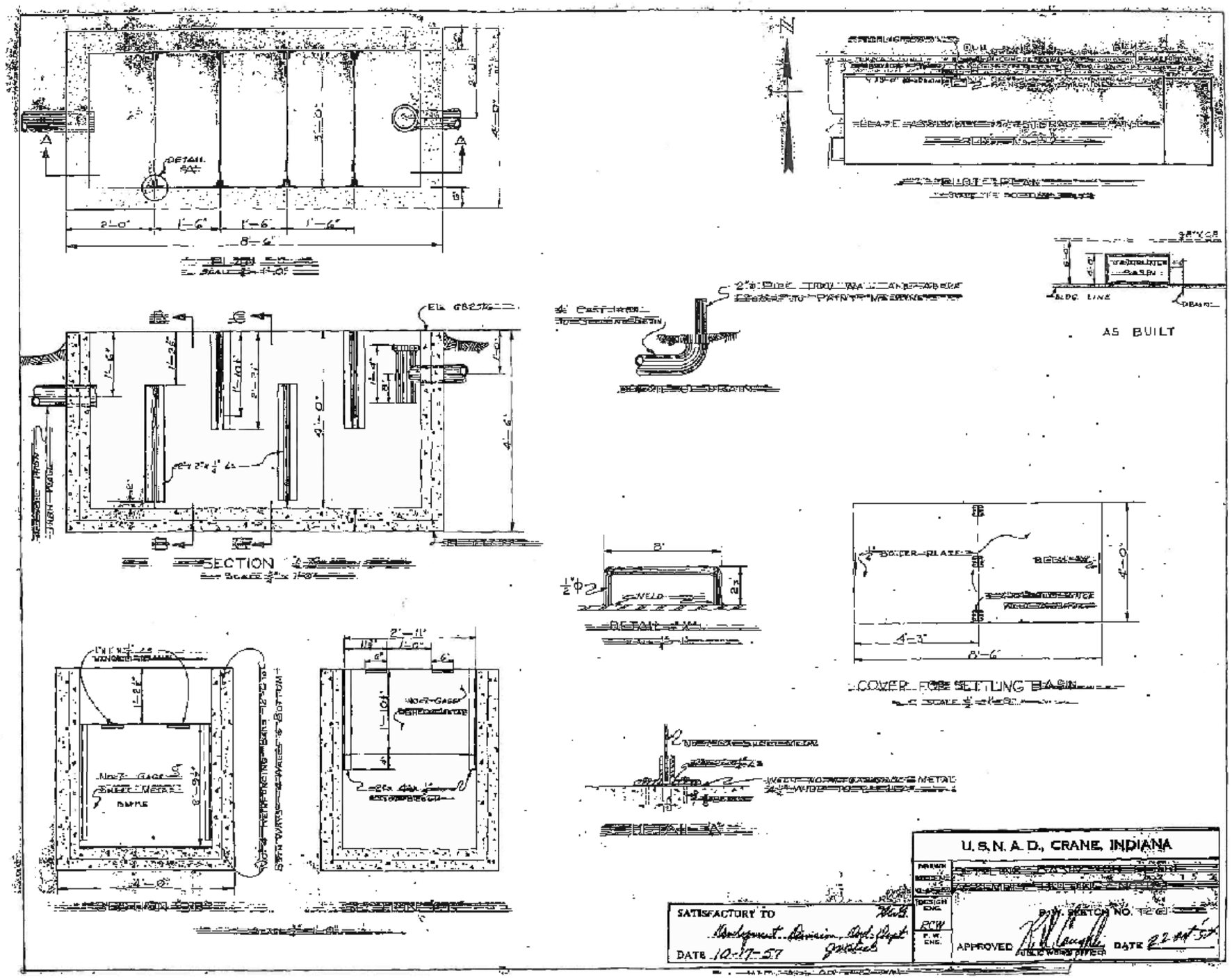
REV 0

SETTLING BASIN FOR BUILDING 133
SWMU 27 - ILLUMINANT BUILDING 126
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. PAXTON	DATE 01/04/13	
CHECKED BY R. BARRINGER	DATE 01/04/13	
REVISED BY	DATE	SCALE AS NOTED

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_SETTLING_BASIN_BLDG122.MXD 01/04/13 SP



CONTRACT NUMBER | CTO NUMBER

APPROVED BY | DATE

APPROVED BY | DATE

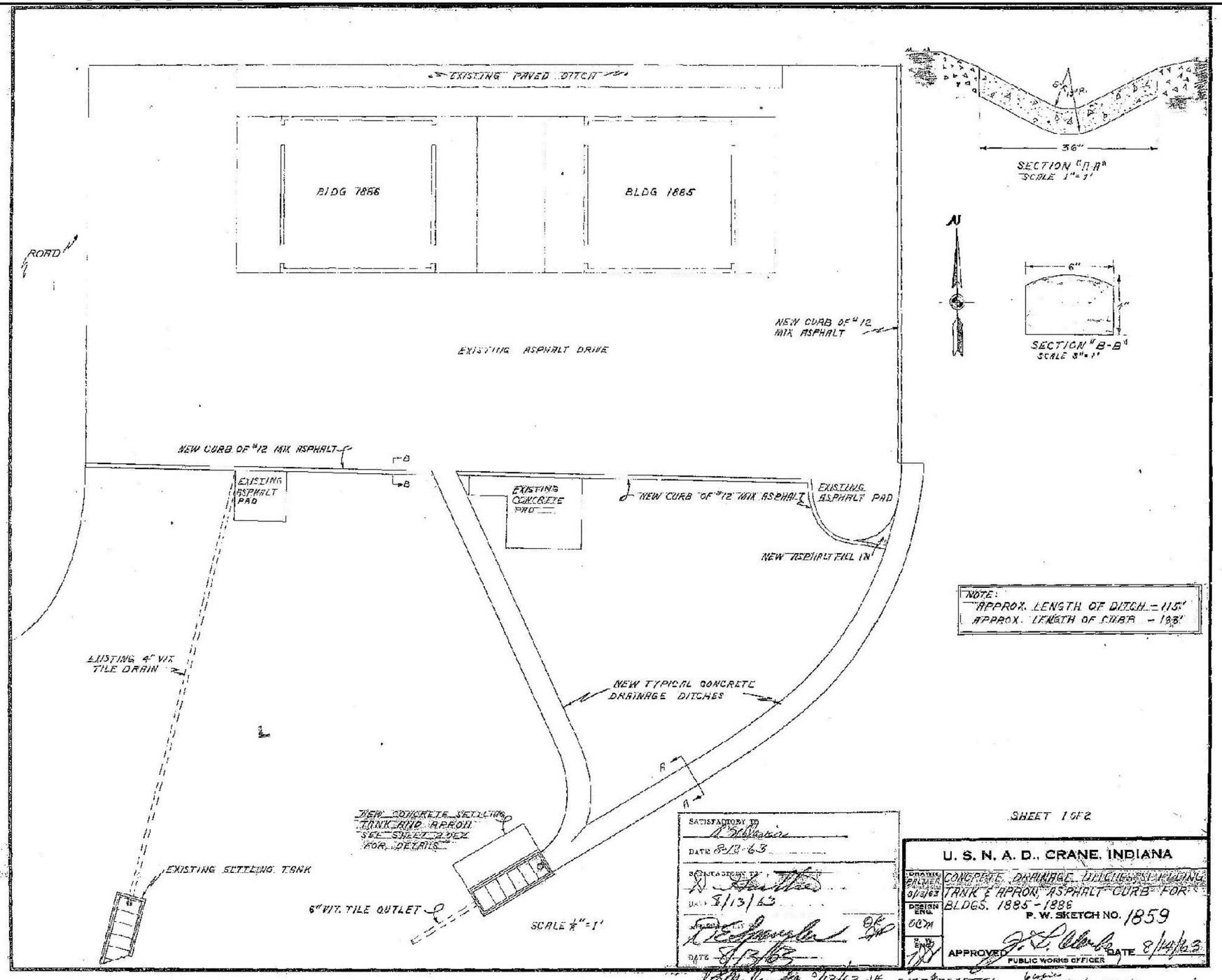
FIGURE NO. 4-2 | REV 0

SETTLING BASIN FOR BUILDING 122
SWMU 27 - ILLUMINANT BUILDING 126
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. PAXTON	DATE 01/04/13	
CHECKED BY R. BARRINGER	DATE 01/04/13	
REVISED BY	DATE	SCALE AS NOTED

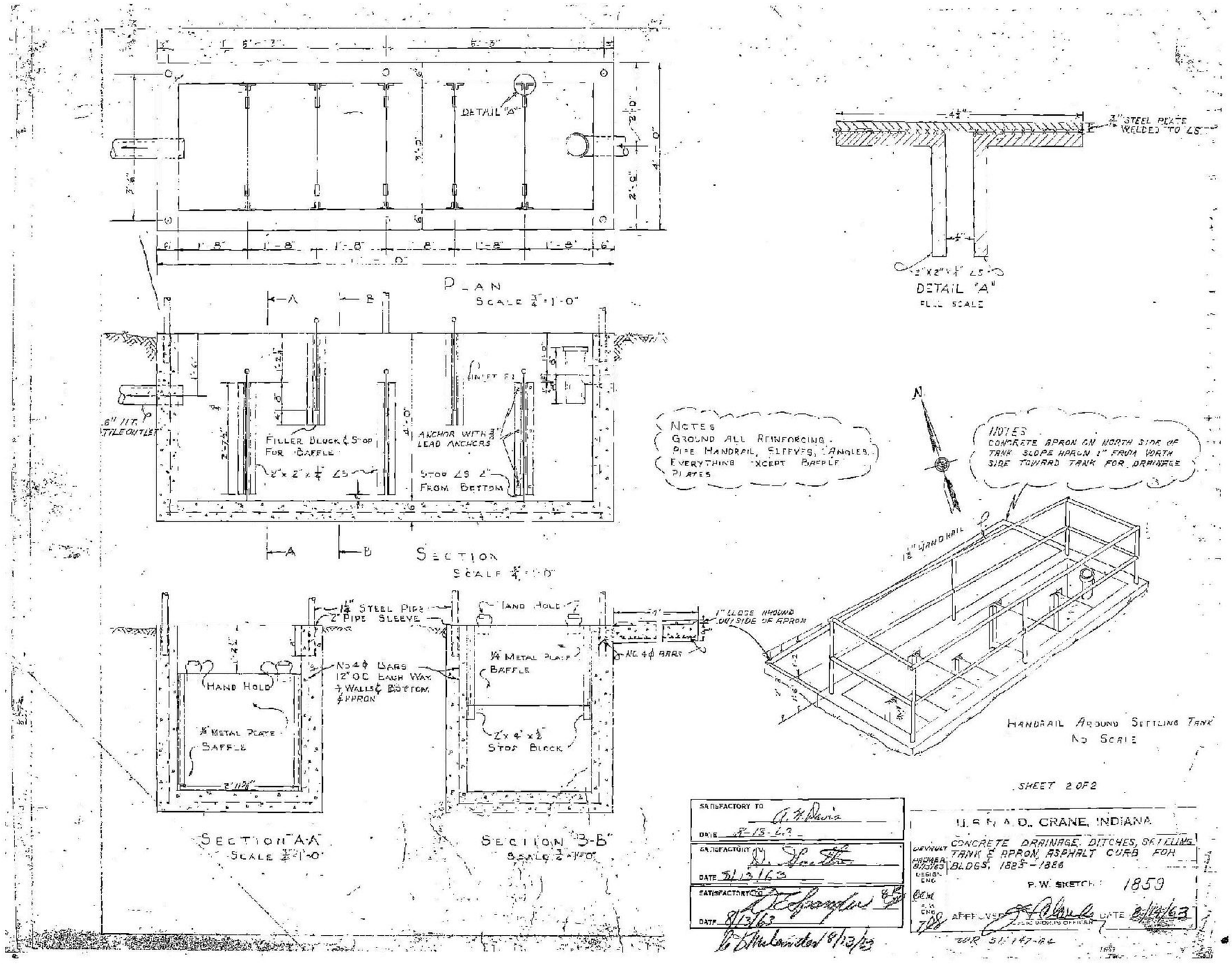
PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_SETTLING_BASIN_BLDG1885-1886_#1.MXD 03/11/13 KM



CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-3	REV 0

SETTLING BASIN FOR BUILDINGS 1885 & 1886
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

DRAWN BY K. MOORE	DATE 3/11/13
CHECKED BY R. BARRINGER	DATE 3/11/13
REVISED BY	DATE
SCALE AS NOTED	

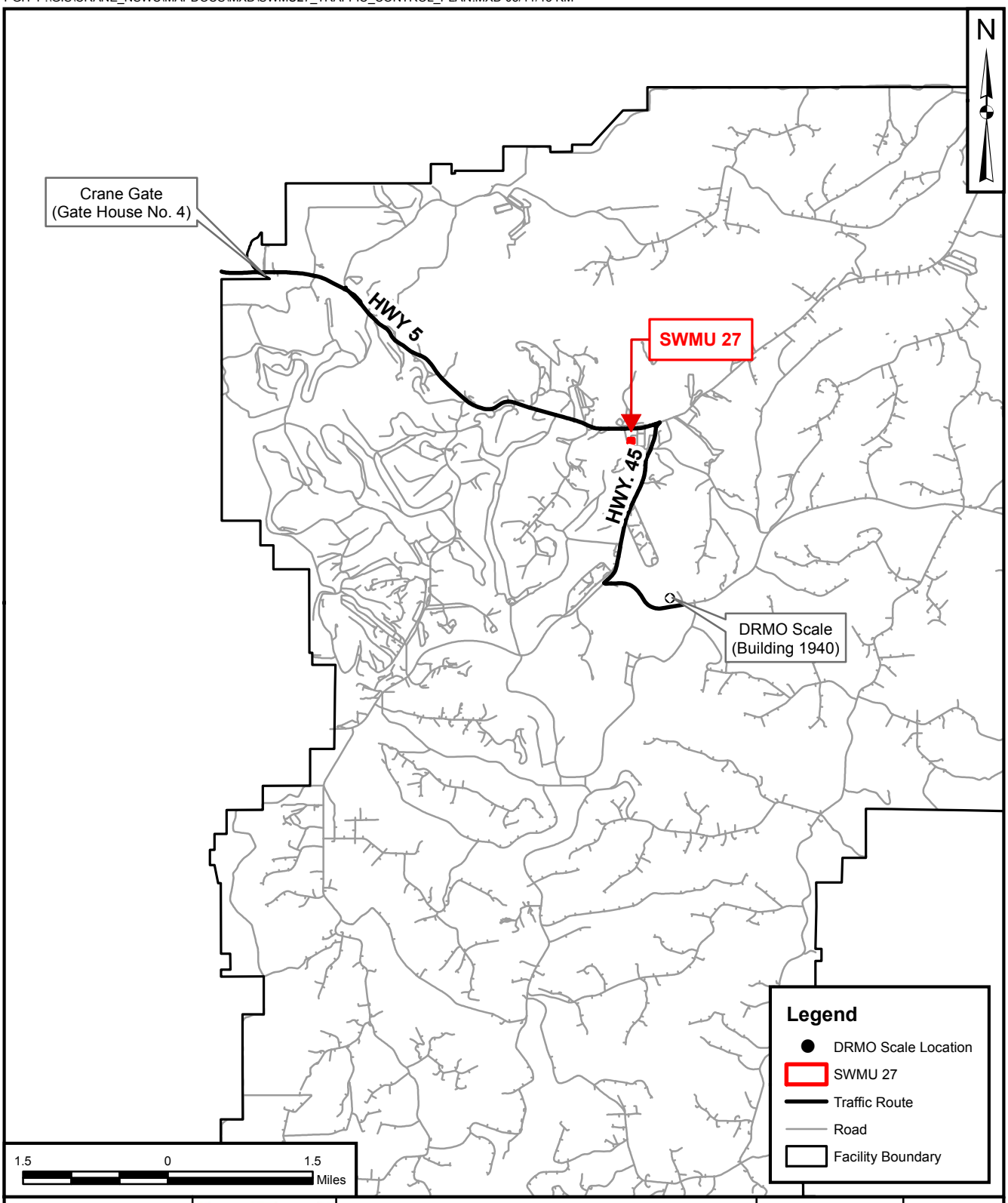


CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-4	REV 0

SETTLING BASIN FOR BUILDINGS 1885 & 1886
SWMU 27 - ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

DRAWN BY K. MOORE	DATE 3/11/13
CHECKED BY R. BARRINGER	DATE 3/11/13
REVISED BY	DATE
SCALE AS NOTED	

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU27_TRAFFIC_CONTROL_PLAN.MXD 03/11/13 KM



DRAWN BY	DATE
S. PAXTON	01/04/13
CHECKED BY	DATE
R. BARRINGER	3/11/13
REVISED BY	DATE
D. COUCH	01/14/13
SCALE AS NOTED	

NAVFAC

TRAFFIC CONTROL PLAN
SWMU 27 – ILLUMINANT BUILDING 126
AND PYROTECHNICS PRODUCTION AREA
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
2126	F276
APPROVED BY	DATE
___	___
APPROVED BY	DATE
___	___
FIGURE NO. 4-5	REV 0

5.0 REFERENCES

A.T. Kearney, 1987. Preliminary Review/Visual Site Inspection Report for the Naval Weapons Support Center, Crane, Indiana. USEPA ID IN5170023498. Prepared for U.S. Environmental Protection Agency - Region V by A.T. Kearney, Inc., March.

IDEM (Indiana Department of Environmental Management), 1992. Indiana Handbook for Erosion Control in Developing Areas.

Tetra Tech, 2011. Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for SWMU 27 – Illuminant Building 126, RCRA Facility Investigation, Naval Support Activity Crane, Crane, Indiana. January.

Tetra Tech, 2012. Final RFI Report for Illuminant Building 126 (SWMU 27), Naval Support Activity Crane, Crane, Indiana. September.

USEPA (United States Environmental Protection Agency), 2009. NSA Crane RCRA hazardous waste management permit, originally issued by the on December 29, 1989 and renewed in September 2009.

APPENDIX A

SITE PHOTOGRAPHS

Residue samples were collected from eight settling basins and sumps in SWMU 27:

- **Building 122 Pit A** (27SS029C0002)

Building 122, Flare Assembly Building Concrete Sump

- **Building 130 Pit A** (27SS031C0002)

Building 130 Pit A between Buildings 135 and 2696

- **Building 133 Pit A** (27SS032C0002)

Building 133 Pit A Sump and Covered Concrete Trench

Building 133 Pit A Sump Interior

Building 133 Pit A

- **Building 1885 Pit A** (27SS033C0002)

Building 1885 Pit A

Building 1885 Pit A

- **Building 1886 Pit A** (27SS034C0002)

- **Building 2698 Pit A** (27SS066C0002)

Building 2698 Pit A

Two grab samples were collected from the interior of the two small sumps south of Buildings 1885 and 1886:

- **Building 1885 (unnamed sump)** (27SS056G0002) and

Suspected Building 1885 Sump

- **Building 1886 (unnamed sump)** (27SS057G0002).

No photo – very similar to the unnamed sump shown above.

APPENDIX B

ANALYTICAL RESULTS

APPENDIX B
ANALYTICAL RESULTS FOR INTERIOR PIT/SUMP RESIDUE SAMPLES
SWMU 27 - PYROTECHNICS PRODUCTION AREA
NSA CRANE, CRANE, INDIANA

LOCATION	27SB029	27SB031	27SB032	27SB033	27SB034	27SB056	27SB057	27SB066
AREA	Building 122 Pit A	Building 130 Pit A	Building 133 Pit A	Building 1885 Pit A	Building 1886 Pit A	Building 1885 Sump	Building 1886 Sump	Building 2698 Pit A
SAMPLE ID	27SS029C0002	27SS031C0002	27SS032C0002	27SS033C0002	27SS034C0002	27SS056G0002	27SS057G0002	27SS066C0002
SAMPLE DATE	20110408	20110408	20110408	20110408	20110408	20110407	20110407	20110826
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
MATRIX	SO	SO	SO	SO	SO	SO	SO	SO
SUBMATRIX	SS	SS	SS	SS	SS	SS	SS	SS
TOP DEPTH	0	0	0	0	0	0	0	0
BOTTOM DEPTH	2	2	2	2	2	2	2	2
METALS (MG/KG)								
ALUMINUM	3190	10600 J	1500	3690	10900 J	7230	5670	18800 J
BARIUM	76.5 J	779 J	102 J	257 J	239 J	373 J	491 J	1010 J
CADMIUM	11.9	14.3 J	12.8 U	18.1 U	7.63 J	7.97 J	10.2 J	138 J
CHROMIUM	240 J	56.7 J	63.9 U	36.3 U	39.5 J	29.3 U	94.6 U	656 J
COPPER	277	1200 J	2420	154	168 J	233	515	765 J
LEAD	597	738 J	1570	396	221 J	1270 J	840 J	6100 J
MAGNESIUM	6970 J	13600 UJ	45300 J	29100 J	11300 J	14500 J	27000 J	3280 J
MANGANESE	640	120000 J	208000	125000	2400 J	67900 J	279000 J	52 J
POTASSIUM	179 J	935 J	305 J	657 J	1040 J	1320 J	921 J	2790 UJ
SODIUM	270 U	1380 J	149 J	262 J	921 J	251 J	460 J	2790 UJ
STRONTIUM	36.6	221 J	18.1	128	108 J	223 J	538 J	35.9 J
ZINC	4580 J	6410 J	18900 J	12400 J	2120 J	7240 J	3250 J	7010 J
MISCELLANEOUS PARAMETERS (MG/KG)								
CYANIDE	0.491 J	--	--	--	--	--	--	--
MISCELLANEOUS PARAMETERS (UG/KG)								
PERCHLORATE	3.56 U	7.48 UJ	2.67 U	3.65 U	7.09 UJ	2.96 U	3.9 U	7.62 UJ
VOLATILES (MG/KG)								
1,1,1-TRICHLOROETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,1,2,2-TETRACHLOROETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 UJ	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,1,2-TRICHLOROETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,1,2-TRICHLOROTRIFLUOROETHANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
1,1-DICHLOROETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,1-DICHLOROETHENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,2,4-TRICHLOROBENZENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 UJ	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,2-DIBROMO-3-CHLOROPROPANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 UJ	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
1,2-DIBROMOETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,2-DICHLOROBENZENE	5.49 U	0.0123 UJ	0.0092 J	0.00277 J	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,2-DICHLOROETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,2-DICHLOROPROPANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,3-DICHLOROBENZENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
1,4-DICHLOROBENZENE	5.49 U	0.0123 UJ	0.0241 J	0.00604 J	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
2-BUTANONE	11 UJ	0.153 J	0.00554 UJ	0.00924 U	0.134 J	0.00794 U	0.00876 U	0.236 J
2-HEXANONE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
4-METHYL-2-PENTANONE	5.49 UJ	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
ACETONE	22 U	0.399 J	0.0111 UJ	0.0185 U	0.761 J	0.0159 U	0.0175 U	0.777 J
BENZENE	5.49 U	0.0123 UJ	0.00331 J	0.00359 J	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
BROMODICHLOROMETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
BROMOFORM	5.49 UJ	0.0123 UJ	0.00277 UJ	0.00462 UJ	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
BROMOMETHANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
CARBON DISULFIDE	5.49 U	0.00888 J	0.00277 UJ	0.00462 U	0.017 J	0.00397 U	0.00438 U	0.0315 J
CARBON TETRACHLORIDE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CHLOROBENZENE	5.49 U	0.0123 UJ	0.00779 J	0.00876 J	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CHLORODIBROMOMETHANE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CHLOROETHANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
CHLOROFORM	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CHLOROMETHANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
CIS-1,2-DICHLOROETHENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.00799 J
CIS-1,3-DICHLOROPROPENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
CYCLOHEXANE	27.9	0.0416 J	0.00277 UJ	0.00462 U	0.891 J	0.00397 U	0.00438 U	0.0904 J
DICHLORODIFLUOROMETHANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
ETHYLBENZENE	297	1.85 J	0.00277 UJ	0.00397 J	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
ISOPROPYLBENZENE	20.1	0.442 J	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
METHYL ACETATE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
METHYL CYCLOHEXANE	349	0.918 J	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.989 J
METHYL TERT-BUTYL ETHER	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
METHYLENE CHLORIDE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.173 J
STYRENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
TETRACHLOROETHENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
TOLUENE	5.49 U	0.0123 UJ	0.0136 J	0.0129	0.0113 UJ	0.00397 U	0.00438 U	0.0415 J
TOTAL XYLENES	829	3.3 J	0.0083 UJ	0.0171 J	0.0171 J	0.0119 U	0.0131 U	0.051 J
TRANS-1,2-DICHLOROETHENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
TRANS-1,3-DICHLOROPROPENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0114 UJ
TRICHLOROETHENE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.0564 J
TRICHLOROFLUOROMETHANE	11 U	0.0246 UJ	0.00554 UJ	0.00924 U	0.0227 UJ	0.00794 U	0.00876 U	0.0228 UJ
VINYL CHLORIDE	5.49 U	0.0123 UJ	0.00277 UJ	0.00462 U	0.0113 UJ	0.00397 U	0.00438 U	0.00724 J

J - estimated value
U - concentration is below the laboratory detection limit
UJ - indicates that the chemical was not detected. However, the indicated detection limit (sample-specific quantitation limit) is considered as estimated.
--- = value not available

APPENDIX C

EMAC SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SPECIFICATIONS

INTERIM MEASURES AT SWMU 27
BUILDING 126 ILLUMINANT BUILDING / PYROTECHNICS PRODUCTION AREA
NSA CRANE, CRANE, INDIANA

1.0 INTRODUCTION

The Environmental Multiple Award Contract (EMAC) contractor shall perform Interim Measure (IM) excavation work in Solid Waste Management Unit (SWMU) 27 in accordance with the NSA Crane Contractor's Operation Manual and EMAC Basic Contract, and as described in these Supplemental Specifications.

The SWMU 27 site is located in the north-central area of NSA Crane as shown on Figure 1-1. As presented on Figure 3-1, the eight settling basins/sumps proposed for interior residue removal and concrete basin demolition and removal are all within the fenced area of the Pyrotechnics Production Area (PPA) and are all within approximately 1,000 feet of the PPA northern entrance gate on Highway 5. As summarized in Table 4-1, the eight settling basins/sumps slated for removal are presumed to contain 3 cubic yards of residues, 17 cubic yards of liquids, and the concrete rubble from these structures will generate nearly 16 cubic yards of concrete debris. All ancillary piping to these structures will be capped and left in place. The sumps and settling basins to be removed range in size from as small as 8 cubic feet to as much as 286 cubic feet in volume. The estimated quantity of backfill materials for the former basin locations is approximately 36 cubic yards (Table 4-1).

The IM work described in these Supplemental Specifications shall include all services necessary to perform the work to consist of the following:

- Planning and permitting documents
- Site preparation and support activities
- Settling Basin/Sump Residue Removal and Basin Removal
- Transportation and Offsite Disposal of Basin Residues and Concrete Debris/Rubble
- Backfill and Restoration
- Summary Report

The IM settling basin and sump removal activities are presented on Figure 3-1, Table 4-1, and in the following sections.

2.0 EMAC CONTRACTOR REQUIREMENTS

The EMAC contractor will be responsible for performing the following work:

1. Attend on-site project kickoff and implementation conference.

2. Submit planning documents in accordance with the EMAC 'Basic Contract' and as described in these supplemental specifications. Submit draft, draft final and final versions of planning documents; the EMAC contractor shall incorporate Navy comments on the draft, and draft-final versions of the documents into subsequent submittals. The draft documents shall be submitted a minimum of 45 days prior to beginning work to allow sufficient time to finalize the documents. These planning documents shall include:

   - Work Plan
     - Settling Basin/Sump Residue Removal and Basin Removal Plan
     - Basin Residue/Debris Disposal and Transportation Plan
     - Traffic Control Plan
     - Erosion and Sediment Control Plan
   - Site-Specific Health and Safety Plan (SSHSP) and Activity Hazard Analysis
   - Project Quality Control Plan (QCP)

3. Acquire Facility-specific permits, including but not limited to the following:

    - Safety & Building Availability Permit (ESO 8020/11)
    - Digging Permit (NWSCC 11000/3)
    - Hazards of Electromagnetic Radiation to Ordnance (HERO) (approval for portable radios)

4. Mobilize required equipment and personnel to perform residue removals from the eight identified settling basins/sumps, disconnect the settling basin/sump structures from influent and effluent pipelines, cap disconnected pipelines, and perform other associated activities. Basin and sump residue sampling for waste characterization must be performed and disposal approvals must be received from the waste facilities accepting the settling basin/sump residual materials before the IM removal and excavation operations are initiated.

5. Construct and maintain the required erosion and sediment control devices for the duration of the project.

6. Construct required support facilities including, but not limited to, temporary gravel construction entrance, decontamination pad(s), and material storage areas, as necessary.

7. Demolish concrete basins and sumps to facilitate loading for removal.

8. Load, transport and dispose basin residue and concrete debris/rubble.

9. Backfill disturbed areas with clean soil to restore natural grade.

10. Restore disturbed area with topsoil and blend with surrounding grades.

11. Establish vegetation on topsoil in the excavation area.

12. Remove all temporary support facilities, leaving perimeter erosion and sediment controls in place until revegetation is complete and as instructed by the Navy.

13. Restore areas used for temporary support facilities (regrading and revegetation).

14. Demobilize equipment and personnel.

3.0 SUBMITTALS

3.1 Planning Documents

Within 30 days of notification to proceed, the EMAC contractor shall submit draft planning documents for review. The Navy will provide comments within 15 days of receipt. The EMAC contractor shall incorporate comments and resubmit the documents within 15 days. The Navy shall then approve the documents or provide additional comments. The Navy must approve the following planning documents before the EMAC contractor mobilizes to the site.

- Work Plan
- Site-Specific Health and Safety Plan (SSHSP) and Activity Hazard Analysis (AHA)
- Project QCP

3.1.1 <u>Work Plan</u>

The Work Plan shall present details and describe the work for site preparation, removal of basin/sump residues, demolition and removal of concrete basin/sump structures, staging residues and debris, offsite disposal, site restoration and all activities necessary to perform the work and include a detailed schedule and sequencing plan. The Work Plan shall include:

- Settling Basin/Sump Residue Removal and Basin Removal Plan

- Basin Residue and Concrete Debris/Rubble Disposal and Transportation Plan
- Traffic Control Plan
- Erosion and Sediment Control Plan

Settling Basin/Sump Residue Removal and Basin Removal Plan. The Settling Basin/Sump Residue Removal and Basin Removal Plan should discuss the methods used to perform residue removals from the eight identified settling basins/sumps, disconnect the settling basin/sump structures from influent and effluent pipelines, cap disconnected pipelines, demolish concrete basins and sumps, and perform other associated activities, as necessary, to dispose the basin residue and concrete debris/rubble at offsite facilities. The concrete settling basins/sumps proposed for removal are shown on Figure 3-1, and relevant dimensional data are presented in Table 4-1. Figures 4-1 through 4-4 present select original settling basin design drawings, provided to support technical removal plan development. The Plan shall describe the method and equipment proposed to remove basin/sump residues, demolish and remove concrete basin/sump structures, stage residue and debris, and transport the basin residue and concrete rubble. It will also include information about the disposal facilities. The plan shall also describe that Tetra Tech will identify the specific basin structures to be removed in the field. Confirmation samples will not be collected after basin/sump removals have been completed.

The EMAC contractor will be required to obtain and analyze representative samples of the residues and liquids in the SWMU 27 basins and sumps identified for removal. The residue characterization analytical data will be submitted to the proposed waste disposal facilities in order to obtain final approvals and/or coordinate scheduling with the facilities accepting these residues for disposal. The Plan shall also address dust control and water management

Basin Residue and Concrete Debris/Rubble Disposal and Transportation Plan. The Basin Residue and Concrete Debris/Rubble Disposal and Transportation Plan shall describe the transportation and offsite disposal of the basin residue and concrete rubble from SWMU 27. The Plan shall include: 1) Subcontractor for transportation of basin residue and concrete debris/rubble including: name, address, contact name, telephone number, and U.S. Department of Transportation (USDOT) number, and 2) disposal facility name, contact information, permit number, and documentation/certification of the facility to accept the SWMU 27 waste. The EMAC contractor will be responsible to satisfy all transportation and disposal requirements and provide the Navy with all disposal documentation.

Traffic Control Plan. The EMAC Contractor shall submit a Traffic Control Plan as part of the Work Plan. The Traffic Control Plan shall present details about travel routes within NSA Crane and describe compliance with security inspection requirements and to minimize interruptions to facility operations. The EMAC contractor vehicles must travel on the roads and use the weighing facilities shown on Figure 4-5. The Traffic Control Plan must function in accordance with the Access and Security requirements and the Traffic and Entry Plan. As shown on Figure 4-5, access to NSA Crane shall be through the Crane Gate (Gate house No. 4) in the northwest. The EMAC contractor is not permitted to travel within restricted areas of the facility. All waste hauling vehicles will be weighed upon arrival and at time of departure using the certified weight scale located at the Defense Reutilization and Marketing Office (DRMO) (Building 1940). The DRMO scale is operated between the hours of 7 am to 3 pm, Monday through Friday, and weight tickets are available.

Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan must identify erosion and sediment control devices that will be used on-site. Because the disturbed area is relatively small (expected to be less than 0.1 acres) and the minimum disturbed area for a permit is 1 acre, formal approval of an erosion and sediment control plan in accordance with the Indiana Storm Water Quality Manual (Indiana Department of Environmental Management [IDEM] Manual) is not required.

3.1.2 Site-Specific Health and Safety Plan (SSHSP) and Activity Hazard Analysis

The SSHSP must conform to the requirements set forth by OSHA and 29 CFR 1910.120 (HAZWOPER), and must address specific anticipated site activities. The SSHSP shall include copies of all 40 Hour 29 CFR 1910.120 Employee Training Certificates for all Contractor employees scheduled to be on site. The plan shall also include a letter documenting that each employee has been medically cleared. A copy of each EMAC Contractor employee's fit test shall be kept on site. Activity Hazard Analysis must address

details of the work identified in the Work Plan and discuss the construction phases which require significant or additional activity hazard analysis.

3.1.3 Project Quality Assurance / Quality Control (QA/QC) Plan

The QA/QC Plan shall address the integration of quality into the project. At a minimum it will describe the process the EMAC contractor will use to locate and control the limits of excavation.

3.2 Facility-Specific Permits

The EMAC contractor shall obtain all required permits, including but not limited to the following:

- Safety & Building Availability Permit
- Digging Permit
- Hazards of Electromagnetic Radiation to Ordnance (HERO) (approval for portable radios)

3.3 Submittals during Construction

The EMAC contractor must submit the following documents during construction:

- Field work reports in accordance with EMAC Basic Contract.
- Erosion and Sediment Control installation and inspection logs.
- Copies of NSA Crane specific permits.
- Site plan showing limits of work areas. The site plan shall be stamped by a licensed surveyor.
- Certification and analytical results for backfill material. A minimum of one sample per borrow source is required and must be submitted and approved before material can be brought on-site.
- Waste profiles, waste characterization results, and any waste disposal facility pre-approval or approval documentation.
- Work Site Decontamination Certificates (verification that all vehicles equipment and containers were properly decontaminated prior to leaving the work site).
- Disposal Site Decontamination Certificates (verification that vehicles and containers were decontaminated prior to leaving the disposal facility).
- Shipment Manifests (manifests and other documents required to ship waste).
- Delivery and Disposal Certificates (verification that waste was received and disposed at identified disposal facility).
- Decontamination Log.

The EMAC contractor shall compile the above documentation in a Construction Completion Report and provide it to the Navy. The EMAC contractor shall provide the Navy, or their representative, all documentation within 30 days of demobilization from the site.

4.0 ON-SITE PERSONNEL REQUIREMENTS

All EMAC Contractor personnel working on-site must have completed the 40-hour HAZWOPER training under 29 CFR 1910.120 (e) and have current annual 8-hour refresher training. In addition, the following key personnel shall perform the roles and meet specific requirements as described herein.

- Site Superintendent
- Project Quality Control Manager
- Site Health and Safety Specialist

Site Superintendent. The Site Superintendent shall have responsibility and authority to direct work performed. The Site Superintendent shall be responsible for the management and execution of all site activities in accordance with these Supplemental Specifications, approved Work Plan, and all Federal, State, and local laws and regulations. The Site Superintendent may not also serve as the Project Quality Control (QC) Manager or Site Health and Safety Specialist (SHSS). The Site Superintendent shall have, as a minimum, the following qualifications:

- A minimum of 6 years site superintendent experience.
- A minimum of 3 years experience on hazardous, toxic, and radioactive waste (HTRW) projects.
- Familiar with the requirements of the U.S. Army Corps of Engineers Safety and Health Requirements (EM 385-1-1).
- Experience in the areas of hazard identification and safety compliance.

Project Quality Control Manager. The Project QC Manager who shall assist and represent the QC Program Manager in continued implementation and enforcement of the approved Project QC Plan. The QC Program Manager or Project QC Manager shall be physically present at the project site whenever work is in progress. The Project QC Manager may also serve as the SHSS, if qualified. The Project QC Manager shall have, as a minimum, the following qualifications:

- A minimum 2 years experience as a Project QC Manager.

- A minimum of 10 years combined experience in the following positions: project superintendent, QC manager, project manager, project engineer or construction manager on similar size and type of construction contracts that included the major trades that are part of this IM.

- Alternatively, the above 10 years combined experience requirement may be satisfied by a professional engineer registered in the State of Indiana that has at least 2 years experience as a Project QC Manager.

- Familiarity with the requirements of the U.S. Army Corps of Engineers Safety and Health Requirements (EM 385-1-1).

- Experience in the areas of hazard identification and safety compliance.

Site Health and Safety Specialist. The SHSS shall assist and represent the EMAC contractor's Health and Safety (H/S) Manager in continued implementation and enforcement of the approved SSHSP. The SHSS shall have the on-site responsibility and authority to modify and stop work, or remove personnel from the site if working conditions change which may affect on-site and off-site health and safety. The SHSS shall be physically present at the project site at all times. The SHSS may be dual hatted with the Project QC Manager. The SHSS shall have, as a minimum, the following qualifications:

- A minimum of 5 years safety work experience on similar projects.
- A 30-hour OSHA construction safety class or equivalent within the last 5 years.
- An average of at least 24 hours of formal safety training each year for the last 5 years.
- Competent person status for at least the following:
  - Confined Space Entry
  - Health hazard recognition, evaluation and control of chemical, physical and biological agents
  - Personal protective equipment and clothing to include selection, use, and maintenance

- First aid and cardiopulmonary resuscitation (CPR) qualified.

5.0 GENERAL REQUIREMENTS

This project is subject to Federal, State, and local regulatory agency inspections and review for compliance with environmental laws and regulations. The EMAC contractor shall fully cooperate with any representative from any Federal, State, or local regulatory agency who may visit the job site and shall provide immediate notification to the Officer in Charge of Construction (OICC), who shall accompany them on any subsequent site inspections. The EMAC contractor shall complete, maintain, and make available to the OICC, Facility, or regulatory agency personnel all documentation relating to environmental compliance under applicable Federal, State, and local laws and regulations. The EMAC contractor shall immediately notify the OICC if a Notice of Violation, Notice of Deficiency, or similar regulatory notice is issued to the EMAC contractor.

The EMAC Contractor shall be responsible for all damages to persons or property resulting from EMAC contractor fault or negligence as well as for the payment of any civil fines or penalties which may be assessed by any Federal, State, or local regulatory agency as a result of the EMAC contractor's or any EMAC Contractor's violation of an applicable Federal, State, or local environmental law or regulation. Should a Notice of Violation, Notice of Noncompliance, Notice of Deficiency, or similar regulatory agency notice be issued to the Navy or Facility owner/operator on account of the actions or inactions of the EMAC contractor or one of its subcontractors in the performance of work under this contract, the EMAC contractor shall fully cooperate with the Navy in defending against regulatory assessment of any civil fines or penalties arising out of such actions or inactions.

After approval of the EMAC Contractor's Work Plan and before commencement of work the EMAC contractor shall submit to the OICC the required certifications. As requested by the OICC, the Navy Representative for this project may review and provide surveillance for the OICC to determine if EMAC contractor's submittals comply with the contract requirements.

The EMAC contractor shall be required to commence work on the approved EMAC contractor's Work Plan within 5 calendar days after receiving the notice to proceed and to prosecute the work diligently after receiving the notice to proceed.

NSA Crane will remain in operation during the entire construction period. The EMAC contractor shall schedule the work as to cause the least amount of interference with the Facility. Work schedules shall be subject to the approval of the OICC. Permission to interrupt Facility road services shall be requested in writing a minimum of 15 calendar days prior to the desired date of interruption. The OICC shall be notified 48 hours prior to starting demolition and/or excavation activities.

Regular work hours shall consist of an 8-1/2 hour daily period established by the OICC, Monday through Friday, excluding Government holidays. The EMAC contractor should assume an 8-1/2 hour daily period. Working outside of the 8-1/2 hour daily period will require approval by the OICC. Work hours shall be established during the pre-IMWP implementation conference.

On-site storage, laydown, material handling, and decontamination activities shall be limited to areas approved by the OICC.

During the progress of construction activities, the work area and adjacent areas shall be kept clean and free of rubbish, surplus materials, and unneeded construction equipment. No material or debris shall be allowed to flow or wash into watercourses, ditches, gutters, drains, or pipes. Upon completion of the work, the EMAC contractor shall sweep paved areas and rake clean landscaped areas, and remove waste and surplus materials, rubbish, and construction facilities from the site.

5.1 Work Restrictions

EMAC contractor personnel employed at the Facility shall become familiar with and obey Facility regulations and keep within the limits of the work and avenues of ingress and egress as directed. EMAC contractor and subcontractor personnel shall not enter any restricted areas unless required to do so and until cleared for such entry. The EMAC contractor's equipment shall be clearly marked for identification.

The EMAC contractor shall indicate on the construction schedule any activity that could potentially interrupt Facility operations. The EMAC contractor shall notify the OICC in writing 15 calendar days prior to the required interruption.

5.2 Facilities and Services

The EMAC contractor shall provide utility permits in accordance with the Basic Contract.

NSA Crane shall make all reasonably required amounts of utilities available to the EMAC Contractor from existing outlets and supplies, as indicated. The amount of each utility service consumed shall be charged to or paid for by the EMAC Contractor at the prevailing rates charged to NSA Crane or shall be furnished at no charge at the discretion of the Facility. The EMAC Contractor shall carefully conserve any utilities furnished.

The location(s) at which NSA Crane will deliver such utilities or services and the quantity available will be identified by NSA Crane.

The EMAC contractor, at its expense and in a workmanlike manner satisfactory to the OICC, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Navy, the EMAC contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

Electric – Electrical power available: primary voltage is 2400 volt, 3 phase, 3 wire, 60 cycle AC; secondary voltages may be 120/208 or 120/240 volts. Final taps and tie-ins to the NSA Crane utility grid will be made by the NSA Crane electric shop.

Potable Water – Potable water shall be made available to the EMAC contractor at the discretion of the Facility. The EMAC contractor shall provide backflow preventer devices on connections to potable water supplies. Under no circumstances will taps to NSA Crane fire hydrants be allowed for obtaining water. The OICC shall identify available potable water supply locations.

Telephone – Facility telephone service is not available to the EMAC contractor.

Sanitary Facilities – The EMAC contractor shall provide temporary sanitary facilities for use by all personnel in accordance with the Basic Contract.

Municipal Waste – Facility municipal waste storage and disposal is available to the EMAC contractor. The disposal of the basin residue and concrete rubble will be to an offsite facility.

Sewer – Wastewater resulting from personnel and equipment decontamination, excavation dewatering, and water collected in the materials handling pad(s) may be discharged to the NSA Crane wastewater treatment system, subject to the approval of NSA Crane based on characterization of the water to be discharged.

5.3 Quality Control

Approval of the QC Plan is required prior to the start of construction. The plan shall include the process to locate and verify the limits of excavation. The OICC reserves the right to require changes in the QC Plan and operations as necessary to ensure the specified quality of work. The OICC reserves the right to interview the QC Manager at any time in order to verify their submitted qualifications.

The OICC shall be notified in writing of any proposed changes to the QC Plan, at a minimum of 7 calendar days prior to the implementation of the proposed change. Proposed changes must be approved by the OICC.

Combined Contractor Production Report/Contractor Quality Control Report (CPR/CQCR) is required for each day that work is performed. CPR/CQCRs are to be prepared, signed, and dated by the Project QC Manager.

5.4 Safety and Occupational Health Requirements

The SHSS and EMAC contractor representatives who have a responsibility or significant role in accident prevention shall attend the pre-IMWP implementation conference. The purpose of the conference is for the EMAC contractor and the OICC to become acquainted and explain the functions and operating procedures of their respective organizations and to reach mutual understanding relative to the administration of the overall project before the initiation of work. The EMAC contractor shall discuss the details of the work identified in the approved EMAC contractor's Work Plan and discuss which construction phases will require significant or additional activity hazard analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of additional hazard analysis shall be established to preclude project delays. Lastly, deficiencies in the submitted accident prevention report will be brought to the attention of the EMAC contractor at the conference. The EMAC contractor shall revise the plan to correct deficiencies and resubmit the plan for acceptance.

New project employees (prime or subcontractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

If unforeseen materials hazardous to human health are encountered during operations, then that portion of the work shall be stopped and the OICC shall be notified immediately. Within 14 days, the Navy will determine if the material is hazardous. If the material is not hazardous or poses no danger, the OICC will direct the EMAC contractor to proceed without change. If the material is determined to be hazardous or to pose danger, and handling of the material is necessary to accomplish the work, the Contracting Officer will issue modifications to the proposed work.

Equipment shall be operated by designated qualified operators. Proof of qualifications shall be kept on the project site for review. Manufacturer's specifications or owner's manuals for the equipment shall be on site and reviewed for additional safety precautions or requirements. Such additional safety precautions or requirements shall be incorporated into the activity hazard analysis. Mechanized equipment shall be inspected in accordance with the manufacturer's recommendations for safe operations by a competent person prior to being placed into use. Daily checks or tests shall be conducted and documented on mechanized equipment by designated competent persons.

5.6 Environmental Controls

The EMAC contractor must prepare and implement an Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan shall describe the location and description of all erosion and sediment control measures, a sequence of construction to be followed, graphic details of all erosion and sediment control measures to be used, and an approval sign-off block containing the names of the Facility and EMAC contractor contacts, whose signatures indicate plan acceptance/approval.

The EMAC contractor shall strictly follow the Erosion and Sediment Control Plan and maintain all measures used during construction. Modifications to the Erosion and Sediment Control Plan shall be submitted to the OICC for approval. No modifications to the Erosion and Sediment Control Plan will be allowed until these changes have been approved by the OICC and three copies of the approved modifications have been submitted to the OICC.

5.7 Transportation and Disposal of Basin/Sump Residues and Concrete Debris/Rubble

The EMAC contractor shall be solely responsible for complying with all Federal, State, and local requirements for decontamination of vehicles, equipment, and containers and shall bear all responsibility and cost for any noncompliance. In addition to these requirements, the EMAC contractor shall perform the following:

- Visually inspect all vehicles, equipment, and containers leaving the work site for proper decontamination.

- Prepare and maintain a written decontamination log.

The EMAC contractor shall be solely responsible for complying with all Federal, State, and local requirements for transporting contaminated materials through the applicable jurisdictions and shall bear all responsibility and cost for any noncompliance. In addition to these requirements, the EMAC contractor shall perform the following:

- Inspect and document all vehicles and containers for proper operation and covering.
- Inspect all vehicles and containers for proper markings, manifest documents, and other requirements for waste shipment.

All contaminated materials removed from the site shall be disposed in a disposal facility permitted to accept such material and with the approval of the OICC.

The EMAC contractor shall properly dispose of investigation derived waste, personnel protective equipment, and miscellaneous wastes associated with implementation of the IMWP, including sampling and analysis of basin and sump residues and liquid wastes.

6.0 EMAC CONTRACTOR SCOPE-OF-WORK

The EMAC Contractor shall be responsible for all interim measures as described as follows:

6.1 Planning and Permitting

The EMAC contractor shall prepare planning documents and obtain necessary site permits prior to performing the work. The planning documents will include:

- Work Plan
- Site Specific Health and Safety Plan (SSHSP) and Activity Hazard Analysis (AHA)
- Project Quality Control Plan (QCP)

The EMAC contractor shall obtain all required permits, including but not limited to the following:

- Safety & Building Availability Permit
- Digging Permit
- Hazards of Electromagnetic Radiation to Ordnance (HERO) (approval for portable radios)

6.2 Mobilization

Mobilization shall include all activities and associated costs for transportation of personnel, equipment, and operating supplies to the site and establishment of offices, buildings, and other necessary general facilities for the EMAC contractor's operations at the site.

The EMAC contractor must mobilize all personnel and equipment in accordance with the approved Traffic Plan described in the Work Plan (Section 3.0 of this SOW).

6.3 Site Preparation

The EMAC contractor shall set up entrances and exits to the Work Area, decontamination areas, and a staging area in a manner that minimizes disturbance of the area. The entrance and exit location will be the gate entrance in the southwest corner of the site. The EMAC Contractor will identify a proposed location for staging equipment; this area should be selected to minimize disturbance. The entrances, exits, and staging areas must be approved by the Navy prior to mobilization.

Temporary decontamination pads will be set up to clean equipment used to remove basin residuals, excavate and demolish the concrete basin/sump structures, and to load and transport the basin residue and concrete debris/rubble. The pads must be located within 100 yards of the basin removal areas. The pad will be sized to accommodate all the equipment to be used at the site and will be constructed in a

manner that contains all the contaminated materials removed from equipment and the liquids used to clean the equipment. Contaminated materials removed from the equipment will be disposed offsite with the basin residue and concrete debris/rubble. Care will be taken to keep off-road transport equipment clean to minimize the spread of potential contamination to areas adjacent to the basins or the temporary roads.

The staging area must be designed and built to control runoff and minimize erosion during the period when materials are staged. Care must be taken to avoid and reduce damage to the area. Many areas of the site have thin soil; disturbed and damaged areas shall be repaired and restored to original condition at completion of the project.

The EMAC contractor shall install and maintain fencing to secure the work area for the duration of the project. Access shall be controlled during both work and non-work hours. The EMAC Contractor shall remove fencing at the completion of the project.

The EMAC contractor shall establish a “clean” area on a portion of the site using imported fill or stone where excavation work is not anticipated to take place. If necessary, a haul road may be established on site using imported fill or stone to reduce the need for decontamination of vehicles as they exit the site.

6.4 Erosion and Sediment Control

Erosion and sediment control measures shall be implemented to reduce or eliminate erosion and sedimentation of soil. The site slopes to the south and southeast. The EMAC Contractor shall construct erosion control at any location necessary to prevent runoff or erosion of soil or debris from any excavated soil, stockpiled debris, or work surfaces. Erosion control measures must be inspected and repaired daily. After the Erosion and Sediment Control Plan is approved, no changes can be made without the approval of Navy.

Based on the type of field activities being implemented during the SWMU 27 interim measures work, the proposed erosion and sediment control measures must include the following, at a minimum:

- Silt fence – A silt fence shall be installed downgradient from excavation area
- Gravel Construction Entrance - Placed as a controlled site entrance to reduce the amount of sediment transported by construction vehicles onto facility and public roads.
- Surface Stabilization - Permanent seeding shall be used to stabilize disturbed areas.

The EMAC Contractor shall prepare an Erosion and Sediment Control Plan. The construction, implementation, and maintenance of these erosion and sediment control devices and permanent seeding will be in accordance with the IDEM Manual. Dust control must be addressed in the EMAC Contractor’s Work Plan.

In general, all erosion and sediment control measures will be checked daily and after each runoff-producing rainfall event. Any required repairs will be made immediately. The following items will be checked during each inspection:

- Silt fence will be checked for undermining or deterioration of the fabric. Sediment will be removed when the level of sediment causes bulging or reaches one-half of the fabric height.
- Gravel construction entrance will be maintained to minimize tracking of sediment onto facility or public roads.
- Seeded areas will be checked regularly to ensure that a good growth of vegetation is maintained, and these areas will be fertilized and reseeded, as needed.
- The fuel and lubricant materials storage area will be checked to ensure that stored containers are not leaking and that the lining system is functioning properly.

All erosion and sediment control devices will be inspected and maintained until the Navy has formally accepted the permanent stabilization of the disturbed areas. The EMAC contractor will maintain a logbook of all erosion and sediment control device inspections and maintenance. This logbook will be available at the site at all times for inspection by Navy.

Erosion control structures shall be adequate to sustain weather damage and degradation, and shall be maintained by the EMAC contractor until site restoration has provided new vegetation or backfill adequate to stabilize remaining soils in-place on the surface of the ground which has been worked by the contractor. Completion of stabilization will be determined by the Navy. Upon completion, the EMAC contractor will remove temporary erosion and sediment control structures.

6.5 Settling Basin/Sump Residue Removal and Basin Removal/Excavation

This work will consist of removing basin/sump residues, excavating, demolishing, and removing concrete basin/sump structures, and loading residues and concrete debris for transport. The concrete settling basins/sumps proposed for removal are shown on Figure 3-1, and relevant dimensional data are presented in Table 4-1.

Tetra Tech will mark the eight settling basins/sumps to be removed during this IM in the field prior to the removal action. The EMAC contractor will be responsible to contain their operations within the required limits. The actual method to remove basin/sump residues and demolish and remove concrete basin/sump structures will be determined by the EMAC contractor and described in the Work Plan. The basin residue and concrete rubble removals will commence upon final approval and/or scheduling with the disposal facility. This work will include dust control, water management, and compliance with OSHA requirements.

6.6 Transportation and Offsite Disposal of Basin/Sump Residues and Concrete Debris/Rubble

The EMAC contractor shall provide all transportation and disposal of contaminated basin/sump residues and concrete debris/rubble as described in the Work Plan.

The EMAC contractor shall provide an appropriate number of off-site disposal trucks during shipping periods in accordance with the Traffic Plan described in the Work Plan. Disposal vehicles shall only arrive and leave the site during site working hours (as described in the Traffic Plan) to comply with security inspection requirements and to minimize interruptions to Facility operations. All waste-hauling vehicles will be weighed upon arrival and at time of departure using the certified weight scale located at the Defense Reutilization and Marketing Office (DRMO) - Building 1940. The DRMO scale is operated between the hours of 7 am to 3 pm, Monday through Friday, and weight tickets are available. The DRMO scale is the preferred scale for the EMAC contractor's use. The EMAC contractor shall adhere to haul routes as described in the approved Traffic Plan.

The EMAC contractor shall ensure that all off-site disposal trucks are equipped with appropriate appurtenances (e.g., liners and tarps) in acceptable working condition. All loads must be covered prior to departure. The EMAC contractor shall ensure that all liners and covers are properly secured and that the vehicles are not leaking or releasing any waste constituents at any time.

Drivers of the off-site disposal trucks must not come in physical contact with the contaminated material while covering the load or preparing it for transport. The EMAC contractor shall load off-site disposal trucks in an area designated in the Work Plan.

The EMAC contractor shall be responsible for providing and carrying waste manifests, bills of lading, placards, labeling, markings, licensing, and any other transportation/disposal documentation as required by federal, state, and local regulations. The Navy will supply an EPA Generator Identification number for this documentation. The EMAC contractor shall supply and prepare all transportation documentation, including bills of lading, manifests, etc. for approval and signature by the Navy. A representative of the Navy will sign completed shipping manifests and bills of lading.

The EMAC contractor shall provide the Navy a 14 day notice prior to mobilization to the site and a minimum of 48 hour notice (2 business days) prior to shipping waste materials from the site.

6.7 Site Restoration

Upon completion of work, the EMAC contractor shall restore all excavated areas on-site and all disturbed areas.

6.7.1 Backfill Materials and Testing

Excavation areas will be backfilled to pre-construction grades. The backfill soil obtained from a borrow source shall have properties similar to the native SWMU 27 soil. The backfill soil (common fill and topsoil) will come from sources where due diligence shows no evidence of a release of a regulated substance has occurred (i.e., clean fill). A certification must be provided regarding the origin of the backfill soil, including a statement that, to the best of the provider's knowledge, the backfill soil has not been contaminated through the release of regulated substances. The backfill soil will be subject to analytical testing to assure that the material satisfies the following requirements:

- Total Petroleum Hydrocarbon (TPH), diesel range organics (DRO), USEPA Method SW-846 8015M DRO - less than 1 mg/kg.
- TPH, gasoline range organics (GRO), USEPA Method SW-846 8015M GRO - less than 1 mg/kg.
- Sum of benzene, toluene, ethylbenzene, and xylenes, USEPA Method SW-846 5030/8021 - less than 1 mg/kg.
- Total polychlorinated biphenyls (PCBs), USEPA method SW-846 8082 – Less than 1 mg/kg
- 4,4'-DDD, USEPA method SW-846 8081 - Less than 3.2 µg/kg
- 4,4'-DDE, USEPA method SW-8468081 - Less than 3.2 µg/kg
- 4,4'-DDT, USEPA method SW-846 8081 – Less than 3.2 µg/kg
- Dieldrin, USEPA EPA method SW-846 8081 – Less than 3.2 µg/kg
- Heptachlor, USEPA method SW-846 8081) – Less than 1.5 µg/kg
- Alpha-chlordane, USEPA method SW-846 8081 – Less than 1.5 µg/kg
- Gamma-chlordane, USEPA method SW-846 8081 – Less than 1.5 µg/kg
- Lead, USEPA Method SW-846 6010B or 6020 – less than 400 mg/kg (US EPA Residential Screen Level and IDEM Direct Contact Screening Level)

6.7.2 Backfill and Grading

Two types of backfill material are required for site restoration; common fill and topsoil. The physical characteristics required for each type of backfill material are described below.

Common Fill. Common fill will be used to backfill all excavation areas to a depth of 6 inches below final grade. This material will be placed into the excavation in maximum 6-inch-thick lifts and compacted to 90% of standard proctor density and compacted by track-walking across 100 percent of the backfilled area with track-type equipment, using the bucket of a backhoe, or other Navy approved method. Common fill will meet the following physical characteristics:

- American Society for Testing and Materials (ASTM) D 2487, group symbols GW, GP, GM, SW, SP, or SM.
- ASTM D 4318, liquid limit, 35 maximum.
- ASTM D 4318, plasticity index, 12 maximum.

- Maximum of 25 percent by weight passing ASTM D 1140, No. 200 sieve.
- Maximum particle size of 1 inch.

Topsoil. The uppermost 6 inches of backfill used to establish final grades will be medium-textured loam suitable for establishing vegetation.

Materials specifications and test results shall be submitted to the Navy.

The EMAC Contractor shall provide all permits, tests, labor, materials, and equipment to restore the excavation area to the adjoining grade. The scope includes, but is not limited to the following:

- Following placement of common fill, place topsoil in a 6-inch thick minimum layer to finished grade.
- Grade topsoil to a smooth surface that will allow proper drainage, and will prevent ponding of surface water runoff.
- Restore areas that have been disturbed and damaged (ruts or scarring in the soil) during the work to original condition.
- Revegetate topsoil areas in accordance with Soil Preparation and Seeding
- Protect revegetated areas from pedestrian and vehicular traffic using signs and/or temporary barriers.
- Maintain or install new appropriate erosion and sediment control measures for the soil excavation area and disturbed areas.

6.7.3 Soil Preparation and Seeding

The disturbed areas will be restored/stabilized using appropriate topsoil and permanent seeding. Topsoil shall be spread and dressed to finished grade leaving no irregularities or depressions and so as to promote positive drainage. Revegetation shall occur within 24 hours of topsoil placement. Permanent vegetation activities include site/seed bed preparation, seeding, and in conformance with Chapter 7 of the IDEM Manual.

The seed mixture recommended for use at SWMU 27 will be a standard Indiana seed mixture for open and disturbed areas. The seed mixture includes perennial ryegrass and tall fescue. Planting rates and optimum soil pH for this mixture are presented in the Handbook. Following seeding, the seeded areas will be covered with temporary erosion control matting to provide additional stabilization until vegetation is established.

Erosion and sediment control devices will remain in place until permanent stabilization is established over the disturbed areas. Erosion and sediment control devices will not be removed by the EMAC contractor until directed by the Navy.

7.0 SCHEDULE

The EMAC contractor shall include a schedule with the Work Plan. The schedule should start with a notification to proceed and extend through project completion and demobilization. It shall include the project kickoff meeting, deliverables, project milestones, and major work items.

The project kickoff meeting must occur prior to mobilization. The meeting will include the site Superintendent, a Navy representative and others. The EMAC contractor must provide a minimum of 7 calendar days notice to the Navy prior to the kickoff meeting.

The EMAC contractor shall be required to commence work upon the approval of the Work Plan and within 7 calendar days after receiving the notice to proceed, and give the Navy a two week notice prior to mobilization to the site. The EMAC contractor can execute the work diligently after receiving the notice to proceed.

NSA Crane will remain in operation during the entire construction period. The EMAC contractor shall schedule the work to cause the least amount of interference with the Facility.

Completion date for the project on the site is to be determined. Completion will require final stabilization of disturbed areas and removal of all EMAC contractor facilities and equipment from the site.